California Climate & Agriculture Network

California Agriculture in a Changing Climate: Policy Recommendations for the Next California Governor

September 2010

CalCAN
California Climate & Agriculture Network

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Executive Summary

Dependent on weather and the availability of natural resources, California agriculture is uniquely vulnerable to climate change. In a state where water is already scarce, climate change scenarios predict that water supplies will become increasingly constrained, threatening severe shortages in the coming decades and limiting a fundamental resource for the state's agricultural industry. Climate change scenarios also predict changing weed, disease and pest pressures, loss of winter chill hours for fruit and nut tree crops, and changing intensity and number of storms. California agriculture may face unprecedented loses in the coming decades.

Much is at stake. California agriculture is one of the most diverse and productive agricultural systems in the United States. The fifth largest producer of food globally, California's 75,000 ranches and farms collectively top $37 billion in annual revenues. More than 400 agricultural products are grown by the state's farmers and ranchers.

Despite the significance of agriculture to California and the industry's unique vulnerability to the effects of climate change, the state of California does not have a plan or the related resources to maintain a viable agriculture in the face of a changing climate. Research, technical assistance and financial incentives are sorely needed to support farming systems that reduce greenhouse gas emissions, produce on-farm renewable energy, sequester atmospheric carbon, and support agriculture's adaptation to a changing climate.

Below we summarize our policy recommendations for the next Governor of California, whose leadership will be crucial in supporting a sustainable California agriculture for years to come.

About Us: The California Climate & Agriculture Network

The California Climate & Agriculture Network (CalCAN) is a collaboration of the state's leading sustainable agriculture organizations and farmer allies, advocating for policy solutions at the nexus of climate change and agriculture. CalCAN advocates for policies to increase resources for California's farmers and ranchers to implement innovative on-farm conservation practices that provide climate benefits.

Policy Recommendations Summary

Implementation of the Global Warming Solutions Act: Achieving Climate Benefits from California Agriculture

1. Working with CARB and the legislature, invest a portion of revenue from the state's cap and trade program in research & demonstration, technical assistance and financial incentives for farmers and ranchers to adopt practices, technologies and farming systems that reduce GHG emissions and sequester carbon while providing environmental co-benefits, such as improved air quality, water conservation and increased wildlife habitat.

2. Form an advisory committee, made up of California researchers, agricultural producers, processors, nonprofit representatives and state and federal agency representatives with expertise in climate change and agriculture issues, to oversee the implementation of the climate change and agriculture grants program as described above.

California Climate Adaptation Program: Supporting a Resilient California Agriculture

1. Create an Office of Climate Change Adaptation, with an Agriculture Division, to coordinate

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state adaptation activities. House the Office either in the Natural Resources Agency or the Governor's office.

2. Use AB 32 revenue, state bond or federal funding to establish the Office of Climate Change Adaptation. The Office should coordinate with CARB and CDFA to provide research, technical assistance and cost-sharing for farmers and ranchers to adopt practices that increase agriculture's resilience to a changing climate, especially decreased water supplies.

On-Farm Renewable Energy: Achieving California's Renewable Energy Future

1. Work with the legislature and CPUC to establish a robust feed-in tariff (FIT) policy to support the development of wholesale distributed generation (WDG) projects on working farm and ranchland.

2. Streamline the state's FIT program application process.

3. Revise Public Utilities Code Section 2827 to include all forms of renewable energy generation in the Net Energy Metering (NEM) program, including but not limited to solar, wind, biogas, and biomass.

4. Take up as a priority for the administration working with stakeholders to develop policy and technological solutions to the operation of biogas digesters and biomass facilities in the state, while maintaining a strong commitment to the improvement of air quality.

Farmland Protection: The Climate Benefits of Land Preservation

1. Restore subvention payments for the Williamson Act in the 2011-12 budget and establish a review of the Williamson Act and other possible farmland protection tools (see recommendation 3).

2. Work with the legislature to develop a statewide farmland mitigation fund, funded by developers of farmland. The fund would provide funding for a diversity of farmland protection tools.

3. Convene a Governor's task force to develop policy recommendations on Williamson Act reforms and a set of policy recommendations beyond Williamson Act to protect California farmland and rangeland.

Water Conservation: Innovations in Farm and Regional Approaches to Conserving Water

1. Develop incentives, including cost-sharing and technical assistance for farmers and ranchers to expand the use and diversity of water-conserving agricultural practices. Coordinate these activities through the Office of Climate Change Adaptation (see Climate Adaptation brief).

Immigration Reform: Supporting California Farmworkers

In the absence of federal action to reform immigration laws, the State of California should take interim actions, as described below, that are within its jurisdiction to ease the burdens on farm laborers and families and facilitate their contribution to California's agricultural industry.

1. Establish a temporary California driver's license and/or identification card for undocumented farm workers working in California.

2. Eliminate the 30-day mandatory impoundment for unlicensed drivers.

3. Take up as a priority for the administration state agency coordination and resources to improve current conditions for California farmworkers. ■

I. Introduction

Dependent on weather and the availability of natural resources, California agriculture is uniquely vulnerable to climate change. In a state where water is already scarce, climate change scenarios predict that water supplies will become increasingly constrained, threatening severe shortages in the coming decades and limiting a fundamental resource for the state's agricultural industry[1]. Climate change scenarios also predict changing weed, disease and pest pressures, loss of winter chill hours for fruit and nut tree crops, and changing intensity and number of storms[2]. California agriculture may face unprecedented losses in the coming decades.

Shortly after becoming Energy Secretary, Steven Chu said: "I don't think the American public has gripped in its gut what could happen (with climate change). We're looking at a scenario where there's no more agriculture in California[3]."

Much is at stake. California agriculture is one of the most diverse and productive agricultural systems in the United States. The fifth largest producer of food globally, California's 75,000 ranches and farms collectively top $37 billion in annual revenues. More than 400 agricultural products are grown by the state's farmers and ranchers[4].

To keep California agriculture viable in the coming decades, greenhouse gas (GHG) emissions must be reduced and the worst climate change impacts averted. Agriculture, which contributes 6 percent to the state's GHG emissions, can be part of the climate solution.

Sustainable Agriculture Solutions

By relying on ecological approaches to pest, soil and natural resource management, sustainable agriculture offers a climate friendly approach to farming by using fewer synthetic inputs and less fossil fuel than its conventional counterparts. Sustainable agricultural practices can also sequester atmospheric carbon by storing carbon in agricultural soils and woody biomass. Moreover, sustainable agriculture not only reduces GHG emissions, but can assist with climate change adaptation by increasing biological diversity, conserving natural resources; thus making agriculture more resilient in the face of a changing climate.

There is growing consumer and producer interest in sustainable food and farming. Consequently, sustainable agriculture is the fastest growing segment of the state's agricultural economy. As one measure of sustainable agriculture's successes, California leads the country in number of certified organic farms and ranches; from 2000 to 2010 the number of organic operations in the state increased from 900 to nearly 3,000.

Agriculture Policy Innovation Needed

California is a state known for its innovation in environmental policy. One notable example is the Global Warming Solutions Act of 2006 (AB 32), which has helped drive the expansion of the state's green technology industry.

In contrast, our state agricultural policies are behind the times. While other states have adopted innovative policies to provide conservation incentives for agriculture to move toward more sustainable farming systems (e.g. Wisconsin), dedicated research centers for climate friendly agricultural practices (e.g. Washington), and programs to support mid-scale, agricultural renewable energy development (e.g. Minnesota), California lags

[1] California Natural Resources Agency. 2009. California Climate Adaptation Strategy: Public Review Draft. Available at http://climatechange.ca.gov/adaptation/index.html
[2] Ibid; Jackson, L.E., F. Santos-Martin, A.D. Hollander, W.R. Horwath, R.E. Howitt, J.B. Kramer, A.T. O'Geen, B.S. Orlove, J.W. Six, S.K. Sokolow, D.A. Sumner, T.P. Tomich, and S.M. Wheeler. 2009. Potential for adaptation to climate change in an agricultural landscape in the Central Valley of California. California Energy Commission, PIER. CEC-500-2009-044-F.
[3] Tankersley, J. Feb. 9, 2009. California farms, vineyards in peril from warming, U.S. energy secretary warns. Los Angeles Times. http://articles.latimes.com/2009/feb/04/local/me-warming4
[4] California Department of Food and Agriculture. 2009. Agricultural Resource Directory 2008-2009: County Statistical Data. http://www.cdfa.ca.gov/Statistics/

behind. Most significantly, the state has not kept pace with the policy innovation that is required to meet the challenges of climate change for California agriculture.

The resources and infrastructure needed to support California agriculture to reduce GHG emissions and cope with a changing climate are sorely lacking. Policy is needed to drive progress in three areas:

1. **Research.** Much of the research on agricultural practices that help with climate change mitigation and adaptation has taken place in the Midwest. California specific agricultural research is needed that takes a systems approach to understanding the opportunities within agriculture to provide climate benefits.

2. **Technical assistance.** To translate research findings into on-the-ground changes, technical assistance for farmers and ranchers is crucial. However, funding for the state's once robust system of on-farm advisors — University of California Cooperative Extension Service — has been cut significantly in recent years (from 500 advisors in the 1990s to 225 advisors today), leaving California producers with a lack of adequate access to university research and technical expertise. Funding for technical assistance must be restored, with an emphasis on meeting the challenges of climate change for California agriculture.

3. **Financial incentives.** Financial incentives are needed to support agricultural producers in the use of climate change mitigation and adaptation activities. Incentives have proven to be powerful tools in supporting the use of agricultural conservation practices, but funding levels are inadequate. Of the farmers and ranchers in California who applied for USDA conservation program funding in 2009, 70 percent were denied participation in the programs because of a lack of federal funding. The state of California must help fill the gap if we are to realize the changes on the ground to conserve water, sequester carbon and make California agriculture more resilient in the face of climate change.

Policy Recommendations

Here we review our policy recommendations for the next Governor of California, whose leadership will be crucial in supporting a sustainable California agriculture for years to come.

The recommendations fall into three main areas:

I. Climate Change Mitigation and Adaptation Resources
II. Protecting Land and Water Resources
III. Healthy Rural Communities

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CalCAN advocates for policies to increase resources for technical assistance, research, and financial incentives for California's farmers and ranchers to implement innovative on-farm conservation practices that provide climate and other environmental benefits.

Please see: www.calclimateag.org

II. California Agriculture: Climate Change Mitigation and Adaptation

A. Implementation of the Global Warming Solutions Act of 2006(AB 32): Realizing Climate Benefits from California Agriculture

Recommendations

Administrative/Legislative Action:

1. Working with the California Air Resources Board (CARB) and the legislature, invest a portion of revenue from the state's cap and trade program in research and demonstration, technical assistance and financial incentives for agricultural producers to adopt practices, technologies and farming systems that reduce GHG emissions and sequester carbon while providing environmental co-benefits such as improved air quality, water conservation and enhanced wildlife habitat.

Administrative Action:

2. Form an advisory committee, comprised of California researchers, agricultural producers, processors, nonprofit representatives and state and federal agency representatives with expertise in climate change and agriculture issues, to oversee the implementation of the climate change and agriculture grants program as described above.

Background in Brief

Investments in research, technical assistance and financial incentives are needed to help meet the objectives of AB 32, reduce GHG emissions in agriculture, sequester atmospheric carbon, and keep California farmers on the land. As an example of this need, CARB, the California Energy Commission (CEC) and the California Department of Food and Agriculture (CDFA) are currently funding research to establish baseline nitrous oxide emissions from agriculture, but currently lack funding to research best management practices that may reduce these emissions.

In 2008, as part of the AB 32 Scoping Plan, the interagency Agriculture Climate Action Team (AgCAT)[5] and the citizen-led Economic and Technology Advancement Advisory Committee (ETAAC)[6] reviewed agricultural practices that may reduce GHG emissions and sequester atmospheric carbon in soils. They found that with a variety of practices California agriculture could reduce GHG emissions between 9.1 to 16.7 million metric tons of CO_2 equivalent(MMTCOe).

Many of the mitigation practices identified by AgCAT and ETAAC may also provide additional environmental benefits such as improved air and water quality, water conservation and enhanced wildlife habitat.

AgCAT and ETAAC recommended funding additional research, technical assistance and financial incentives to achieve GHG emission reductions in California agriculture. The ETAAC report noted:

> While the carbon cycle returns the majority of this carbon to the atmosphere, sequestering a portion of this carbon or converting it into renewable energy, fuels or permanent products, would translate into a significant reduction of California's carbon footprint. Thus, the agricultural sector also offers the opportunity to reduce *(sic)* GHG emission reductions through the capture of carbon and/or production of renewable low-carbon fuels. Other specific farm-related GHG emission sources can also be controlled and mitigated. Yet a concerted research, development and demonstration effort and new regulatory incentives and programs will be needed to meet the GHG emission reduction goals in AB 32[7].

[5] Agriculture Climate Action Team. December 2008. Agriculture Sector Write-Up for Public Distribution. AB 32 Scoping Plan. http://climatechange.ca.gov/climate_action_team/reports/CAT_subgroup_reports/Ag_Sector_Summary_and_Analyses.pdf
[6] ETAAC. February 11, 2008. Recommendations of the Economic and Technology Advancement Advisory Committee (ETAAC). Final Report. A Report to the California Air Resources Board. Chair: Alan Lloyd Vice Chair: Bob Epstein. http://www.arb.ca.gov/cc/etaac/ETAACFinalReport2-11-08.pdf
[7] Ibid. Page 6-1.

In their final report, the Economic and Allocation Advisory Committee, comprised of climate change policy experts and economists, also recommended investing a portion of allowance revenue in biological carbon sequestration activities in agriculture and forestry[8].

These recommendations are echoed at the regional and national levels. The Western Climate Initiative Partners suggest that one of the public purposes of allowance revenue could be promoting emission reductions and sequestration in agriculture[9]. Nationally, federal climate legislation (Waxman-Markey in the House and Kerry-Lieberman in the Senate) would have created a new U.S. Department of Agriculture (USDA) conservation program to incentivize climate friendly agricultural practices.

While much attention has been focused on the possibility of future carbon markets to achieve GHG emission reductions in agriculture, we cannot rely on them as a sole solution. The marketplace lacks adequate funding for research to understand opportunities within California farming systems to achieve GHG emission reductions and carbon sequestration. Also, translating research findings into real opportunities for California agriculture to provide voluntary GHG reductions requires technical assistance from on-farm advisors. And, in some cases when transition costs may be high, financial incentives for farmers are essential. Allowance revenue can turn research into opportunities for agricultural activities to help meet the state's GHG targets while providing environmental co-benefits.

[8] EAAC. March 2010. Allocating Emissions Allowances Under a California Cap-and-Trade Program. See pages 33, 54 and 55. http://www.climatechange.ca.gov/eaac/documents/eaac_reports/2010-03-22_EAAC_Allocation_Report_Final.pdf
[9] AB 32 Scoping Plan. December 2008. Appendix D: September 23, 2008. WCI Design Recommendations (page 7).

B. California Climate Adaptation Program: Supporting a Resilient California Agriculture

Recommendations

Administrative Action:

1. Create an Office of Climate Change Adaptation, with an Agriculture Division, to coordinate state adaptation activities. House the Office either in the Natural Resources Agency or the Governor's office.

Budget Action:

2. Use AB 32 revenue, state bond or federal funding to establish the Office of Climate Change Adaptation. The Office should coordinate with CARB and CDFA to provide research, technical assistance and cost-sharing for farmers and ranchers to adopt practices that increase agriculture's resilience to a changing climate, especially decreased water supplies.

Background in Brief

As described in the state's 2009 Climate Change Adaptation Strategy Report[10], California is already experiencing the effects of climate change, including warming temperatures, a rise in sea levels, longer fire seasons and shifts in precipitation. Efforts to reduce GHG emissions and avoid the worst effects of climate change are needed, but they will not be enough to avoid all of the impacts of climate change.

Agriculture is one of the most vulnerable sectors of the state to climate change effects, especially to predicted water shortages in the years to come. Annual costs of nearly $200 million could be incurred by agriculture if water availability is reduced by 20 percent below current demand levels[11]. Decreased water availability could produce losses of up to $1,700 an acre[12]. A recent report by the Natural Resources Defense Council, using IPCC climate models, finds that fourteen states, including California, face "an extreme or high risk to water sustainability, or are likely to see limitations on water availability as demand exceeds supply by 2050[13]."

To ensure that agriculture remains a diverse and vibrant contributor to the economy, food security, and culture of California in the face of climate change, investments must be made using innovative policies and state and federal funding. However, the Adaptation Strategy Report failed to identify funding options for agriculture's needed climate change adaptation activities. Should Congress eventually pass climate change legislation, it may offer funding for state adaptation activities (both Waxman-Markey and Kerry-Lieberman bills would have developed adaptation funds for the states). However, California cannot wait for federal action and must move now to identify funding options for adaptation to prepare important sectors of the economy and our communities for the impacts of climate change.

An Office of Climate Change Adaptation can provide needed coordination of state adaptation activities and should include a strong focus on agriculture. Farmers and ranchers will need access to research, technical assistance and financing to support agricultural practices and technologies that allow them to cope with decreased water supplies, rising temperatures and new pest and disease pressures. The Office can coordinate with CARB and CDFA to ensure that needed resources are reaching the state's agricultural producers. Examples of this work include:

- Cost-share and technical assistance support for on-farm and regional water conservation activities that go beyond conveyance and dam construction (see the water section for details)
- Research funding for traditional plant breeding of heat-tolerant varieties for the state's specialty crops
- Research, technical assistance and financial incentives to support increased biological diversity of the state's agriculture to support its resilience to climate change.

[10] California Natural Resources Agency. 2009 California Climate Change Adaptation Strategy. http://www.climatechange.ca.gov/adaptation
[11] Medellin-Azuara, J., C.R. Connell, K. Madani, J.R. Lund, R.E. Howitt. 2009. Water management adaptation with climate change. California Energy Commission Draft Paper, PIER. CEC-500-2009-049-D.
[12] Schlenker, W., W.M. Hanemann, A.C. Fisher. 2007. Water availability, degree days, and the potential impact of climate change on irrigated agriculture in California. Climatic Change. 81: 19-38.
[13] Climate Change, Water and Risk. 2010. NRDC. http://www.nrdc.org/globalwarming/watersustainability/

C. On-Farm Renewable Energy: Realizing California's Renewable Energy Future

Recommendations

Legislative Action:

1. Work with the legislature and the California Public Utilities Commission (CPUC) to establish a robust feed-in tariff (FIT) policy to support the development of wholesale distributed generation projects on working farm and ranchland. To maximize farmer/rancher participation and the deployment of on-farm renewable energy generation, a successful program should feature:

- Tariffs based on the price of generation rather than on a market price referent (i.e. "avoided costs" of traditional fossil-fuel based generation)
- Tariffs and fees differentiated by project size, including but not limited to < 1.5 MW projects
- Tariffs differentiated by type of renewable energy technology, including but not limited to solar photovoltaic, wind, biogas, and biomass
- Long contract terms (20 years or greater is typical for successful programs, but contract length should vary by technology)
- Tariff inflation indexing over the life of the project
- High or no program cap

Administrative Action:

2. Streamline the state's FIT program application process, including the establishment of:
- Reasonable and accessible process timelines
- Alternate funding mechanisms to cover or lessen the cost of the application review process
- Consistent equipment guidelines for common technologies

Legislative Action:

3. Revise Public Utilities Code Section 2827 to include all forms of renewable energy generation as defined by PRC 25741 in the Net Energy Metering (NEM) program.

Administrative Action:

4. Take up as an administration priority working with stakeholders to develop policy and technological solutions to the operation of biomass facilities and biogas digesters in the state, while maintaining a strong commitment to the improvement of air quality.

Background in Brief

To reach the Renewable Portfolio Standard (RPS) goal of 33% by 2020, California will have to employ diverse strategies. More than a quarter of the state's land base is farm and ranchland and agriculture offers a natural fit with renewable energy production: Abundant open space suitable for wind power, large farm buildings suitable for solar photovoltaic, and available agricultural residues for use in biogas and biomass utilizing combined heat and power (CHP) generation.

The state has robust programs encouraging renewable energy development on the residential scale (e.g. California Solar Initiative, Self-Generation Incentive Program) and utility scale (e.g. Renewable Portfolio Standard). However, California is lacking an effective program to support the development of renewable, wholesale distributed generation (WDG) from mid-scale generators. This has negative consequences for on-farm renewable energy projects, many of which fall within the definition of WDG.

Scaling up this mid-scale market and supporting the development of on-farm renewable energy represents an important opportunity to diversify and meet the state's renewable portfolio. It also represents an important opportunity for California's farmers to diversify their operations and increase their revenue.

At a time when rural areas have been hit extraordinarily hard economically, effectively designed policies could create jobs and stimulate rural economies. For example, it has been estimated that a feed-in tariff (FIT) policy

could create three times the number of California jobs from 2011-2020 compared to a "business as usual" renewable energy scenario. This represents a total of 28,000 jobs per year, with an additional 27,000 indirect jobs per year. A good FIT policy would also increase state tax revenues and stimulate up to $50 billion in new investment in the state[14].

a. Feed-in Tariff Reforms

Feed-in tariffs (also known as Advanced Renewable Tariffs, Renewable Energy Producer Payments, and Standard Offer Contracts) are payments per kilowatt hour for electricity generated from a renewable resource. The price that is paid is based on the cost of producing the electricity plus a reasonable profit for the producer. In traditional regulated electricity markets, utilities are similarly paid for their cost of generation plus a reasonable profit. The difference is that whereas a regulatory commission negotiates with an electric utility after a conventional power plant has been built to determine a fair price, the FIT policy sets a fair tariff price *before* a project is built in order to encourage investment in the renewable energy project.

FITs are among the most promising strategy for spurring on-farm and other WDG development, but programs must be well designed to be successful. The profit margin for the generator determines the rate of growth, so an effective tariff must be sufficient to cover all costs for a given technology as well as a rate of return commensurate with the desired level of development. To account for mid-scale projects' higher production price per kWh, an effective program must ensure that these projects are incentivized through higher tariff prices[15].

Tariff prices must likewise be adjusted to encourage geographic distribution. In addition to supporting rural development, encouraging mid-scale renewable energy projects means more reliable generation from microclimate-dependent technologies like solar and wind. Too great an emphasis on larger centralized projects can also displace agriculture, by exerting pressure on farmers to convert productive farmland to large solar arrays.

Established in 2008, the current California FIT program has a total program cap of 480 MW, a comparatively low cap, and does not differentiate between technologies. Most importantly, the current FIT is based exclusively on the market price referent (MPR) which is based on the price of natural gas. Therefore it does not include an incentive in the FIT price[16].

The application process for California's existing FIT program is one of the greatest disincentives for participation, with applicants facing a range of initial and potential fees as well as a high degree of uncertainty. Fees levied on applicants include a high non-refundable application fee, equipment evaluation and study fees that range from $25,000 to $1 million depending on the technology, and potential equipment upgrades and other modifications that can cost tens or hundreds of thousands of dollars. In addition, the entire process does not mandate a timeline or deadline for completion, leaving some applicants without project approval for years after investing large sums to apply.

For example, in 2007, Dixon Ridge Farms of Winters installed a 50 kW biomass generator fueled by walnut shells, a byproduct of their organic walnut processing operation. Because their expected rate of return on energy generation did not equal or exceed the application and interconnection fees, costing several hundreds of thousands of dollars, Dixon Ridge Farms was instead forced to run the generator off-grid and at sub-capacity, a highly inefficient solution.

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[14] Wei. M and D. Kammen. 2010. "Economic Benefits of a Comprehensive Feed-in Tariff: An Analysis of the REESA in California". Renewable and Appropriate Energy Laboratory. University of California, Berkeley. http://www.fitcoalition.com/storage/resources/studies/economic-benefits-of-a-fit/economic_benefits_of_a_comprehensive_feed-in_tariff-july072010.pdf

[15] Gipe, P. 2010. Grading North American Feed-in Tariffs. World Future Council. http://www.worldfuturecouncil.org/fileadmin/user_upload/PDF/Grading_N.Am._FITs_Report.pdf

[16] Consequently, the current FIT program in California is not widely used and has failed to incentive mid-scale on-farm production. Of the major investor owned utilities, PG&E reports 32 total FIT contracts, with 9 of these currently online. SDGE has 3 current FIT contracts, while SCE has only one FIT contract. Nearly all of the existing FIT contracts in California are with irrigation districts (hydroelectric projects) or landfills (biogas projects).

All told, the current costs and risks associated with FIT program application constitute an unacceptable burden for applicants. The application process should serve as an incentive rather than a barrier to participation. Mechanisms to reduce and manage risks include refundable or partially refundable application fees and detailed standardized equipment requirements.

California can lead on clean energy, while driving much-needed economic development in rural areas of the state. Robust feed-in tariffs are widely recognized as the world's most successful policy for stimulating rapid renewable energy growth in the fairest possible manner at the lowest cost to electricity consumers.

b. Net Metering Program Reforms

For some small farm-based energy producers, the amount of power generated may be equal to or less than the amount consumed. For these producers, as well as for operations that also do some form of energy-intensive processing, participation in the Net Energy Metering (NEM) program may make more sense than feed-in tariffs.

Net metering is an arrangement by which renewable energy produced by a "customer generator" is supplied to the grid, causing the customer's electric meter to spin backwards and generate credit to their electric utility account.

Public Utilities Code Section 2827 outlines eligibility for California's NEM program, and currently defines an "Eligible Customer Generator" as a residential or small commercial, industrial, or agricultural customer "who uses a solar or a wind turbine electrical generating facility, or a hybrid system of both." The NEM programs offered by the state's three largest utilities are only offered to solar, wind, and some biogas generators. Other forms of farm-based generation – such as biomass from agricultural residues – are currently excluded from these programs. California's NEM programs should be modified to include generators of all forms of renewable energy[17].

c. Finding Solutions for Air Quality Conflicts with Biodigesters

Leadership is needed to resolve the current conflict between reducing air pollution in the state and encouraging energy production from biodigesters. For example, the San Joaquin Valley is currently in severe nonattainment for EPA's ozone standards, threatening the health of valley residents[18]. The valley is also home to a number of farms and ranches that could support biogas development with agricultural waste and residues. However, current digester technology and combined heat/power generation produces NOx, an air particulate that contributes to the severe air pollution problems of the valley. In response, the San Joaquin Valley Air District has prevented the operation of several biodigesters on valley dairy farms until the air pollution issues can be resolved.

Administrative leadership is needed to help break the logjam of on-farm renewable energy production in the valley without jeopardizing the health of valley residents. Ultimately, it will likely take policy and technology innovations to support the dual goals of reducing air pollution and supporting on-farm renewable energy production in the valley and elsewhere in the state.

[17] As defined by Public Resources Code Section 25741.
[18] See: http://www.valleyair.org/aqinfo/attainment.htm

III. Protecting Land and Water Resources

A. Farmland Protection: The Climate Benefits of Land Preservation

Recommendations

State Budget:

1. Restore subvention payments for the Williamson Act in the 2011-12 budget and establish a review of the Williamson Act and other possible farmland protection tools (see recommendation 3).

Legislative Action:

2. Work with the legislature to develop a statewide farmland mitigation fund, funded by developers of farmland. The fund would provide resources for a diversity of farmland protection tools.

Administrative Action:

3. Convene a Governor's task force to develop policy recommendations on Williamson Act reforms and a set of policy recommendations to go beyond the Williamson Act to protect California farmland and rangeland.

Background in Brief

Loss of California farmland to sprawl has many negative effects and among them is lessening the state's capacity to mitigate climate change. By paving over farmland, along with reducing the ability of the state to produce food and fiber, the opportunity to sequester carbon in soils is lost and the albedo[19] of the state is raised. Protecting farmland adjacent to urban areas has the additional benefit of limiting urban/suburban sprawl and associated transportation-related GHG emissions. However, the state's primary farmland protection program is in financial jeopardy and innovations that go beyond our current policy tools are needed.

The Williamson Act is the state's primary program for protecting farmland and open space from development. Landowners who enter into Williamson Act contacts agree to maintain their land in farming, ranching or open space and in return receive reductions in their property taxes. Contracts are for 10 years and renew automatically unless either the landowner or county seeks a nonrenewal. Known as subvention payments, for more than 30 years the state has reimbursed counties for the loss of property taxes from Williamson Act lands[20]. Sixteen million acres of the state's 29 million acres of farm and rangeland are enrolled in the program.

Funding for the subvention payments was for practical purposes eliminated in the 2008-9 state budget ($1,000 was left in the budget). Without state subventions, several counties will likely withdraw from Williamson Act contracts, putting farm and rangeland at risk of development. Efforts are underway to save some funding for the subvention payments, but if successful it is unlikely to fully reimburse counties, leaving the future of some Williamson Act contracts in doubt.

States like Maryland, Wisconsin, Pennsylvania and others have taken on farmland protection as a state priority, adopting a diversity of measures to slow the loss of farmland and promote dense, infill development. Many state programs have dedicated funding sources either from property or sales taxes or property transfer fees. However, California lacks adequate, consistent funding for farmland protection programs, as demonstrated in the recent budget battles over $35 million for Williamson Act subvention payments.

[19] "Albedo is the amount of light that is reflected from an object. A light-colored, bright object has a high albedo as it reflects most of the light that hits it. Conversely, a dark object has a low albedo as it absorbs most of the light. The lower the albedo of the Earth (less snow cover, smaller ice caps, more dark land exposed, etc.) the less infrared radiation is reflected back to space, enhancing global warming." From:
Pirog, R. and R. Rasmussen. June 2009. "Understanding Common Terms Used in Discussions about Climate Change and Agriculture." Leopold Center for Sustainable Agriculture.

[20] For more on the Williamson Act, see: http://www.conservation.ca.gov/dlrp/lca/Documents/WA%20fact%20sheet%2006.pdf

The state should develop a statewide farmland mitigation fund for farmland protection and help limit sprawl. Currently, a number of local governments (e.g. Davis, Brentwood, San Joaquin County and Stanislaus County and others) have farmland mitigation programs, which require developers of farmland to pay into a fund to allow for purchase of conservation easements on nearby farmland. Program requirements vary, but the fund provides easement funding which has traditionally been difficult to come by.

A statewide farmland mitigation fund can provide an alternative funding source for farmland protection programs, while also promoting infill development. To avoid limiting local government farmland mitigation efforts in areas where a local program already exists, the state mitigation fund could require that developers of farmland pay the difference between the state and local programs into the statewide fund. Having a statewide fund would allow the state to target farmland protection efforts in areas where preserving farmland maximizes environmental and social benefits.

Current definitions of prime farmland should be expanded to go beyond soil quality and include farmland that provides a diversity of environmental and social benefits (e.g. groundwater recharge, wildlife habitat, urban growth boundaries, etc.).

Finally, as other states have done, California will have to go beyond the Williamson Act to look at a variety of strategies to support farmland protection and dense urban development in the state. A Governor's task force should be convened to review the benefits of farmland protection and efficacy of a variety of potential tools to support preserving the state's farmland. Among the strategies to consider are[21]:

- Transfer of development rights (TDR)
- Conservation easements[22]
- Soil and water conservation standards for participants of farmland preservation tax or rebate programs
- More stringent agricultural zoning standards
- Density requirements in development approvals
- Sliding scale for agriculture mitigation ratios to reward relatively dense projects and impose higher mitigation costs on low-density projects.

[21] For more information on farmland protection tools, see: Municipal Research and Services Center of Washington. Farmland preservation techniques and sustainable agriculture. http://www.mrsc.org/subjects/planning/farmland.aspx#mitigation. Wisconsin Department of Agriculture, Trade and Consumer Protection. Wisconsin Working Lands Initiative. http://datcp.state.wi.us/workinglands/index.jsp

[22] The Department of Conservation has a program that provides grants to land trusts to establish easements on farmland. However, the program has traditionally been underfunded and dependent upon inconsistent bond funding.

B. Water Conservation: Innovations in Farm and Regional Approaches

Recommendations

Legislative Action:

1. Develop incentives, including cost-sharing and technical assistance for farmers and ranchers, to expand the use and diversity of water-conserving agricultural practices. Coordinate these activities through the Office of Climate Change Adaptation (see Climate Change Adaptation section).

Background in Brief

Climate change scenarios predict reduced snow pack and earlier snowmelts in California which will reduce the amount of water available to agriculture. Increased flows to reservoirs from winter snowmelts will increase chances for flooding, forcing dam managers to reduce reservoir levels early in the year; thus making less water available to agriculture in the summer[23]. Severe water shortages will threaten the livelihoods of farmers and farmworkers, the viability of many Central Valley towns, and the longevity of agricultural lands. It will also deepen tensions between urban, environmental and agricultural water interests.

Now and into the future, all water users in the state will have to conserve water and put in place measures to support water use efficiency. The Department of Water Resources (DWR) estimates that urban water users, which currently use roughly 8 million acre feet (maf) of water a year, can reduce water use consumption by up to 3 maf. DWR estimates that agricultural users can reduce their water use by 1 maf[24]. To get there, a diversity of practices is needed. Examples of on-farm water conservation practices include:

- Building soil organic matter to increase water holding capacity
- Drip and mirco sprinklers or other efficient methods of applying water
- Soil moisture and evapotranspiration monitoring
- Irrigation scheduling and management practices
- Dry farming
- On-farm water storage (e.g. ponds)
- Keyline plowing

Agricultural water conservation and efficiency measures can make agriculture more resilient in a climate-constrained world. But resources are needed to support agricultural water stewardship, including outreach and technical assistance and financial incentives for the state's farmers and ranchers. Funding cuts over the years have gutted California's agricultural Cooperative Extension service, leaving farmers with few options for science-based technical support.

The California Water Stewardship Initiative, a collaboration of state agricultural organizations notes:

> One element that is lacking to make this approach work is sufficient funding for outreach. We can find successful examples of every sort of water-conserving practice and yet most farmers are not aware of their options. The mobile water labs have been cut, Cooperative Extension has less than half the personnel it once had and has limited focus on water conservation, the Fresno State irrigation program lacks sufficient funding for outreach, and a recent Agricultural Water Management Council survey showed that the use of CIMIS [California Irrigation Management Information System] and other water technologies was much lower than expected[25].

Infrastructure projects must be balanced with water capture and conservation and the resources are needed to make that possible.

[23] Weare, B. C. April-June 2009. How will changes in global climate influence California? California Agriculture. Vol. 63. No. 2.
[24] Runsten, D. 2010. Why Water Stewardship for Agriculture? The California Water Stewardship Initiative. www.agwaterstewards.org
[25] Ibid.

IV. Healthy Rural Communities

A. Immigration Reform: Supporting California Farmworkers

Recommendations

In the absence of federal action to reform immigration laws, the State of California should take interim action that is within its jurisdiction to ease the burdens on farm laborers and families and facilitate their contribution to California's agricultural industry. The following interim actions, which could sunset upon passage of comprehensive federal reform, are recommended:

Legislative actions:

1. Establish a temporary California driver's license and/or identification card for undocumented farmworkers working in California.

2. Eliminate the 30-day mandatory vehicle impoundment for unlicensed drivers.

Administrative action:

1. Take up as an administrative priority state agency coordination and resources to improve current conditions for California farmworkers.

Background in Brief

The passage of a comprehensive federal immigration reform act is a vital component of assuring the sustainability of California's agricultural workforce. Federal legislation should be characterized by:

- A pathway to earned legalization
- Incorporating family-first priorities to avoid breaking up families with children via deportation
- Transparent and consistent enforcement mechanisms

While California awaits fair federal immigration reform, the state can take action now to improve the conditions for California's farm labor community, including:

- Passage of state legislation to establish a temporary California driver's license and/or identification card for undocumented farm workers working in California
- Passage of state legislation that eliminates the 30-day mandatory vehicle impoundment for unlicensed drivers

In addition to the state legislative priorities described above, below are some of the improvements to the current conditions that are needed to ensure a sustainable, healthy farm labor force for California agriculture:

- Coordination between workforce agencies and educational institutions to train agricultural workers and make additional opportunities available
- Network to connect willing workers with available seasonal and year-round agricultural jobs at all skill levels
- Increase access to public transportation systems that serve areas of rural employment
- Expansion of affordable housing options for agricultural workers by creating a network for distribution of information about available housing for all categories of workers
- Additional funding for, and expedited regulatory approval of, the construction of affordable, energy efficient agricultural worker housing
- Increase in agricultural worker access to effective and compassionate public health facilities and education, including special screening, vaccination, prenatal care, treatment of chronic disease and pesticide exposure and vision and dental care
- Promotion of "life skills" assistance for farmworker families, including on-the-job training (for example, in constructing agricultural worker housing) and education in English and agricultural skills.