CDFA EFFORTS ON AGRICULTURAL CLIMATE CHANGE ADAPTATION

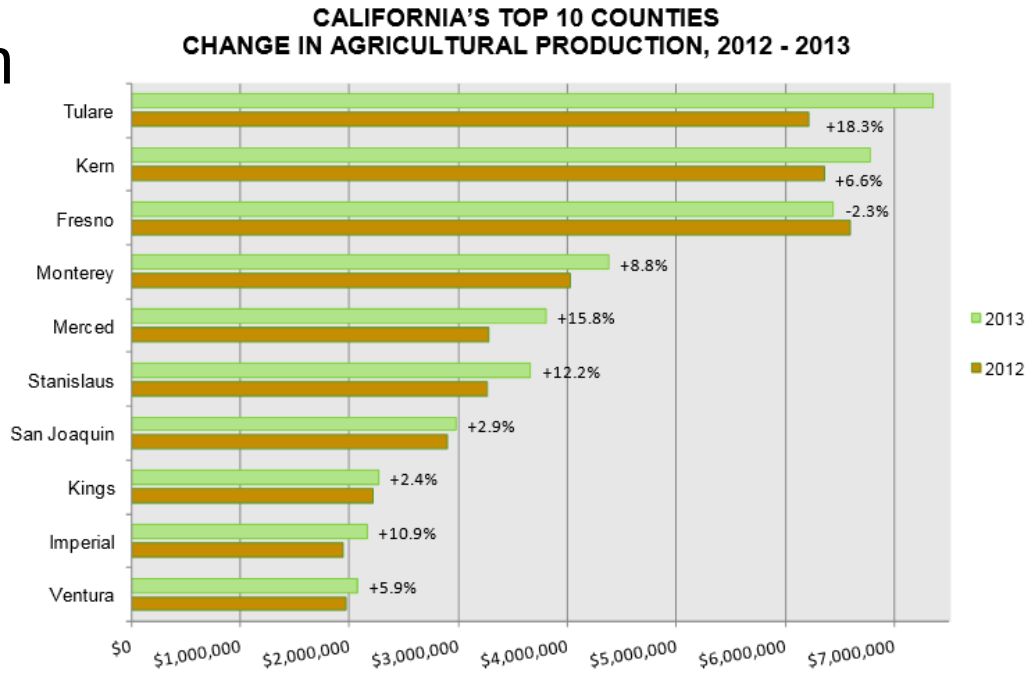
SENATE COMMITTEE ON ENVIRONMENTAL QUALITY

SEPTEMBER 22, 2015

Amrith Gunasekara, PhD. Science Advisor
California Department of Food and Agriculture

CALIFORNIA AGRICULTURAL PRODUCTION

- California is the nation's leading agricultural production state and has been for more than 50 years
- The Central Valley counties lead the state in agricultural production; 8 of the 10 leading production counties
- CDFA climate change adaptation has statewide applicability



Data Source: 2012 Annual Crop Report by USDA NASS

CALIFORNIA'S CENTRAL VALLEY

TOP 15 COMMODITIES IN CALIFORNIA Highlights by Rank and County Percentage of State Total, 2012-2013	
Milk and Cream	Tulare leads again with over 27 percent of the State total
Grapes, All	Kern takes the lead with almost 25 percent of the State total
Almonds	Stanislaus overtakes Fresno and Kern this year as the leading county
Cattle and Calves	Tulare is No. 1 again, Imperial moves to rank 2nd this year
Nursery Products	San Diego continues to lead
Strawberries	Monterey and Ventura lead with more than 60 percent of the total value
Walnuts (English)	San Joaquin leads with over 20 percent of the total value, followed by Butte
Lettuce	Monterey leads with almost 66 percent of the total value
Alfalfa Hay	Kern leads with 15 percent, followed by Imperial at 12 percent of the total value
Oranges	Tulare leads with almost 63 percent of the State total value
Pistachios	Kern leads with more than 31 percent of the total value
Silage, All	Tulare holds over 34 percent of the total value
Chickens	Fresno leads with over 44 percent of the total value, Merced follows with 32 percent
Rice (Excl. Seed)	Colusa leads with 28 percent of the State total value
Tomatoes, Processing	Fresno leads with over 37 percent of the total value, followed by Yolo and Kings

Data Source: CDFA County Agricultural Commissioners' Reports, 2013

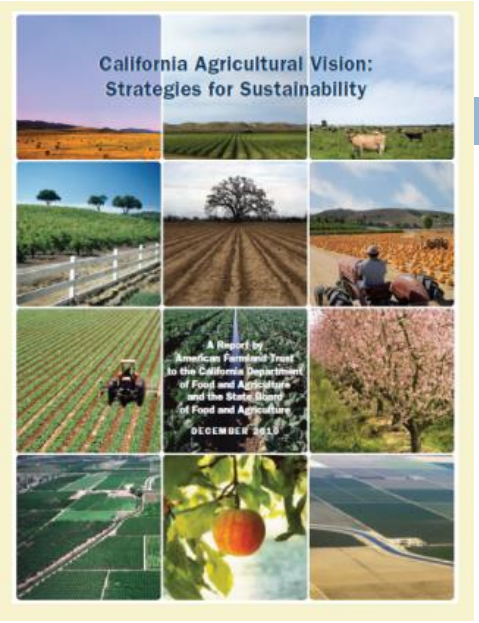
CALIFORNIA "SPECIALTY" CROPS

- Leads the nations in producing 90 commodities

- California is the sole producers (>99% production) of some crops – Almonds, artichokes, dates, figs, grapes (raisins), kiwifruit, olives, clingstone peaches, pistachios, dried plums, pomegranates, walnuts

Data Source: 2012 Annual Crop Report by USDA NASS

AG VISION- 2010

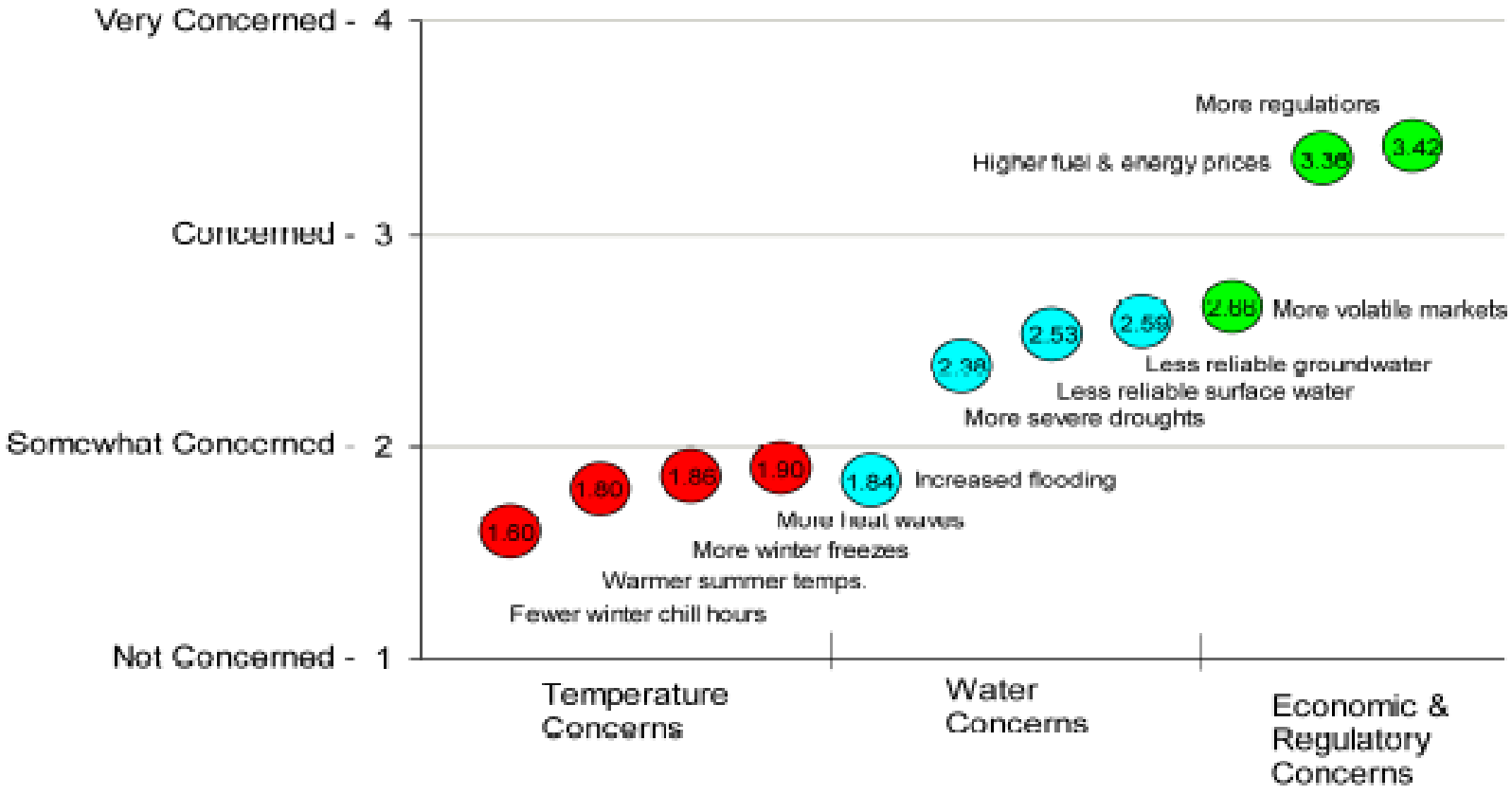


Strategy 9

Assure Agricultural Adaptation to Climate Change

"Assure that all sectors of California agriculture can adapt to the most likely climate related changes in seasonal weather, water supply, pests and diseases, and other factors affecting agricultural production."

ADAPTATION STRATEGIES FOR AGRICULTURAL SUSTAINABILITY IN YOLO COUNTY, CALIFORNIA



Jackson et al. *Adaptation Strategies for Agricultural Sustainability in Yolo Co., California*. CEC report, submitted.

Challenge – how do we engage the agricultural community on climate change and identify adaptation needs?

News Release

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

Media Contacts:
Steve Lyle, CDFA Public Affairs (916) 654-0462 or slyle@cdfa.ca.gov

CDFA TO ESTABLISH CLIMATE CHANGE CONSORTIUM TO HELP SPECIALTY CROP GROWERS PLAN FOR FUTURE IMPACTS

Release #12-029
Print This Release

SACRAMENTO, August 2, 2012- California's specialty crops account for more than half of the nation's fruits, vegetables, and nuts as well as nearly $7 billion dollars of exports worldwide. California's production of diverse specialty crops is threatened by potential climate-related phenomena, including reduced water supplies, increased plant heat stress, decreased chill hours, shifts in pollinator lifecycles and increased influx of invasive species. Addressing these risks to ensure agricultural adaptation to climate change will require a concerted effort and is an objective of California Agricultural Vision: Strategies for Sustainability.

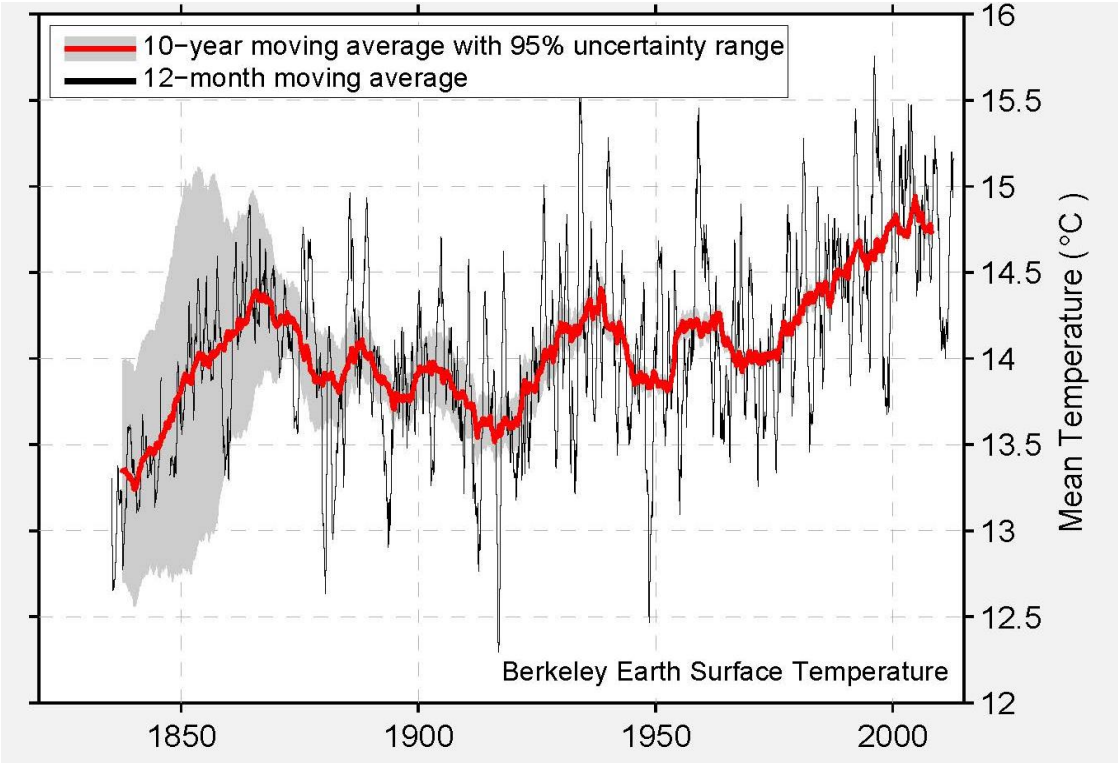
CCC PARTICIPANTS

- Three members from different agricultural associations
- One grower of each of the following specialty food crops; grapes, strawberries, almonds, tomatoes, walnuts, lettuce, citrus, pistachios, broccoli, and tree fruits.
- One scientist from the University of California system
- One extension specialist from the University of California
- Two scientists from the California State University system
- One Pest Control Adviser/Crop Control Adviser
- One member that is an Agricultural Commissioner
- One member from the California Resource Conservation Districts
- One member from the Local Government Commission

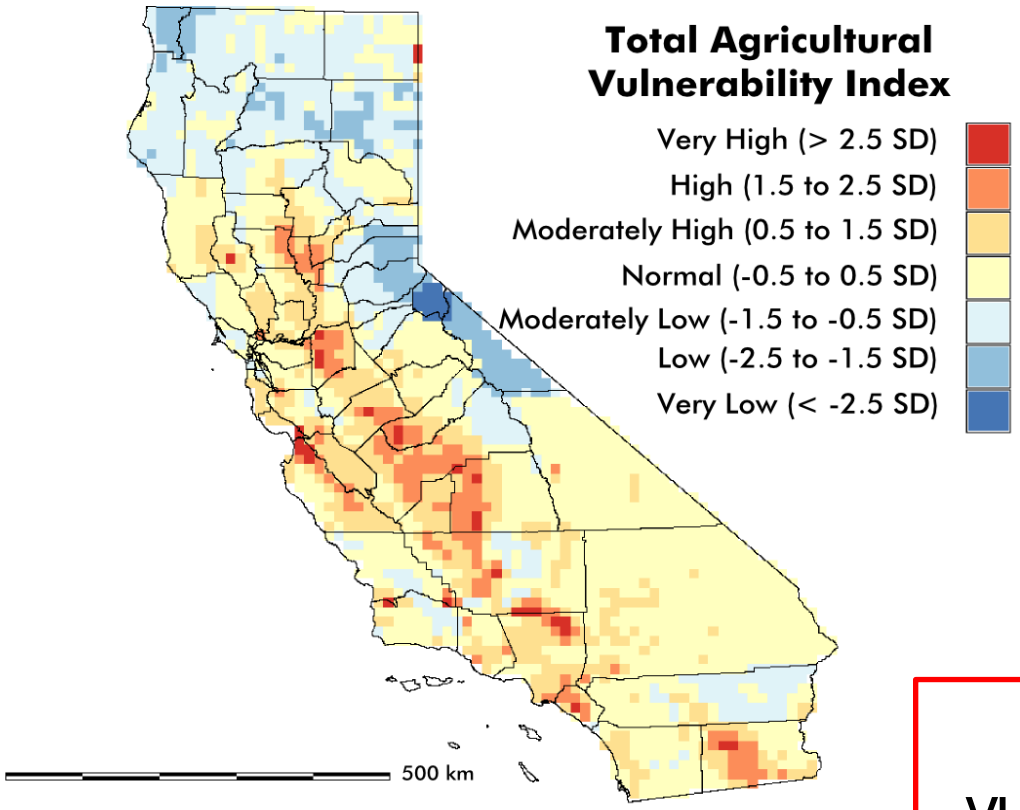
CCC DISCUSSIONS

Example of Information shared - Temperature increase is one variable that is used to measure climate change and need for adaptation

This figure shows the average warming observed in the San Joaquin Valley near Modesto, Merced, and Turlock, California.



CCC DISCUSSIONS



Vulnerability Index uses 4 sub indices:

1. Climate
2. Crop
3. Land use
4. Socioeconomic

Total modeled agricultural vulnerability in some areas of the state is very high

Data Source: Jackson et al. UC Davis. Energy Commission Study. 2012. http://www.energy.ca.gov/2012publications/CEC-500-2012-031/CEC-500-2012-031.pdf

CCC DISCUSSIONS

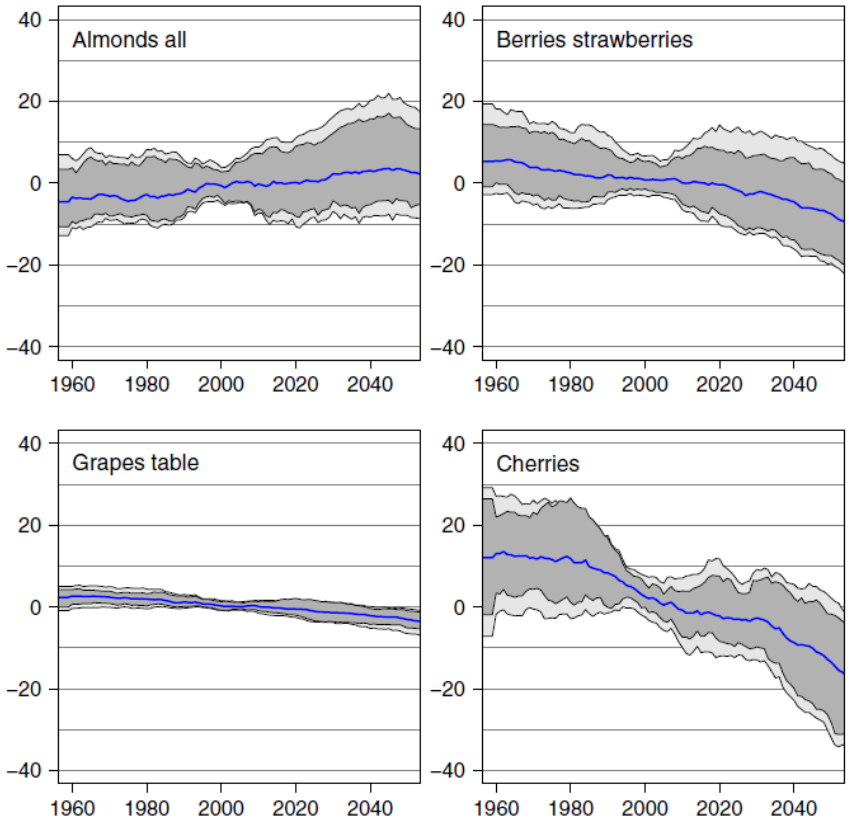


Fig. 9 Simulated change in crop yields for four crops with most reliable crop models. The thick blue line shows the average of all projections, the dark shaded area shows 5%–95% range of projections when using multiple climate models, and the light shaded area shows 5%–95% range when using multiple climate models and multiple crop models (based on bootstrap resampling). The results are presented as percent changes from the 1995–2005 average yields, and as 21-year moving averages in order to emphasize the trend rather than year-to-year variability

Climatic Change (2011) 109 (Suppl 1):S317–S333
DOI 10.1007/s10584-011-0303-6

California perennial crops in a changing climate

David B. Lobell · Christopher B. Field

D. B. Lobell (✉)
Department of Environmental Earth System Science and Program on Food Security and Environment, Stanford University, Stanford, CA 94305, USA
e-mail: dlobell@stanford.edu

C. B. Field
Department of Global Ecology, Carnegie Institution, Stanford, CA 94305, USA

Impacts on Specialty Crops will vary by the specific crop and location

CCC ACTIVITIES

Questions for CCC -

1. What activities and strategies are growers taking now to adapt to climate change?

2. What can CDFA do to help the agricultural sector prepare for climate change?

- Report and Final Recommendations were completed in September 2013

News Release

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

Media Contacts:
Steve Lyle, CDFA Public Affairs, (916) 654-0462

CLIMATE CHANGE CONSORTIUM FOR SPECIALTY CROPS FINAL REPORT IDENTIFIES CHALLENGES AND MAKES RECOMMENDATIONS FOR AGRICULTURE

Release #13-032
Print This Release

SACRAMENTO - October 3, 2013 - As part of the ongoing effort to ensure that California is prepared for the impacts of climate change, the Climate Change Consortium for Specialty Crops has produced a report, *Climate Change Consortium for Specialty Crops - Impacts and Strategies for Resilience*, which identifies recommendations to address the challenges posed by climate change to producers of specialty crops. As a member of the Governor's Climate Action Team, the California Department of Food and Agriculture (CDFA) convened the Consortium to prepare the report. Climate change is expected to have significant and widespread impacts on California's economy and environment.

CCC RECOMMENDATIONS

1. Research Needs
2. Planning and Resource Optimization
3. Outreach and Education
4. Technology and Innovation

Information from report used in;

- Safeguarding California Report
- Safeguarding California Implementation Plan
- 4th Climate Change Assessment Research
- USDA NRCS Climate Sub-hub discussions

EXAMPLE

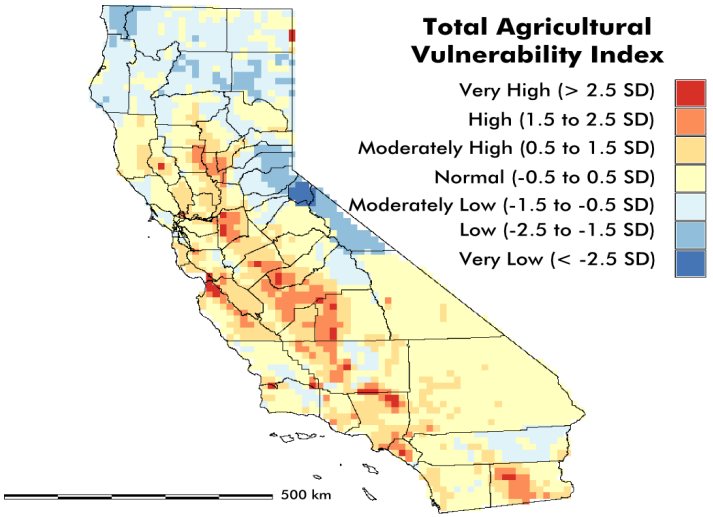
Recommendation

Research Needs

Economic and Environmental Studies of the Costs, Benefits, and Risks of:

- Crop relocation, including infrastructure considerations, and climate analogues; define where crops will be best suited under future climate conditions considering soil type, topography, water availability, and potential hazards;

- This recommendation has been included in the 4th Climate Change Assessment Research request for proposals to begin in 2015



NEXT STEPS - MOVING FORWARD

Recommendation

Research Needs

Economic and Environmental Studies of the Costs, Benefits, and Risks of:

- Water Management, in terms of:
  - Increasing above and below ground water storage capacity;
  - Groundwater recharge;
  - Use of recycled/reused or desalinated water;
  - Efficient irrigation technology implementation;
  - Reduction of evaporation from irrigation canals using solar panels or chemicals;
  - Sustainable forest management practices to enhance water resource availability for agricultural systems downstream.

State Water Efficiency and Enhancement Program

- Incentivizes the implementation of efficient irrigation system that reduce GHGs and save water

GHG REDUCTIONS - MITIGATION

Dairy Digester Research and Development Program

- CDFA was appropriated $12 million dollars from the Greenhouse Gas Reduction Fund to provide financial assistance for the installation of dairy digesters in California, which will result in reduced greenhouse gas emissions.
- $500,000 of $12 million will be for research

News Release

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

Media Contacts:
Steve Lyle, CDFA Public Affairs, (916)654-0462
steve.lyle@cdfa.ca.gov

DEPARTMENT OF FOOD AND AGRICULTURE FUNDS 5 "DAIRY DIGESTER" PROJECTS IN CENTRAL VALLEY

cdfa

Release #15-032
Print This Release

Projects designed to cut global-warming methane emissions and generate revenue

Sacramento, July 13, 2015 - The California Department of Food and Agriculture (CDFA) has selected five projects for approximately $11.1 million in grants to implement digester technology on California dairy operations that will reduce greenhouse gas emissions (GHGs) from dairy manure.

Financial assistance for the installation of dairy digesters comes from the state's cap-and-trade program for combating climate change. Through the Greenhouse Gas Reduction Fund, CDFA and other state agencies are investing cap-and-trade auction proceeds in projects that reduce greenhouse gas emissions while providing a variety of additional benefits to California communities.

Recipients of the CDFA grants will provide an estimated $18.9 million in matching funds for the development of the digester facilities.

"These projects demonstrate a commitment by California to support efforts by dairy farmers to fight climate change by reducing greenhouse gases from the agriculture sector," said CDFA Secretary Karen Ross. "This is definitely a win-win for agriculture: cutting methane emissions and improving the environment while also generating revenue from renewable bioenergy."

NEXT STEPS - CDFA

1. Evaluate the potential to tailor RFP's and seek funding for research and outreach needs
2. Interagency coordination
    1. CAT Research Plan update
    2. Safeguarding California Implementation Plan
3. Annual California Adaption Conference
4. Opportunity for CDFA to be an information hub
5. Database of adaptation management practices by studying climate analogues
6. Integration of activities with existing CDFA programs – Office of Environmental Farming and Innovation
7. Close coordination with the scientists – Dr. Tapan Pathak, specialist for climate adaptation in agriculture, UCCE, Merced

NEXT STEPS – STATE ASSISTANCE

- Assisting through initiatives such as the 4th Climate Change Assessment for Research

Research

(e.g., water efficient technologies)

↓

Management practices for adaptation and mitigation

(e.g., quantifiable GHG reduction practices)

↓

Incentives for implementation of practices including demonstration projects (e.g., SWEEP)

THANK YOU

Jim Houston
Undersecretary

Amrith (Ami) Gunasekara, PhD
Science Advisor to the Secretary

California Department of Food and Agriculture
916-654-0433
amrith.gunasekara@cdfa.ca.gov

cdfa
CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

TEN HIGHEST PRIORITIES ESTABLISHED BY THE CLIMATE CHANGE CONSORTIUM

1. Support economic and environmental studies of the costs, benefits, and risks of adaptation strategies;
2. Facilitate a reinvestment in grower technical assistance and trainings specific to climate change adaptation;
3. Include grower interests in the Integrated Regional Water Management discussions;
4. Perform or fund a review of regulatory barriers to adaptation mechanisms, such as food safety and other regulations;
5. Facilitate interagency coordination on the recommendations of the Climate Change Consortium;

TEN HIGHEST PRIORITIES ESTABLISHED BY THE CLIMATE CHANGE CONSORTIUM

6. Compile a list of grower needs for weather data and forecast products;
7. Develop research plots to study adaptation strategies and new technologies and products;
8. Promote farmland conservation;
9. Recognize growers who develop or adopt novel strategies to adapt to climate change;
10. Support USDA NRCS in a review and/or creation of policies to improve growers' ability to adapt to climate change.