

A Report on the Workshop on Integrating Climate Change in California Extension

February 6-7, 2018

Kearney Research and Extension Center, Parlier, California

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Workshop report compiled by Susie Kocher, Forestry Advisor, UCCE Central Sierra, March 2018

Executive Summary

Overview: The UCANR Climate Change Program Team was established in 2015 and began a process of investigating how climate change is integrated into Cooperative Extension in California. In 2017 we sent an online survey to over 1000 UC ANR faculty, specialists, advisors, and staff which showed that though there is overwhelming agreement on the importance of addressing climate change, fewer than half of the respondents currently incorporate it in their extension programming in some way. Perceived barriers included lack of access to climate information relevant to their extension programs and clientele, limited familiarity with climate science fundamentals, and fear of alienating clientele by talking about a contentious topic. These results (published in [California Agriculture](#)) led to a pilot professional development workshop held February 6 & 7, 2018 at Kearney Agricultural Research and Extension Center in Parlier, CA funded by Renewable Resources Extension Act (RREA) and the California Institute for Water Resources.

Workshop participants heard presentations on climate science and communication as well as examples of how UCANR and others are conducting climate informed research, extension and outreach across many disciplines. Attendees participated in discussion groups around needs for improving practices. Participants identified the following needs to improve climate change extension within UCANR:

Professional Development: Across disciplines, participants identified the need for on-going climate related professional development for UCANR academics, staff and volunteers. Specific training needs included:

Communicating climate change science and research results to stakeholders.

- How and when to talk about adaptation and mitigation with clientele,
- How to be an honest broker of information/ be transparent about research funding sources, and
- Communicating with and supporting other academics with controversial results.

Training in existing UCANR tools: We already have some great tools developed especially Cal-Adapt (<http://cal-adapt.org/>). Making additional trainings in Cal-Adapt tools available would be helpful across UCANR disciplines.

Train the Trainer programs for volunteers: Master gardeners, food preservers, 4h club leaders and California naturalists would benefit from climate change training opportunities. This could be accomplished through a train the trainer approach with a core set of trainers including academics, statewide programs, the environmental education workgroup, the Cal Nat climate stewards and Project Learning Tree.

Delivering Climate Change Extension: Suggestions to foster climate change extension included development of information and resources to be shared with clientele. These included:

Climate change toolkits: Resources should be developed for/by extension staff that are customized by specific programs. Specific suggestions included:

- Curated climate change curricula and educational materials (presentations, websites, videos)
- Cal-Adapt tool kits on pest, trees/ species for climate change scenarios
- How to assisting your community after a disaster including how to serve those affected by trauma
- Fact sheets that help explain climate weather data lingo/ averages / how projections work/ data.
- Case studies written for the layman such on drought tips, approaches/ tools
- Effective climate change digital and radio messaging for low-income communities developed in accessible, user friendly, culturally relevant, linguistically appropriate ways

Translation of climate data for various users: Participants felt unsure about exactly what kind of climate data was needed by various users. They suggested conducting a needs assessment with various stakeholders to talk about weather and climate resources and decision making strategies. Raw weather and climate data could be translated into decision support tools for clientele decision-making.

Climate research needs: Discussion groups stressed that additional research is needed across disciplines to help localize information on both mitigation and adaptation to climate change and to help clientele with decision making. Several also discussed how to allocate scarce research resources by considering whose interests are served by research projects and how to incorporate social justice. Specific research needs discussed included:

- **Historical research follow up:** There is a lot of opportunity within ANR to follow up on past research. There is follow up data that could be easily collected and synthesized to inform on climate change.
- **Climate change impacts on food security** including food access, availability, and utilization, the increased cost of specialty crops and the potential for healthier diets to mitigate climate change.
- **Disaster preparedness and recovery:** Research into information needs and effectiveness of dissemination before, during and after disasters as well as policy effectiveness.
- **Climate mitigation practices certification:** Exploration of the need for a body/group that certifies climate change practices by producers that could be used to reduce impacts and help market products.
- **Research/demonstration best practices:** How to identify enlightened leaders within stakeholder groups to work with.

Next steps: Workshop participants discussed the next steps for moving forward on climate change within UC Cooperative Extension. They suggested the climate change program team:

- **Continue to communicate:** Participants said that talking about climate change within this interdisciplinary context was very useful and should be continued.
- **Coordinate disaster responses:** Participants suggested we continue to share information, possibly by developing a work group on disaster response as an ANR collaboration.
- **Identify climate change work more consistently:** Another suggestion was to develop a way to tag extension activities as climate change related even when we don't call them that.
- **Strive for carbon neutrality:** Some participants suggested that UCANR could do a better job of walking our talk for carbon neutrality. UC has a policy on making meetings carbon neutral that is not fully adopted by UCANR. The program team could advocate for the implementation of the policy.
- **Pursue collaborative funding:** Suggested activities for the program team meeting at the April 2018 statewide conference included identifying funding for some of the described goals through ANR Opportunity Grants, RREA proposals or other sources.

Evaluation: Participants said they appreciated that the workshop was cross disciplinary and incorporated flexible discussions along with excellent speakers. 97% rated presenters as knowledgeable with practical information to share, 90% rated presentations as excellent or very good and 75% agreed that they have a better idea of how to integrate climate change into their programs as a result of the workshop. Many suggestions for follow up workshops were given.

Workshop goals and content

The University of California's Division of Agriculture and Natural Resources (UC ANR) has worked with Californians for more than 100 years to solve problems in agriculture, natural resources and food systems. Climate change compounds these problems, making it more difficult for UC ANR to achieve its vision for a thriving California in 2025. As a result, UC ANR academics and staff are mobilizing to address the threat of climate change. For example, ANR leadership supported the establishment of a climate change program team in 2015, with the primary goal of building capacity within Cooperative Extension to better serve the public in addressing climate change impacts and adaptation challenges.

As one of its first activities, members of the program team distributed an online survey in early 2017, reaching out to approximately one thousand UC ANR faculty, specialists, advisors, and staff to evaluate interests and experiences in incorporating climate change science into research and extension programs. The results (published in [California Agriculture](#)) indicated that though there is an overwhelming agreement on the importance of addressing climate change, fewer than half of the respondents currently incorporate it in their extension programming in some way. Many respondents also had a low level of confidence in their current ability to incorporate climate change in their extension programming. Perceived barriers included lack of access to climate information relevant to their extension programs and clientele, limited familiarity with climate science fundamentals, and fear of alienating clientele by talking about a contentious topic.

In part as a response to these survey results, the program team submitted a successful proposal for Renewable Resources Extension Act (RREA) funds to develop a pilot professional development opportunity for UC ANR academics and staff to increase our capacity to integrate climate change into extension programming. Program team leaders communicated with Strategic Initiative leaders and Statewide Program leaders to solicit attendance by staff and academics from the many disciplines within UCANR. The workshop was held February 6 & 7, 2018 at Kearney Agricultural Research and Extension Center in Parlier, CA. Funds were also contributed by the California Institute for Water Resources.

Workshop participants heard presentations on climate science as well as examples of how UCANR and others are conducting climate informed research, extension and outreach across many disciplines. There was a presentation about climate communication as well as a whole group discussion on it. Participants also broke out into discussion groups. The workshop agenda can be found starting on page 17. This document reports on key discussions that were held at the workshop and also recommended next steps to improve integration of climate change into UCANR extension programs.

Climate change discussion groups

Workshop participants were given an opportunity to nominate topics for break out groups to discuss. The topics below were nominated and interested participants attended the break out group of their choice. Below are notes about the discussion in each group.

1. Direct delivery of climate change education, environmental literacy
2. Climate change mitigation in agriculture - conflict over controversial topics and research results with different ANR stakeholder groups
3. How do we scale our efforts as an institution? How far can we go with our conversations? Adaptation? Mitigation? How do you decide?
4. Use of climate mitigation/ soil health as marketing/ branding tools for small scale or other growers

5. The role of Cooperative Extension in responding to climate enhanced disasters

1. Direct delivery of climate change education, environmental literacy

Participants in this break out group were most interested in developing systematic professional development opportunities on climate change for those within UCANR. They felt that there is significant interest within various UCANR statewide programs (SAREP, MG, MFP, IPM, and others) for improved access to a curated set of climate change education resources and trainings. Between the ongoing work of the Environmental Education Workgroup, the development of the Climate Stewards Initiative of the California Naturalist program, and the Project Learning Tree E-Unit on climate change for teachers, there are a number of opportunities that could be advanced without a significant realignment of staff time.

In-service trainings for staff and volunteers: One successful model for this exists with the Department of Water Resources' climate change education in-service program. In addition, Dr. Arnold Bloom (UC Davis, Plant Sciences) has been in discussions with the California Department of Conservation about conducting similar in-service training for their staff based on some of the materials he's developed for his Climate Change Course. The training could be designed broadly for representatives from each of the statewide programs who could go on to tailor more specific trainings using relevant modules for specific clientele groups. For example, a core group of trainers from ANR could conduct a training for representatives from the different statewide programs. Those representatives could select the most appropriate material for their clientele and train their staff on how to use them. One of the challenges of this approach is determining how much training a person needs to be able to deliver educational programs to clientele with a high degree of competence.

Environmental education toolkit: The collection and sharing of California specific climate change educational material (e.g., PPT presentations, websites, and videos) possibly as a "Tool-Kit" is something that would be consistent with the work of the Environmental Education Workgroup. The Workgroup could make the materials available through its Collaborative Tools page. Some level of curation would be helpful to ensure only the most relevant and up-to-date materials were included.

Needs: The group recognized a number of potential barriers to accomplishing these objectives. First, everyone is busy with their primary work responsibilities so much of this work would need to relate to ongoing initiatives programs have already committed to. For example, the Climate Stewards project and the EE Workgroup could as part of their ongoing group curate the climate change education resources for use by SWPs and the in-service initiative. Second, support from the Climate Change Program Team and UC ANR would help ensure a systematic and high quality implementation of in-service training. Finally, these efforts have to remain focused on the specific needs of the programs and units within ANR and the needs of their clientele.

2. Climate change mitigation in agriculture - conflict over controversial topics and research results with different ANR stakeholder groups

The group discussed the role of ANR professionals with respect to communicating sometimes contested topics and research results (such as on climate change) to stakeholders. Several principles were discussed, as follows:

Be an honest broker: The group agreed that it is not the role of UCCCE to tell anyone what to do, per se, but to offer the relevant science and explain the implications for what they want to do, similar to the idea of the "honest broker" model of science communication. Extension staff should also never assume we know exactly

what “the industry” wants, in terms of what type of science they want or how they might react to controversial study results. Often discussing scientific results one-on-one or face-to-face can help dispel concerns (that are sometimes generated by over-simplified or sensationalized media stories). Some commodity groups have been very proactive in funding climate change work – these may see the benefit for themselves in the long run.

Be transparent: Transparency of funding sources is important, even when that funding comes from industry groups, commodity boards, etc. One strategy for addressing the potential for people to be suspicious of results based on funding source is to gather funding from a variety of different sources for the same project, especially on topics that are particularly sensitive or controversial.

Engage enlightened leaders: Identify the “enlightened leaders” within the stakeholder groups who may be more receptive to the science and results, and then they can be the ones to talk about it or promote the results to others within their communities.

Needs:

- *Best practices:* Extension needs a set of best practices for communicating scientific results on controversial topics. For example, never leave colleagues (especially county-based staff in the affected counties) and key leaders (ANR leadership, deans, etc.) without talking points about a study in advance of something being published publicly.
- *Supporting each other:* How do ANR staff support each other, as fellow scientists, even if one person’s study might bring up results that seem threatening to stakeholder groups that are particularly important to another colleague? How do we make sure that we respect each other’s scientific integrity and vouch for the quality of science behind the controversial results?
- *Choosing projects:* Addressing specific inquiries from stakeholders on a personal level may be one thing, but do additional ethical considerations come into play when we are making decisions about what topics to even spend time on (e.g. in terms of writing grant proposals, and to which funders)? How do we consider whose interests to serve in terms of our research questions and topics?
- *Social justice:* Ultimately, is there a social justice issue in terms of how much time and attention we give to certain stakeholders and their needs and concerns (with respect to climate change or other potentially controversial topics) over others? Who is making these decisions, and at what level of our institution? Who are we ultimately accountable to, and over what timeframe (short-term interests versus long-term interests)?

3. How do we scale our efforts as an institution? How far can we go with our conversations? Adaptation? Mitigation? How do you decide?

This group started with the challenging need to make issues, information, management options relevant at the local level in order for effective progress to be made. They felt this was fundamental to any planned extension education programming in climate change. They suggested the following approach:

Contextualization: Extension staff ought to strive for a ‘decision framework for climate uncertainty’ that could provide local-context information specific to the audience which presents various ranges or future scenarios, risks and management options.

Mitigation/ adaptation: The group discussed whether they should address both adaptation and mitigation. This could depend on the audience and their political sensitivities. In situations where audience members are likely

to be climate change deniers or skeptics, then start slow and go easy. Many people are aware that temperatures have been rising, and there is sometimes more interest in adaptation strategies than in attribution of the causes of climate change to human causes. So mitigation is not yet a popular topic for such individuals. For these people, start by merely supplying answers to questions. Maybe they just want information on new crop varieties. So give that with minor references to facts such as, “As temperatures warm, this variety or cultivar will probably become more successful here than the ones we have used in the past.” There is no need to go into arguments about attribution to humans or the need to reduce fossil fuel use in these situations. After a time, even the more skeptical clientele may want more information on all aspects of climate change.

Discussing mitigation: To be effective and bring skeptics along, we need to be aware of good timing and sensitivity to the needs and beliefs of our clientele. You may feel that we need to get everyone onboard to mitigate climate change by reducing fossil fuel emissions as soon as possible. If your audience clearly wants that information, then find ways to give it to them without alienating individuals that are not ready yet. Different audiences will have very different tolerances for such information. Youth and master gardeners audiences, for example, are more ready for the more sobering scenarios and more ready to take action than some agricultural producers, for example.

Professional development: The group recognized a strong need within ANR to better ‘train the trainers’ with understanding and knowledge on climate change. The example of having knowledgeable in-house folks like Tapan Pathak undertake to train the ‘next wave’ of knowledgeable advisors, specialists, and other ANR staff to become better able to then use climate change information in their respective programs.

4. Use of climate mitigation/ soil health as marketing/ branding tools for small scale or other growers

This group discussed how markets could be used to create incentives for producers to adopt climate change mitigation practices. This may require certification, and an understanding of the role of consumers and how they would be affected by prices charged for climate services.

The role of consumers: Some consumers are interested in preventing or exacerbating climate change. Extension can help to give them tools to understand their food behavior, for example, the water/carbon footprint, though those labels may be misleading or over-simplified. We also need to balance nutrition and environmental footprint (e.g. calorie per environmental impact). Changing the buying habits of consumers will also incentivize change at the farm level.

Certification: Do we need a body/group that certifies climate change practices? How do we ensure practices on-farm are really leading to climate change impacts? What about climate change labels (e.g. “mountain-lion-free” beef, dolphin-free tuna). How to verify marketing claims? An example might be through a net water meter.

Payments for ecosystem services: If these payments are implemented, who’s responsible for paying, consumers or local or federal governments?

Social inequality: How do you address social inequality in this since income will determine what consumers are going to be able to buy? How does that play into our climate change adaptation?

5. The Role of Cooperative Extension in Responding to Climate Enhanced Disasters

This group talked about the role of Cooperative Extension before, during and after emergencies. There were a lot of questions about how CE should engage. These included:

Timing: Most thought the role of CE was mostly before and after disasters. Most CE people are not trained as emergency responders to respond during disasters though some UC groups, like 4H, have helped with animal evacuations. Most of us have worked on post –disaster response. Recent examples include post-fire forest restoration workshops by Kate Wilkin in Northern California and offering meeting spaces for agencies to create a one stop aide post for ranchers affected by fires by Matthew Shapero in Southern California.

Needs: During a disaster information is hard to come by. How can extension staff find out what their clientele needs during and after a disaster? How should we set ourselves up to know how to help? One example shared was of food safety fact sheets by nutrition educators for people who are returning to their homes after evacuation that give information on how long food is good in the refrigerator when the power has been off.

Sensitivities: How do we help sensitively? There some disciplines which train practitioners in working with people who have experienced trauma. We could benefit from this.

User friendly information: During a disaster people may need to have paper copies of things if they have no access to the internet. Do we know if our information is actually useful and user friendly?

Guide/ toolkit: The group discussed developing a guide/ toolkit for how extension staff can assist communities after a disaster as a cooperative extension person. This should be multidisciplinary/ integrated like the ANR initiatives and synthesize and bring available information together. It would include information on dealing with those affected by trauma in the most effective ways.

Disciplinary discussion groups

On day two, workshop participants broke out into disciplinary groups centered on the four categories below to talk about needs and next steps for better incorporating climate change into their extension work. The categories were:

1. Agriculture
2. Natural Resources
3. Nutrition, Youth and families
4. Education of public, volunteers, citizen scientists

1. Agriculture

The agricultural break out group talked about how to make climate change more relevant to clientele by localized research on both mitigation and adaptation to climate change. Resources for doing this include Cal-Adapt, California Department of Food and Agriculture “Climate change consortium on specialty crops” and California Department of Water Resources reports on climate change. Some barriers to doing more include lack of support at county level, limited funding support, and lack of post meeting follow up to execute new projects. Some commodity boards have started recognizing the issue. On-going needs extension include:

Climate data: Translation of raw weather and climate data into decision support tools for growers' decision-making. This could possibly be done by expanding Cal Adapt usability for agricultural issues. Needs could be assessed during informal meetings with stakeholders to talk about weather resources and decision making strategies without focusing too much on the big issue of climate change

Customizing ANR tools: There is a need to develop ANR climate change resources that can be readily available to utilize at various Extension programs

2. Natural resources

The natural resources group talked about how to weave extension on adaptation to climate change in to their current activities and how to become more organized in that approach. Most felt they are already actively addressing climate change adaptation by giving advice and working with clientele on reducing fire hazards in forest and range systems and how to encourage landscapes to recover from fire. We have also focused on the drought issues and adapting to those. Those present were not really focused on climate change mitigation. The group discussed the following needs:

Needs assessment: The group thought there could be some better ways to assess needs of stakeholders on climate information. An example would be developing a list of the top three information needs in a particular discipline or region. Another way to approach this would be to ask the work groups at the statewide meeting what their information needs are. The Climate Change Program Team could facilitate this by putting together the survey data for each work group and hand it out there.

Pest issues: It seemed like easily accessible information on climate impacts on pests was not available. Its possible researchers are not framing their work this way. We could reach out to the IPM folks and make sure they are involved.

Potential Cal-Adapt tools: The group thought there was great potential to increase the use of Cal-Adapt in extension work across disciplines. UCANR staff would benefit from specific trainings on how to use the program. Some clientele could use it as well in targeted workshops. Cal-Adapt could develop some 'Tool kits' on pest, trees/ species for climate change scenarios that could then be part of climate trainings on how to do it by IGIS. Trainings could be for specialists/ advisors, include the pros and cons of different approaches, assessing the quality of information, and with specific questions for IPM.

Historical research project follow up: There is a lot of opportunity within ANR to follow up on past research. There is follow up data that could be easily collected and synthesized to inform on climate change.

Case studies: The group could develop a series of case studies written for the layman (using something like Story board) on CIWR drought tips, approaches/ tools written for an internal audience (ANR, agency folks).

Fact sheets/ glossary: We could develop two page fact sheets that help explain climate weather data lingo/ averages / how projections work/ data. They could include topics like - What is attribution? Also a glossary for Cal Nat climate steward program will be developed – there are already many resources for this.

Policy: We may have policy recommendations after a disaster. Are agency responses effective? For example, Matthew suggested changes may make sense for FSA Payments for lost forage for ranchers. Susie is finding needs to revamp post-fire reforestation programs. One way to address this would be to involve the research to policy program team.

System wide coordination: We talked about the need to be more coordinated across ANR in our disaster responses. One solution would be to hold an ANR town hall about disaster/ crisis responses. We may want to emphasize the idea of resilience to emergencies.

3. Nutrition youth and families

This group discussed climate change resources, barriers, and needs for the nutrition, youth and families disciplines. There are many resources in place that could be drawn on. Volunteer programs and curriculum (including Master Food Preservers and Master Gardeners) have well trained volunteers that can take on the topic and some curriculum on disaster preparedness. In some counties, post disaster newsletters have been developed (both external and internal). The Nutrition Policy Institute holds brown bag seminars and there is on-going research on food waste and climate change.

Barriers to doing more integration of climate change into extension include lack of communication and lack of effective climate change messages for communities, especially low-income communities. Also, not all staff can work on policy changes. The UC Cal Fresh Nutrition Education Program allows staff time to engage in policy, system and environmental change strategies while EFNEP does not. Additional work is needed on:

Professional development: Nutrition education staff need training on climate change impacts on food security and disaster preparedness.

Developing content: Disaster preparedness/post disaster newsletters should be reviewed, updated, and adapted. Messaging should be developed in accessible, user friendly, culturally relevant, linguistically appropriate ways for digital and radio messaging.

Increased communication: There is a need for increased communication between NFCS, Mater Food Preservers (MFPs), Master Gardeners (MGs), and Nutrition Policy Institute (NPI). The group could develop a white paper on NFCS programs and climate change.

Research: We need more research on climate change impacts on food security (food access, availability, and utilization) and the increased cost of specialty crops (food access) and the potential for healthier diets to mitigate climate change

Valuation: There should be a way to integrate climate change into public values statements

Action Items: The break out group developed a list of priority action items. These included:

- *Professional development:* Participate in webinars and other professional development opportunities provided by NPI.
- *Literature review:* Conduct a literature review on disaster preparedness, food waste and other nutrition related climate change topics
- *Workshops:* Develop a workshop on food waste awareness and emergency preparedness for MGs, MFPs, and nutrition educators. Develop workshop for partners with emphasis on the Federal Bill Emerson Good Samaritan Food Donation Act and other food waste issues
- *Communication:* Set up collaborative tools for this working group to post research and information relevant to NFCS

4. Education of public, volunteers, citizen scientists

This group administers direct education programs to UC volunteers and citizen scientists. They talked about how to deliver climate change content to audiences. They preferred incorporating climate change into existing programs, rather than starting a climate change program. They discussed whether or not climate change always need to be stated explicitly as opposed to discussing chill hours and fire safety. It needs to be made fun and informative. They felt the needs are for:

Training: There is a need to develop in-service trainings for volunteers such as the Climate Stewards Program.

Tools and resources: The group would like the help of the Climate Change Program team to develop tools and resources that can then be customized by specific programs to help people better understand actions or decision making timelines. What's the action we want people to take and when? IGIS could be helpful with this. It would also be good to be able to collect existing materials e.g. Fireworks materials.

Communication: The group would appreciate direction on how to message and communicate.

Conference: They felt the statewide conference should incorporate climate change.

Wrap Up Discussion and Next Steps

After the break out group discussions, participants reconvened as a whole to discuss the needs and themes that were common between groups. Common themes between disciplines included:

- **Tool kits:** The need for tool kits was broadly expressed. These could take different forms but would be of value for communication with simplified scientific information customized to audiences.
- **Professional development:** Groups all thought there was a need for more customized in service trainings for educators, volunteers, and advisors.
- **Sharing case studies:** Participants thought develop a list or a template to describe the climate adaptation strategies being used by different clientele was useful.

Participants discussed the next steps for moving forward on climate change within extension. They suggested the Climate Change Program Team could work on the following:

- **Continued communication:** Participants said that talking about climate change within this interdisciplinary context was very useful and should be continued.
- **Disaster response:** Participants suggested we continue to share information, possibly by developing a work group on disaster response as an ANR collaboration.
- **Branding:** Another suggestion was to develop a way to tag extension activities as climate change related even when we don't call them that.
- **Striving for carbon neutrality:** Some participants suggested that UCANR could do a better job of walking our talk for carbon neutrality. UC has a policy on making meetings carbon neutral that is not fully adopted by UCANR. The program team could advocate for the implementation of the policy.
- **Statewide conference:** The program team has a two hour time slot. The group suggested that time could be used to:
 - Develop the first draft of climate glossary for review/ additions
 - Work on collaborative funding for some of these goals

- Apply for an ANR Opportunity grant a 10K one year project (clearing house website/ toolkit?)
- Follow up on in service training needs through another RREA grant proposal

Evaluation Discussion:

Participants were asked what they liked about the workshop and what could be done better next time. They also filled out paper evaluation forms.

What worked: What participants liked about meeting:

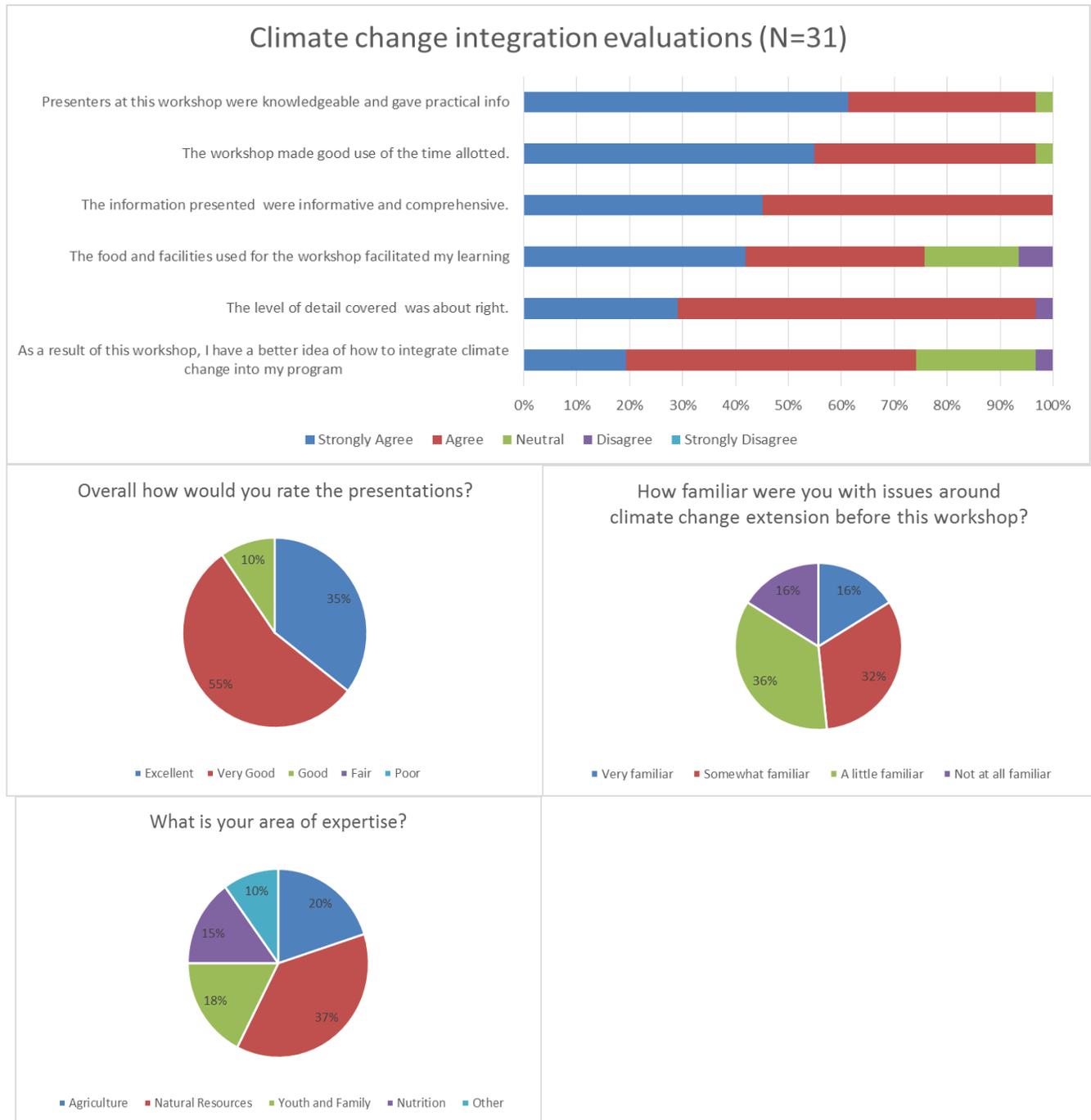
- Flexible break out groups with new topics – new topics before program team/ disciplines
- Many excellent speakers
- Lightening talks helpful
- Good size
- Food
- Different programs represented
- Cross pollination/ platform
- Mix of staff/ advisors/ external

What could be better: Suggestions from the group on what to do better next time:

- Reduce food waste
- Have physical activity breaks
- Record sessions
- Remind people to bring reusable mugs/ water carafes, healthy beverage policy
- Have a field trips
- Discuss how to talk about attribution
- I See Change climate observations- future speakers
- Have a stakeholder panel

Evaluation Results

Participants were asked to fill out workshop evaluation forms. Ratings and suggestions from the 31 participants that filled out the forms are summarized below. 97% rated presenters as knowledgeable with practical information to share, 90% rated presentations as excellent or very good and 75% agreed that they have a better idea of how to integrate climate change into their programs as a result of the workshop.



10: Please share any comments you have about this workshop

Great:

- Great speakers and great side conversations. Very useful
- This workshop was very helpful, I hope we have similar workshops, building off this, in the future
- Very well done. Excellent content
- Very well organized. Great speakers
- Great job!
- Very informative; good learning opportunity
- Great job. Great info. Thank you.
- So grateful I can attend and work with the folks here - thank you to climate change PT
- Great event! Quite well organized and implemented

Content:

- I enjoyed and learned a lot about climate change. The workshop about science communication and the bureau of linguistics didn't fit in this workshop. I wanted to learn more about our role in climate change and the future for CA or the whole world. Many of the data presented by the speakers was old, from 2013. I wish they would present newer data.
- Less general information and more case studies with effort to determine the practical impacts and implications for different stakeholders
- Lightning talks were great as a format.
- I really enjoyed the morning presentations on Day 1 and the linguistic dinner activity.
- A bit surprised at the apparent lack of interest by participants in addressing mitigation, i.e. reducing dependence on fossil fuels
- Visual on the various components of climate change was very useful. Will the presentations be available? How can multi-disciplinary projects be developed
- Need to get a better understanding of ANR's role in acute chronic disaster
- I think I might have needed more background information - climate change 101, current controversies, current mitigation efforts, most effective strategies for mitigation, inputs/causes of climate change, and internal ANR dynamics around climate change work.

Flow:

- Appreciate that you changed the paradigm - scheduled/unscheduled (or discussion led) time and art. Area for improvement - day 1 was very long with dinner and dinner activity. Loved all of it but would have appreciated art activity as AM icebreaker on Wednesday.
- Wonderful opportunity to ask questions and connect to other UC ANR people (build connections).
- Appreciated being adaptable regarding topic discussions and needs. Great speakers
- Really enjoyed the breakout group discussions! Gave us the chance to talk with people from different programs but similar interests
- Also, Wednesday breakout groups needed better facilitation. In the Ag group, no one really took ownership to move the discussion along, ensure more equitable participation, and take notes on action items.

Communication:

- Appreciated the presentation on communication. Excellent and important topic. Looking forward to developments on this front. Would like to know more about attributions, UC messaging and communications, resources, etc.
- Still a lot of jargon and assumption by experts that we know why the data presented are important and key words. Would like to support climate change knowledge transfer better, but I'm not sure how within my discipline. If people aren't asking my program for climate change info, how can I talk about it?
- I wish we discussed how to talk about the pieces of climate change - 1. Do you believe that the climate is changing? 2. Do you believe in anthropogenic climate change? 3. What type of mitigation and adaptation can you complete in your field
- I was hoping to have a little more concrete breakdown of what has/has not worked in climate change communication for specific audiences that ANR commonly services. Mike Crimmins and Faith Kearns' presentations were most useful in this regard, but they were placed on the schedule in a disjointed way.

Facilities:

- I know restaurants that can accommodate large groups are sparse in this area, but a steakhouse to me conflicts with the topic of this workshop. Practice what we preach. And a lot of plastic and waste.
- The role of mono agriculture and meat/dairy industry was not addressed here. It takes over 2,000 gallons of water to produce a single steak. I wonder how many gallons we used in our dinner. If we are really interested in helping to stop climate change we should start by changing the way we eat. I was looking into more eco-friendly food. Going vegan for 2 days will not kill anybody on the contrary.
- Facilities and hotel were good.
- I recommend having an internal facing room at the hotel as the street noise prevented a restful night.

Follow up:

- This was a very good first step in tackling an interdisciplinary approach to improving extension of climate change. We need to do more internal education about each other's program area.
- I'd like to see a "Train the Trainer" for volunteers. Perhaps this could be a future RREA grant through IPM or Master Gardeners.

11. Would you like the climate change program team to conduct similar professional development workshops in the future? Topic?

- Yes, no specific topic mentioned (3)

Topics:

- Yes, meat production and climate change
- Yes, support workshops for our volunteer programs! (2) - I'd like to see a climate change workshop that relates more to the volunteer programs. Topics such as decreasing food waste and its implications as well as a more in depth emphasis on nutrition that could be taught to volunteers.
- Yes, for stakeholders in the AA Water Management arena but more tailored to practical impacts and implications a local level (not regional or global scale)
- Yes, how to communicate, train the trainer to develop public outreach
- Yes, how to use Cal-Adapt and other tools described to answer climate questions, custom portals or decision support tools (2)
- Yes, maybe translating model results

- Yes; how to understand the basics of climate change and extending to specific audiences (no-one-size-fits-all)
- Yes, trauma-informed extension
- Yes in a specific topic mitigation or adaptation
- Look at existing literature on climate change communications and as a group identify how it may or may not apply to our audiences/collaborators. For agriculture focus: pull together experts and their resources on crop adaptation to climate change being worked on in CA, and info on GHG mitigation practices being worked on in CA
- Yes, sharing best practices or successful examples in extension - as well as failures and lessons learned

Products:

- Yes, very very interested in quality communication/resource sharing post. Thank you!
- Yes, follow up with a climate change resource exchange "tool kit" program integrating CC action plan
- Yes! Very helpful to learn/think/brainstorm/action plan around climate change. I really enjoyed the presentations and opportunity to work in small groups based on subject area - there was a good blend of this. So many speakers made the program feel a bit fragmented at times
- Yes, how to implement the UC policy on Sustainable Practices in UC ANR
-

Format:

- Yes, across disciplines (2):
 - This type of exchange across disciplines is vital. Would be good to have follow up meeting to present action/progress from this meeting.
 - Towards creating/developing a true ANR-wide focused initiative on climate change education and mitigation. I think the sense that "we're all different, we all have different comfort levels, we all see ourselves and our abilities to engage or to do something differently, when in reality, that is nothing short of a very urgent imperative for our University to be doing much much more impactful leadership in this entire arena. I felt or left Tuesday with a sense that the "bottom line" solution was something like "We're all different. We'll all take up this challenge in different ways" when in all actuality, the need to act is far more serious than that.
- Yes, maybe a smaller session targeted by program team or theme
- Yes, great agenda. Thank you for leaving time to meet and plan. (Note to Program Team: she did a great job, however bottled water, drinks, disposable foods, prepackaged, etc. isn't good leadership. ANR should adopt UC policy on reusable foods, cutlery, etc. We can do better)
- Yes, more over time to share experiences and new opportunities in climate change extension
- Yes, in-service trainings for CE offices
- Yes, a few of my county colleagues had conflicts and hope to attend future climate change workshops
- Yes - this was a good intro but now what? I definitely need resources in one place! What the impacts are as pertains to me? I kept asking myself during the meeting: What does your data mean to me (pest management)? How do I adapt or mitigate (as a grower/PCA/pest management professional)? What can I do (as a program or pest manager)? What is ANR doing about solutions to prevent or adapt the harm?
- Yes and please let the environmental education workgroup know how we can help!

Agenda

AGENDA FOR WORKSHOP ON INTEGRATING CLIMATE CHANGE IN CALIFORNIA EXTENSION

February 6-7, 2018

Kearney Research and Extension Center, Parlier, California

Desired outcomes:

- Provide professional development in climate science and communication
- Improve climate literacy within UCANR, connect people working on climate change issues within ANR, build a climate change community of practice for California Extension
- Develop climate change extension priorities within each discipline

February 6, 2018

- 10:00-10:30am** **Welcome** – goals, background, introductions *Ted Grantham, UCB*
- 10:30-11:30am** **Climate change and cooperative extension: On the front lines in a warming world** - *Mike Crimmins, Extension Specialist, University of Arizona*
- 11:30am-12:30pm** **Climate change in California**
- *Climate change in California*, Tapan Pathak, UC ANR
 - *Climate change data and visualization tools*, Maggi Kelly, UCB
 - *Climate change impacts on human health and well-being*, Arnold Bloom, UCD
- 12:30-1:30pm** **LUNCH**
- 1:30pm-2:15pm** **Lightning talks: What are we already doing or thinking about for climate extension in UC ANR?**
- *California Agriculture*, Jeff Mitchell, UCD
 - *Cal Nat Climate Stewards Program*, Greg Ira, UC ANR
 - *Nutrition and Family Consumer Sciences*, Anna Martin, UC ANR
 - *Range: Voices from the Drought*, Leslie Roche, UCD
 - *Water and ecosystems*, Ted Grantham, UCB
 - *Youth and families*, Woutrina Smith, UCD
- 2:15-3:45pm** **Climate communication**
- *State of the science (and art) of climate communication*, Faith Kearns, UC ANR
 - *An overlooked part of communication: listening* - paired exercise
 - *Learning from each other: True stories of climate communication in extension*
- 3:45-4:00pm** **Break**
- 4:00-5:00pm** **Open Space break out groups** for capacity building/reflection of where we are with climate change extension
- 5:00-5:30pm** **Report back/ discussion**

5:30-6:30pm Travel to hotel, check-in, and travel to restaurant
6:30pm Dinner at Cattlemen's with interactive art project the [Bureau of Linguistical Reality](#)

February 7, 2018: Breakfast at hotel

8:30-9:30am **Statewide climate change resources and connections**

- *A successful extension approach to climate change communication*, Nick Sadrpour, USC Sea Grant
- *USDA Climate Hubs: Bridging science and management to advance climate response and adaptation*, Steve Ostoja, California Climate Hub
- *California's Fourth Climate Assessment*, Guido Franco, California Energy Commission

9:30-10am **Break**

10-11am **Action planning by topical area: *What can I do when I get home?***
Participants discuss ways to structured work on identifying needs, resources, and barriers as a breakout group

11-11:30am **Report back**

11:30am-12pm **Next steps for the Climate Change Program Team and evaluations**
Future professional development needs, information resources, etc.

12:00-1:00pm **Lunch**

Workshop adjourned

Attendees

First name	Last name	Title	Affiliation
Mary	Blackburn	NFCS Advisor	UC ANR Cooperative Extension, Alameda
Arnold	Bloom	Professor	Dept. of Plant Sciences, UC Davis
Valerie	Borel	Master Gardener Program Coordinator	UC ANR Cooperative Extension, Los Angeles
Sonja	Brodt	Academic Coordinator	UC ANR SAREP
Tracy	Celio	Community Education Specialist II	UC ANR Coop Extension, Central Sierra
Wei-ting	Chen	Advisor	UC ANR Coop Extension, San Mateo
John	Cobourn	Water Resource Specialist	Western Nevada
Jeff	Couture	Project Manager	UC ANR Facilities Planning & Mgmt.
Michael	Crimmins	Extension Specialist - Climate Science	University of Arizona
Catherine (Mae)	Culumber	Advisor	UC Cooperative Extension, Fresno
Sandra	Derby	Project Learning Tree State Coordinator	UC ANR Youth, Families and Communities
Sabrina	Drill	Advisor	UC ANR Coop Extension, Los Angeles
Ashraf	El Kereamy	Viticulture Advisor	UC ANR Cooperative Extension, Kern
Gwenael	Engelskirchen	Sustainable Supply Chain Analyst	UC ANR SAREP/ ASI, UC Davis
Shane	Feirer	GIS Manager	UC ANR IGIS Program
Guido	Franco	Team Lead for Climate Change and Environmental Research	California Energy Commission
Missy	Gable	Director	UC Master Gardener Program
Brook	Gamble	Community Education Specialist	UC ANR California Naturalist Program
Phoebe	Gordon		
Ted	Grantham	CE specialist	Dept. of ESPM, UC Berkeley
Gregory	Ira	Program Coordinator	UC ANR California Naturalist Program
Jeremy	James	Specialist	UC ANR Sierra Foothill REC
Robert	Johnson	GIS Programmer	UC ANR IGIS Program
John	Karlik	Advisor	UC ANR Cooperative Extension, Kern
Faith	Kearns	Academic Coordinator	UC ANR California Institute for Water Resources
Maggi	Kelly	Specialist	UC ANR IGIS Program, UC Berkeley
Susie	Kocher	Forestry/ Natural Resources Advisor	UC ANR Coop Extension, Central Sierra
Dawn	Kooyumjian	Program Coordinator, UC Master Gardener Program	UC ANR Coop Extension, Alameda and Contra Costa
Danielle	Lee	Policy Analyst	UC ANR Nutrition Policy Institute
Andy	Lyons	Program Coordinator	UC ANR IGIS Program
Tunyalee	Martin	Associate Director for Communications	UC Statewide IPM Program

First name	Last name	Title	Affiliation
Anna	Martin	Nutrition, Family and Consumer Sciences Advisor	UC ANR Coop Extension, San Joaquin
Jeff	Mitchell	CE Cropping Systems Specialist	Dept. of Plant Sciences, UC Davis
Ali	Montazar	Irrigation and Water Management Advisor	UC ANR Cooperative Extension, Imperial
Max	Moritz	Specialist	UC ANR Coop Extension, UC Santa Barbara
Katelyn	Ogburn	MFP Statewide Coordinator	UC ANR Master Food Preservers Program
Steven	Ostoja	Director	USDA and UC Davis
Rebecca	Ozeran	Livestock & Natural Resources Advisor	UC ANR Cooperative Extension, Fresno
Tapan	Pathak	Specialist	UC ANR Cooperative Extension, Merced
Natalie	Price	Nutrition, Family and Consumer Sciences Advisor	UC ANR Coop Extension, Los Angeles
Heidi	Quante	Artist	Bureau of Linguistical Reality
Lorena	Ramos	Staff Research Associate	Small Farms and Specialty Crops-Fresno
Kristine	Randal	Master Gardener Coordinator	UC ANR Coop Extension, Mariposa
Maggie	Reiter	Environmental Horticulture Advisor	UC ANR Coop Extension, Fresno, Madera, Tulare, Kings
Leslie	Roche	Assistant Cooperative Extension Specialist	Dept. of Plant Sciences, UC Davis
Marisa	Rodriguez	Community Education Specialist	UC ANR California Naturalist Program
Nick	Sadrpour	Science, Research & Policy Specialist	Univ. of Southern California Sea Grant
Samuel	Sandoval	Assistant Professor and Extension Specialist	Dept. of Land, Air and Water, UC Davis
Matthew	Shapero	Livestock & Range advisor	UC ANR Cooperative Extension, Ventura
Yolanda	Silva	health educator	UC Cal Fresh
Woutrina	Smith	Co-Director	UCGHI Planetary Health Center of Expertise
Aubrey	Thompson	Communications Coordinator	UC ANR SAREP
Eleanor	van Hest		UC ANR Program Support Unit
Jeannette	Warnert	Public Information	UC ANR Strategic Communications
Kate	Wilkin	Forestry/Fire science Advisor	UC ANR Coop Extension, Sutter-Yuba
Karey	Windbiel-Rojas	Associate Director for Urban & Community IPM/Area IPM Advisor	UC Statewide IPM Program
Daniele	Zaccaria	Agricultural Water Management Specialist	Dept. of Land, Air and Water, UC Davis

Workshop Article

From the [UCANR Green Blog](#) – February 21st, 2018

UCCE to be a leader in climate change awareness and education

By Jeannette Warnert

Although individual extreme weather events cannot yet be reliably linked to global climate change, the warming planet may be contributing to recent weather disasters in California. Across the state, 129 million trees died as a result of the drought of 2011-2016, many of them in the Sierra Nevada. Last fall, the worst wildfires in the state's history whipped through wildland areas and neighborhoods, and then were followed by a January deluge and deadly mudslide.

Climate change is also impacting agriculture. The winter chill that farmers rely on to re-boot cherry, pistachio, walnut and other important fruit and nut crops has been curbed by unseasonably warm nighttime temperatures. Sustained summertime heat waves are damaging crops and putting diminishing water resources under stress.

Climate change isn't just about the planet. Increased frequency and intensity of climate extremes impact peoples' lives by forcing evacuations and migration from fire- and flood-prone areas, reducing the availability and safety of food, and dampening emotional well-being.



Millions of trees in California, many in the Sierra Nevada, died as a result of the 2011-2016 drought. (Photo: NASA)

How can Californians grapple with climate change?

On the front lines of climate change education, mitigation and adaptation is UC Cooperative Extension (UCCE), with its network of scientists headquartered throughout the state, living and working in communities where local climate change impacts must be addressed.

In 2015, UCCE's parent organization, [UC Agriculture and Natural Resources](#) (UC ANR), formed a [Climate Change Program Team](#) to lead a coordinated effort by UC ANR staff and academics dealing with climate change. The team surveyed UC ANR academics to find out about their current role in California climate change resilience.

"Eighty percent of respondents thought incorporating climate change impacts, mitigation and adaptation in their programs is important," said UCCE specialist [Ted Grantham](#), a member of the program team. "Less than half are actually doing so."

[*Read the survey report in California Agriculture journal.*](#)

The barriers respondents shared to working on climate change include technical complexity, lack of relevant information, and discomfort with the difficult conversations climate change can trigger. The program team brought together a diverse group of specialists, advisors and staff for a [two-day workshop](#) in February to increase capacity to raise public awareness about climate change, find practical ways to reduce the impacts of climate change, and help communities adapt to the reality of a changing planet.

Keynote speaker Michael Crimmins, a climate science extension specialist at the University of Arizona, said land-grant outreach programs have the interdisciplinary expertise and connections to provide decision support to farms and communities facing a warming world.

"Climate change is too big to tackle alone," he said. "We have a lot of programs that can nibble at the edges. If everyone nibbled at the edge, we can make a difference."



UCCE rangeland advisor meets with ranchers in the field to discuss rangeland management decisions.

Resources are available for climate change extension

Myriad climate change resources were presented. UC Davis professor [Arnold Bloom](#) shared a free online college course posted at <http://climatechangecourse.org>. The course examines the factors responsible for climate change, the biological and social impacts, and the possible

engineering, economic and legal solutions. Forty-eight mini-lectures, assignments and even exams are available to anyone willing to devote time to understanding climate change.

UCCE specialist [Jeff Mitchell](#) explained ongoing efforts to implement conservation agricultural practices on California row crop land. Research has shown the potential for climate change mitigation with precision irrigation and tillage reduction, practices that sequester carbon in the soil, reduce fertilizer needs, improve soil quality and increase yield.

[Greg Ira](#), coordinator of the UC California Naturalist program, said a new advanced training module on climate stewardship is in development. The training will be provided to select certified California Naturalists, volunteers who work with partner organizations across the state on environmental stewardship, nature education and citizen science.

UCCE specialist [Maggi Kelly](#) introduced the website <http://Cal-Adapt.org>, which contains volumes of climate change projections and climate impact data from California's scientific community. Users can explore projected changes in temperature, precipitation, snowpack and sea level rise in California over this century with interactive climate data visualizations. They can download data, find peer-reviewed research and learn how to use climate projections.

[Leslie Roche](#), UCCE rangeland management specialist, conducted rancher interviews after the 2011-2016 drought to gauge whether they consider climate change an important consideration for their ranching businesses, and whether they believe future climate will be different from the past. She found that ranchers are generally confident that they have the skills to manage for long-term drought, and that they are interested in learning about climate change and its potential impacts on their industry.

Roche has aggregated rangeland drought- and climate-management resources online at the [Rangeland Drought Hub](#). The website includes "Voices from the Drought," the personal stories of ranchers discussing the agonizing decisions they made during the drought – such as culling cattle, reducing staff, paying more for feed, and allocating limited water resources.

Steve Ostoja, the director of the USDA's [California Climate Hub](#), said the program helps California farmers, ranchers, forest landowners and tribes maintain sustainable communities and ecosystems by adapting to climate variability and change. Guido Franco of the California Energy Commission said the organization recently released its fourth [Climate Assessment](#). The assessment presents research on the impacts of climate change on the state, as well as strategies to dramatically reduce greenhouse gas emissions.

"I found the information and materials compiled by the Climate Change Program Team very useful," Mitchell said. "I will be consciously using these in extension education when I can."



California experienced its worst wildfire in history in 2017.

Climate communication

UC California Institute for Water Resources academic coordinator [Faith Kearns](#) led a segment of the workshop on climate communication, taking into account the [emotional side](#) of climate change by practicing active listening and empathy building. She shared climate change communication strategies used by effective national advocates, such as Katherine Hayhoe, an evangelical Christian and climate scientist who recommends a soft approach that starts by establishing personal connections with individuals before diving into climate science.

Another approach is that of Sarah Myhre, a climate scientist at the University of Washington who believes scientists should speak boldly about climate change facts.

"... Scientists are naturally risk-averse when it comes to public dialogue," Myhre wrote in an essay on [Guardian.com](#). "The verbal, argumentative skills common to professions in law, politics, or business do not come easily to most scientists. ... Our job is not to objectively document the decline of Earth's biodiversity and humanity, so what does scientific leadership look like in this hot, dangerous world?"

At the meeting, UCCE advisor John Karlik pointed out that some listeners want to hear straight science, just facts.

"We're all needed," Kearns said. "We all come with a difference set of circumstances and groups that we can connect with."

Future steps

The workshop closed with action planning and next steps. Among the needs presented during the session were:

- A climate change online portal with resources, tools and data that allow advisors and specialists to translate information into decision support.
- Simplified scientific information and case studies to personalize climate change impacts.
- Training for educators, advisors, specialists and volunteers.
- Research-based evidence on the impacts of climate change on food security and the cost of healthy food.
- A glossary of climate change terms.

In their article on the climate change survey in *California Agriculture* journal, the members of the UC ANR Climate Program Team said they believe UCCE is well positioned to understand and communicate the consequences of climate change to the public, and to identify strategies to mitigate negative outcomes for local economies, the environment and public health.

“UC ANR can become a powerful catalyst for climate adaptation and we should embrace a leadership role in advancing the knowledge and tools needed for a climate-resilient California,” they wrote.

Leaders of the UC ANR Climate Change Program Team are [Ted Grantham](#), [Faith Kearns](#), [Susie Kocher](#), [Tapan Pathak](#) and [Leslie Roche](#).