

# Forging a Working Partnership in the Southwestern United States

for locally relevant, action-oriented climate change education:

Results of World Café Discussions, December 7, 2016



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# Abstract

In 2016, University of Nevada Cooperative Extension held a workshop for Cooperative Extension faculty from six southwestern states and the Pacific Islands to build capacity for working with the USDA's Agricultural Research Service's Southwestern Climate Hub. The workshop, sponsored by the U.S. Department of Agriculture's National Institute for Food and Agriculture (NIFA, award 2016-67004-24969, program A3144) and hosted by the University of Arizona, had the goal of creating an interstate partnership between Extension faculty and scientists at the Southwestern Climate Hub to improve Extension's ability to deliver effective climate change information in the southwestern United States. Much of the discussion during the two-day workshop centered on the difficulty of teaching about a topic that is politically controversial. Some of Extension's audiences might not want to hear about climate change, while others are eager to learn and to take action.

The workshop began with presentations about climate change and panel discussions about how to communicate about climate science and strategies for adaptation and mitigation to enhance resilience. Participants then joined discussion groups (World Café sessions) to give their ideas about how to incorporate climate science information into their existing Extension programs. This paper gives summaries of the ideas of participants from several World Café discussion groups.

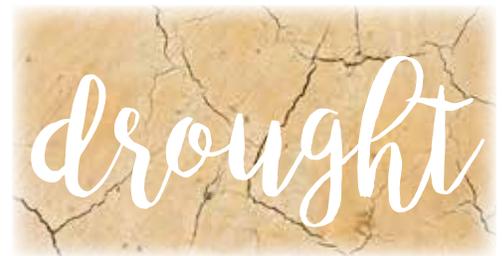


## Introduction

Beginning in the 20th century, weather and streamflow observations in the southwestern United States have regional warming trends and decreased water supply in drainage basins that sustain major population centers [1] [2]. Climate scientists project with a high level of confidence that these trends in the southwestern United States will continue, with prolonged summer heat waves, decreases in precipitation, decreases in late-season snowpack accumulations, associated declines in river flow and soil moisture, increased potential for high-intensity rains and flooding, prolonged drought, increased occurrences of wildfires, and increased competition for scarce water resources for people and ecosystems [1]. This includes Hawaii, which faces changes similar to those anticipated in the other states in the southwestern United States [3] [4].

Community members concerned about climate change have a bewildering range of information available about this topic, in the forms of headlines, tweets, comprehensive and dense printed and online reports, websites, radio and television commentators and political agendas.

Cooperative Extension, as a part of the U.S. land grant university system, has been developing and delivering programs that find innovative solutions to issues related to agriculture, food, the environment, and communities for more than 100 years. Extension serves every county in the nation. Community members trust Extension as a source of locally relevant, useful, and objective information to improve lives. Extension's role includes addressing controversial topics such as climate change, which are important for community security and safety. Extension staff feel a responsibility to develop programs focused on climate change, but educators and specialists have concerns about the best way to deliver useful information to audiences with varied needs and perspectives, especially given the political controversy generated by this topic and potential pushback from unconvinced community members.



Several surveys have found that climate change is an important part of 21st century Extension programming [5] [6] and should be an important component of the programs Extension offers, though the belief is tempered by some skepticism. Extension Educators and Specialists feel unprepared to assume the primary responsibility for meeting the challenges associated with the politically charged debate about climate change [5]. This underscores the need to invest in regional approaches to Extension's role in climate change education, to allow for tailoring information to the needs of stakeholders. The workshop and subsequent activities described here were designed to support Extension faculty with education and information for programs with a local focus rather than promoting Extension faculty as climate experts.

The U.S. Department of Agriculture's Agricultural Research Service (ARS) established regional climate hubs throughout the United States to provide research and technical support for climate-informed decision making: [Climate Hubs](#). The Southwest Climate Hub, based in Las Cruces, New Mexico, includes Arizona, California, Hawaii, Nevada, New Mexico, Utah, Nevada and the Pacific Islands and Territories: [SW Climate Hubs](#). The Southwest Climate Hub, established in 2014, relies on Extension to identify information needs within target audiences and to integrate climate change science and climate-informed research in community programs.



***Dr. Rob Davies presented his approach to discussing the fundamentals of climate change as part of the opening presentations.***

A recent review and synthesis paper made a compelling case for having Cooperative Extension lead efforts to meet local informational needs for adaptation and mitigation strategies for climate change [7]. Extension remains a trusted source of objective advice about climate change [6], especially because of Extension's reputation for accurately interpreting the science behind climate change predictions.

Reductions in state, county and federal support have diminished Extension's capacity to develop and deliver new programs in some states [6]. However, regional multi-agency and multi-institutional efforts, such as the

[Southeast Climate Consortium](#), a NOAA-Regional Integrated Sciences and Assessments program (RISA) working closely with Extension in multiple states, have developed regional partnerships that effectively meet educational needs across state lines and educational systems [5]. Such successful efforts represent the key strengths that Extension can bring to bear as a boundary organization in forging partnerships, brokering information and connecting with regional stakeholders [7]. These also illustrate the need to work with Extension Educators (who are land-grant University staff and faculty based in counties) and Extension Specialists (who often link county-based Educators and campus-based researchers) to prepare them to act as community resources for climate change information.

Extension in the states served by the Southwest Climate Hub recently launched a comprehensive initiative to integrate climate change science into community programs. Extension began this effort with a regional workshop in 2016 to share experience, lessons learned, and resources focused on climate change. Participants recognized the challenge of building considerable capacity to increase Extension’s technical knowledge and appropriate communication strategies. NIFA’s Climate Resilient Land Use for Agriculture and Forestry Program provided support for a regional workshop to develop climate science into existing and emerging programs (NIFA program A3144, award 2016-67004-24969). The initiative depends upon working collaboratively beyond the state level, engaging a host of additional partners, including state climate offices, university faculty without Extension appointments, and state departments of agriculture and natural resources and county organizations, such as soil and water conservation districts.



***Caiti Steele, of the U.S.D.A’s Agricultural Research Service, introduced participants to the national Climate Hub initiative.***

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The workshop, hosted by the University of Arizona's Institute of the Environment ([www.environment.arizona.edu](http://www.environment.arizona.edu)) in December 2016 in Tucson, sought to establish a partnership between Cooperative Extension faculty in the six Southwestern states and the Southwest Climate Hub. The workshop organizers<sup>8</sup> hoped to help participants progress from education to action about climate change and to understand more about ways to support Extension and its partners in sharing information on this topic.

**The goal** for this workshop was to *improve Extension's ability to deliver effective climate change information in the southwestern United States*. This goal included the following associated objectives:

1. Establish Cooperative Extension in the southwestern U.S. as an accessible and trusted resource for climate change education by identifying, developing and promoting feasible mitigation/adaptation strategies at the producer and manager level,
2. Identify audiences and develop audience-specific strategies to reach them with educational programs and materials.
3. Identify opportunities to increase the relevance of climate research to better meet stakeholder and extension staff needs and concerns.
4. Develop a strong working partnership between Extension and research groups (such as the U.S.D.A's Climate Hubs, and state climate offices) to provide information useful for educational efforts about climate change.
5. Develop a working intellectual foundation to support development of local adaptation and mitigation strategies.
6. Develop approaches to evaluate the efficacy of educational efforts.

The workshop attendees included Extension professionals and partners within the Southwestern Climate Hub. Speakers included Extension staff members from the region, staff members from the Southwest Regional Climate Hub and speakers from outside of the region with experience in developing such partnerships. One of the anticipated outcomes was a regional partnership with functional, thematic working groups, assigned responsibilities, a roster of participants and well-defined tasks.

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<sup>8</sup> See Organizing Committee for the Working Partnership Workshop

# Workshop Participants Speak

The first workshop sessions were devoted to lectures and panel discussions about climate change and the challenges of teaching about it. Participants heard from Katharine Jacobs, Director of the University of Arizona's [Center for Climate Adaptation Science and Solutions](#) who is an Extension Specialist who also had served as Director for the [Third U.S. National Climate Assessment](#) (NCA3). Ms. Jacobs summarized the chief findings published in the NCA3 [2]. The attendees also heard from panelists about Extension's role in addressing the topics of climate adaptation and mitigation. Given the politically controversial nature of the national climate dialog, participants heard several panelists describe approaches that work well in engaging citizens and some to avoid.



*The World Café discussions provided an informal way of gathering thoughts about how to incorporate climate change and climate science in Extension's programs.*

After participants considered the ideas and dilemmas presented by the early speakers and panel discussions, they shared ideas about incorporating climate science into program areas. The workshop organizers supported World Café discussions<sup>9</sup> for small groups, focusing on the Extension program areas of Youth and Family; Water, Floods and Drought; Fire, Range and Forestry; Agriculture; and Urban Programs. These discussions examined how climate change could be integrated into each of Extension's program areas rather than creating a stand-alone climate change program.

The following section summarizes World Café discussions about these major themes, captured by reporters in each session. In these sessions, participants contributed their thoughts about the best way to blend climate change information into regular programming. We report, below, key messages, and ideas for integrating climate change into each program area.

<sup>9</sup> See [World Café Method](#) (last accessed December, 2017) for a description of the World Café method.



# Results of Discussion Sessions

## YOUTH AND FAMILY

### Summary:

4-H was seen as the most promising entryway for climate information in this category. High-school students can be enlisted and educated to provide trainings for middle-school or elementary students, and are more likely to be paid attention to than teachers. A facilitator can help with initial sessions, but hearing from high school students is impactful and can be supplemented by experts to make sure critical points have been covered. 4-H's National Youth Science Day could be a great venue for this information. 4-H afterschool programs also provide an informal environment that is conducive to learning. Maker-fairs also are good conduits for citizen science.

Within schools, teachers are often most comfortable having others (external experts) come in to provide education about climate change. There may be no political will to introduce climate units into the curriculum in some states but relevant topics can be integrated into studies of ecology and earth science as well as math, literature and art. For example, basic knowledge of the sun as earth's heat and energy source and its effects on our atmosphere in producing our weather should be understood by all middle school science students. The role of the atmosphere in controlling temperatures on earth is already integral to this topic, so explaining how greenhouse gases work is an obvious component. It is important to link to existing teaching standards. The Climate Hubs have developed some materials that can be utilized and many other sources of climate-related curricula exist.

### Programming Ideas:

Gardening can be a topic that leads to discussions about local food, which can lead to discussion of changes in seasonality, temperatures and precipitation, as well as mapping where food comes from and the mileage it travels to tables, and the associated energy implications. Gardening can also provide garden food to cafeterias, linking students to hands-on learning and better nutrition. Discussing energy use is another entryway.

Utah and California hold youth sustainability camps that have been quite successful. For families, neighborhood-scale organizations provide structure and social connections. Informal meetings such as potlucks and fairs can provide forums for discussion on imminent concerns such as drought and fire, emphasizing the implications for personal safety and using and strengthening existing social bonds.

### Key messages:

- Working with youth is especially important because as an audience they are most affected, most at risk, most likely to be dealing with this issue, and possibly most open-minded.
- Mainstreaming climate change topics into existing education efforts is better and more effective than instituting a stand-alone curriculum.
- Youth must be engaged in interesting and relevant ways such as through outdoor activities, food-related activities, citizen science, and gardening.
- Programs should coordinate across Extension so that county needs can be addressed from the bottom up. Regional, state, and district initiatives could incentivize curriculum development and teacher participation
- Peer-to-peer and near-peer teaching and mentoring are the most effective means of connecting effectively with youth.

***"One mistake I made was not fully trusting that an audience was ready for the information. Even the youngest kids can do something and I should not hold back."***

## NATURAL RESOURCES: WATER, FLOODS AND DROUGHT

### Summary:

Water supply impacts from climate change vary from overabundance (floods) to scarcity (droughts). In the Pacific Islands, the problems are usually drought-induced, though there are also issues concerning effluent discharge and recirculating/reusing drainage water from irrigated fields. One effective project was a partnership between Cooperative Extension and the Natural Resources Conservation Service (NRCS) to help a tilapia farmer grow vegetables from water previously used for aquaculture. This water contains a substantial amount and variety of nutrients so there are multiple benefits to using it for irrigation.

There is considerable interest in rethinking crop management. In the Russian River Basin of California, California, flows are low in summer but necessary for keeping salmon and trout populations alive, so one new water management strategy is for landowners to build recharge basins to improve water security during times of low flows.

In New Mexico, the problem is too little water.

The state is experiencing groundwater depletion and the need is for more reliable irrigation water and saline soil management.

Extension staff need to be more aware of local conditions and the needs of their stakeholders. Growing cover crops in Texas and New Mexico can dry out soil for the next round of crops, but in other places, such as California, it can be effective to grow cover crops in winter before spring vegetable production to retain soil moisture. The fact that solutions are not always transferable to other locations is critical for Extension to recognize.

Urban vegetation can be used to address both adaptation and mitigation, e.g., by using gravity-fed irrigation, water-efficient landscaping, or shade trees, energy use can be reduced as well as risks associated with urban heat island effects. Solutions must be very localized. It is important for Extension staff to exercise humility and acknowledge they are not the prime

*"Lack of preparation for climate change communication can be a problem. Better to know how you will manage challenges to scientific information before you experience it in public."*

knowledge holders. Know your audience, and tailor information to their needs and capacity. People on the ground are doing good work, e.g., ranchers are adapting to drought by not stocking at full capacity, and developing their water resources, and looking at ways to improve delivery efficiency.

Peer-to-peer collaborative learning is very effective. Finding “early adopters” who can help deliver the message but are already within communities is always effective. One way to incorporate climate science into discussions with agricultural producers is to look for openings. For example, when talking about a farm’s future planning, one can say, “As the climate warms, you might want to convert this field to [an alternative crop], which will do better than your current crop.”

*“The term climate change to my guys is a bad word.”*

Indigenous knowledge should be given attention and respect. In Palau, agro-forestry is a 4,000-year-old industry and does not use fertilizers and pesticides. Native Palauans already know about climate variations, adjust to drought, and expect food production to decline in the context of climate change. Extension staff should be sensitive to this knowledge and can reinforce the idea that traditional practices can help native farmers adjust their farming techniques to capitalize on tourist food demands. In fact, some of these solutions are appropriate for integration into Western agricultural practices. It is not helpful to impose “Western” agricultural practices in places where they are not useful.

### **Programming Ideas:**

Solar panels to shade irrigation canals and gravity-fed rainwater harvesting systems are examples of integrated climate-resilient thinking into program areas. There is also substantial interest in local foods and the potential to initiate and integrate agrotourism, which could take the form of producer tours for urban audiences. These would build partnerships with the private sector to increase the opportunity side of the equation. Transitioning to organic agricultural growing practices can create much better financial returns. Sale of biomass from forests (as from thinning projects) has great potential but has some opposition; regulatory obstacles need to be overcome.

## Key messages:

### Common themes and perspectives

- The topic of water is important in almost all Extension programs and so the subject of water availability can help to integrate Extension programs and promote resilient thinking about climate issues.
- Monitoring and benchmarking are effective ways to quantify benefits and promote adaptive learning/management. The only way you can tell if you are making progress in adaptation is through objective assessments of progress, and these require good monitoring.
- Use systems thinking. Talk about how agriculture is connected to water supplies, transportation, global markets, etc., and how climate affects these things at multiple scales.
- Learn from indigenous cultures about resilience. There are multiple examples (including those shared at this workshop from the Pacific Islands) of how native peoples have developed approaches to managing climate related stresses over centuries.
- Watch for opportunities to address (and prepare for) the threats of future droughts and larger, more destructive floods. These are impacts that people can relate to, especially after recent occurrences in other parts of the country.



*Discussions continued throughout the workshop, even during breaks.*

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## Maximizing opportunities

- Partner with other sectors. For example, biofuels and forest thinning to reduce wildfire threats can increase revenues from existing agricultural and forest management practices.
- Agro-tourism and organic and sustainable practices all have economic benefits and can promote climate resilience.
- Solve problems through economies of scale; working together on solutions across communities may improve cost-efficiency.
- Extension can serve as a bridge between policy, regulatory agencies, and farmers. Inject input from on-the ground managers into policy discussions.

*"Water limitations make farmers focus on high-value crops, which leads to increasing risk in response to a shortage. Demand hardens."*

## Minimizing emissions

- Biomass, cover crops, piped irrigation (rather than unlined ditches), solar panels, green water systems, food labels, etc. were all suggested as ways to limit emissions.

*"If we listed water and energy use on our food labels, things would really change."  
Conservation can lead to risk in some cases; for example, highly efficient water systems have no buffer during drought."*

## NATURAL RESOURCES: FIRE, RANGE, AND FORESTRY

### Summary:

The Extension clientele is broad and diverse. It can be helpful to address communities of clients with shared problems rather than large, generic groups. The clientele includes some people who shut down at the mention of climate change. Best to get them talking about what they do, the issues that they face, and possible solutions. People may know what they need to do but can't afford it. It is best to refrain from getting pulled into the politics of the issue and solicit ways to work together rather than against each other.

*"There may be too many Ph.D.s in Extension work; we need a less hierarchical style of communication."*

Participants agreed that language and terminology is important. The phrase "climate change" is often a non-starter, as is "climate resilience." Identify issues that are most visibly impacting the farmer and address those first (such as drought). You can reframe the issues in less threatening terms or initiate discussion in the form of questions rather than statements. In contrast, others felt that Extension is neglecting its responsibility by dancing around the issues and should be more straightforward in their discussions with their clientele about climate change.

*"Ranchers take care of their lands; stewardship is already understood."*

*"We need to find ways to turn early adopters into peer leaders."*

## Key messages:

- We must remain flexible and frame our conversations in light of the new political environment.
- We must understand what clientele priorities are and how we can work within their goals; climate change is often at the bottom rung but can be framed as an opportunity.
- There is no magic bullet for effective conversations. Maintain relationships by understanding the consumer. Sometimes we may not be able to use the term “climate change.”



*Break-out groups worked to synthesize the results of presentations and discussions in the context of integrating climate change into Extension programs throughout the southwestern United States.*

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## AGRICULTURE

### Summary:

It is more important to help farmers become more climate-resilient in their practices and long term planning than to make them political converts. Determine what information they lack when they make management decisions and try to provide it in a climate context. The needs are local. Farmers can use climate data for yield forecasting to help them decide what to plant annually.

Some participants advocated “stealth Extension,” letting the stakeholders explore how to integrate climate change science into their work without using climate change terminology. Stakeholders will talk about drought or old practices that are no longer working. Use language they are comfortable with. Hawaiian farmers have noted that grazing lands have moved up in elevation as temperature changes and have asked Extension agents why this is happening.



Such observations provide an opportunity to talk about a changing climate with higher temperature and drier conditions than those considered to be “normal” in a historic context. Others found success by being explicit about the links between climate change and pests and food production. It is also possible to talk about climate change without talking about attribution. This is more palatable to some and also allows management changes on at least a small scale.

Discussion about longer-term climate change is possible by sharing information with stakeholders on future trends: this normalizes the idea, especially if it comes from people they have a trusted relationship with.

Fourth- and fifth-generation farmers have already proven their resiliency in running their farms. They need to hear how the future will be different and harder to predict than current conditions. For example, climate scientists predict that snow accumulations in western mountain ranges, a primary source of water for agricultural irrigation in many states, may be smaller with less stored water and may melt earlier than at present. Both changes could have important effects on snow-fed irrigation systems that sustain farming in arid western states.

Some participants thought that discussions with stakeholders about minimizing emissions are only possible if that is the stated focus of a meeting. Ranching was seen by some as an

***“We need to find convincing and quantifiable ways to convince people of the usefulness of climate work.”***



***A participant from Hawaii offered thoughts on programming***

activity that has more potential for mitigation, compared to farming. Waste lagoons from pigs, dairy, and feedlots impact methane emission in the atmosphere. Ranchers can put in digesters that convert methane to burnable fuels. Farmers instead are generally concerned with water supply and water quality and need

more information. Carbon calculators are available for farmers to help assess and compare which changes will have the biggest impacts, but there are “supply chain” boundary problems. The amount of fertilizer used in agriculture is an issue being debated in California and Utah.

## Programming Ideas:

Extension needs to understand the risk tolerance for a poor forecast. Growing degree days are also a concern. Conversations with certified crop advisors (CCAs) can be productive, such as discussions about decreased corn yields and seasonality. In California, fewer chill hours have been a problem and present an information need, especially for specialty crops like fruit and nut trees and grapes. The issues and answers vary by region and by cultivar. With minimum temperatures rising more than the maximums pistachio and pecan crop yields were adversely affected.

Seasonal change is an easy entryway into communities. Allow that topic to lead into discussion of longer-term change. Climate Smart Farming (from the Cornell Institute for Smart Solutions, [www.climatesmartfarming.com](http://www.climatesmartfarming.com)) provides a relevant and helpful factsheet, “Farming Success in an Uncertain Future [8].” Other good information sources include [Climate Wisconsin](#), which has an ice thickness tool that can plug in data to tailor it locally. [CalAdapt in California](#) is another good resource.

*“It is more important to help farmers become more climate-resilient in their practices than make them political converts.”*

Data use is context-specific. We can make better use of data by giving people the specific data sets they need, including summary sheets of data. We need to target specific audiences, such as wildlife managers, with information that we know they can use, such as GIS-ready data they can plug into species distribution models. We need to be ready with the data and familiar with audience needs so we can be a primary resource for our clients.

## Key messages:

- We must frame our conversations around what matters to our audience.
- We need to recognize the needs of the clients.
- We need to tell stories using the language relevant to our clients rather than academic approaches.
- We need to seize the moment and momentum to have difficult conversations.
- We must present the message respectfully and in a way that maintains the relationship.
- We must strive to prove and document the efficacy of what we do, both to farmers and our bosses.

## URBAN PROGRAMS

### Summary:

Creative strategies are required in the context of climate change. The topic must be linked with discussion that is tangible for stakeholders to engage with. Interactive tools are helpful. Also, it is best to hold workshops and events that focus on very specific impacts (e.g., drought) rather than complex topics related to climate change. The economics of climate change need to be communicated.

Much of the southwest US is highly urbanized and changing rapidly. These areas also provide opportunities for innovation within Extension. Young people are considered the key to advancing knowledge on how to adapt to climate change and also how to mitigate. Creation of curricula similar to what was created for recycling holds promise. Master Gardeners are learning from youth groups about what works best in transferring knowledge. Drawing on the success of Master Gardeners, a Climate Master's program could be developed to assist with climate-informed decision-making. Critical thinking skills can be promoted that will help in solving problems. Because urban populations are by nature highly concentrated, this group is an important focus area for Extension programs.

## Key messages:

- Bringing awareness to the topic of climate change can be a challenge, and different engagement techniques may be appropriate in urban contexts.
- Young people are the key to successful dissemination of knowledge because they are the future decision-makers.
- Urban programs are an important element in this equation because of the numbers of people who can be reached.



## Conclusion

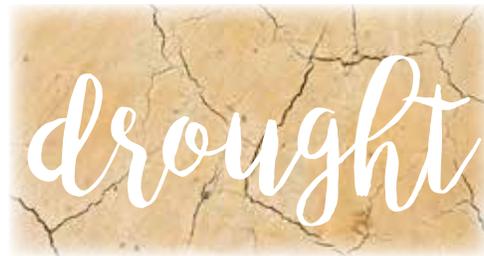
Workshop participants learned much about climate change and had a chance to think about effective ways to incorporate climate information into programs. It was helpful for them to hear from members of Extension throughout the region who had already dealt with the challenge of teaching about a controversial topic. Workshop organizers included interactive discussion groups such as the “World Cafes” to encourage participants to wrestle with the question about how they could best teach about climate change. The reports from the World Café sessions show that most are aware that they should know their audience before choosing the best educational methods.

The idea of forming a “Southwest Extension Climate Science Partnership” was well-received by the group. Participants saw the benefit of communicating with the Climate Hub and with other faculty to share lessons learned and methods that worked well and not so well. The Southwestern Climate Hub agreed to create website with links to participating institutions: [Info Partners](#) and to publish the bi-monthly the [Southwest Climate Hub Bulletin](#) with news about Extension’s activities related to climate change in the region. All presentations and panel discussions from the first day (leading up to the World Café sessions) were videotaped, and the edited versions will be posted on the Partnership website.

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As with any conference or workshop, the question arises after participants return home, “Did the Workshop accomplish its purpose?” When participants returned home, did they increase the amount of climate science information presented in their programs? Reports published in the 2017 issues of the Partnership Newsletter indicate that some participants have done so. Participants from California, in particular, surveyed all Agriculture and Natural Resources faculty in the state to learn their attitudes and needs associated with climate education. They subsequently organized a statewide training, similar to the Tucson workshop, to increase faculty ability to teach about climate science in their programs.

Generally though, when a partnership has members across a broad region such as the southwestern United States, it can be difficult to keep the momentum going over the years. Participants in the workshop valued the face-to-face interaction with peers and expressed the desire to get together for follow-up meetings of the six southwestern states in future years. At this point, the Partnership does not have funding to hold such meetings. During periodic conference calls, participants continue to build communication capacity, but without new resources, the future of the Southwest Extension Climate Science Partnership is unclear.



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