

## **Disasters Happen: Identifying Disaster Management Needs of Cooperative Extension System Personnel**

### **Abstract**

Disasters are deeply affecting communities and economies in the United States, and the role of Cooperative Extension in disaster management efforts continues to grow. We surveyed University of California Extension personnel to identify existing disaster management programs and future needs. We found that about one third of our respondents had been involved in preparing for, responding to, or helping communities recover from disasters. Respondents experienced having a variety of needs related to disaster preparedness and response systems, procedures, materials and equipment, and educational materials. Our findings revealed a critical need for program and professional development around disaster management for Cooperative Extension personnel.

**Keywords:** [disaster management](#), [Cooperative Extension](#), [needs assessment](#), [professional development](#), [Extension Disaster Education Network \(EDEN\)](#)

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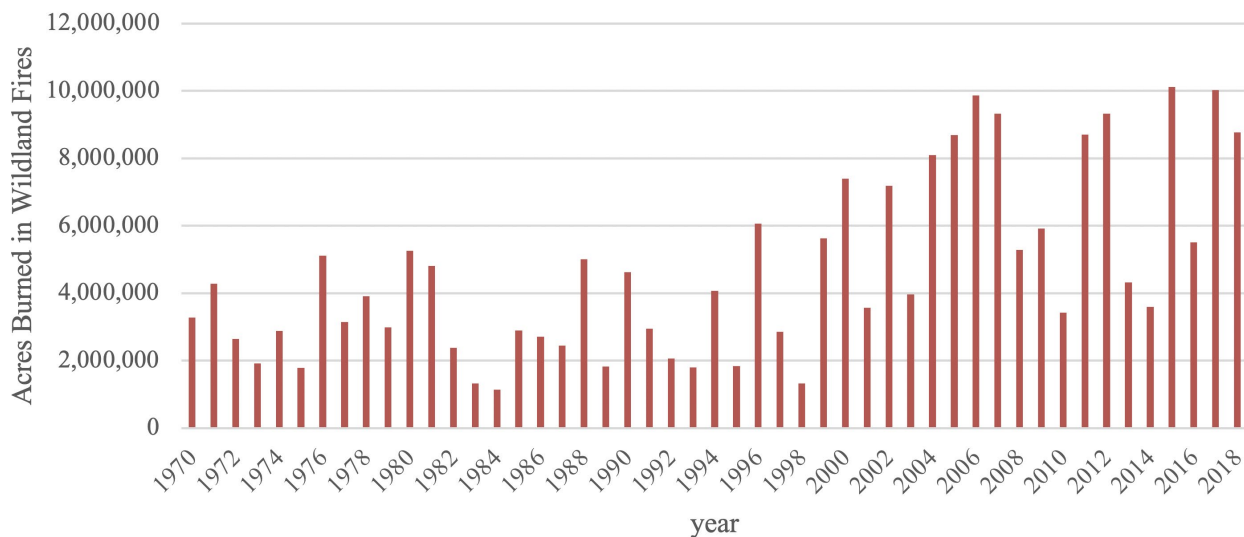
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## **Introduction**

Disasters are deeply affecting communities throughout the United States (Kerr et al., 2018). The numbers of meteorological, hydrological, and climatological disasters that have caused at least one death and/or losses of \$3 million or more have increased in the last 40 years throughout the United States (Munich RE, 2018). Between 1980 and 2019, hurricanes caused significant economic damage and deaths in the United States. For example, Hurricane Katrina resulted in a \$170 billion loss and 1,833 deaths, and Hurricane Maria caused a \$94 billion loss and 2,981 deaths (National Centers for Environmental Information [NCEI], 2020). The central and eastern drought/heat wave caused 1,260 deaths in 1980, the eastern drought/heat wave resulted in 502 deaths in 1999, and the U.S. drought/heat wave caused 454 deaths in 1988 (NCEI, 2020). Moreover, the number of acres burned annually in wildfires in the United States has increased in the last 50 years, and has risen even further in the most recent years (Figure 1; National Interagency Fire Center, 2018).

**Figure 1.**

Acres Burned in Wildland Fires in the United States 1970–2018



California is one of the states that has suffered greatly due to disasters. The drought between 2012 and 2016 generated total economic losses in California of approximately \$10 billion and has had ongoing ramifications for rural and urban communities (Lund et al., 2018). The highest numbers of state disaster declarations since 1953 have been because of fires (Federal Emergency Management Agency, 2019). The costliest and deadliest events in California have been droughts and heat waves, followed closely by wildfire events (NCEI, 2020). In 2017, fires cost the state \$10 billion (Bove, 2018) and led to over 47 deaths (CALFIRE, 2020) in what was a record-setting year. By 2018, there were new records set with \$16.5 billion in economic damage from a single fire, the Camp Fire (Munich RE, 2019), which also led to 85 deaths, burned 153,000 ac, and destroyed 18,800 structures (Insurance Information Institute, 2019).

Climate and forestry experts predict that this situation will worsen across the nation (Intergovernmental Panel on Climate Change, 2019; Wuebbles et al., 2017). In California, the average annual area burned under a high emission scenario statewide is predicted to increase by 77% in the next 80 years (Bedsworth et al., 2018). This confluence of factors warrants more focus and support for efforts related to wildfire response, and disaster management in general.

The Cooperative Extension System is well positioned to work on disaster management (Black, 2012; Cathey et al., 2007; Kerr et al., 2018; Telg et al., 2008). Personnel in University of California Cooperative Extension (UCCE) are responding to local disasters in a variety of new ways, as the disaster landscape evolves. In 2017, a range advisor organized an emergency hay program when the Thomas Fire hit Ventura County (Shapero, 2018). By 2018, another range advisor coordinated animal care for Camp Fire evacuees. The state's 4-H program also has launched relevant projects, including some addressing fire recovery and erosion control (Hill, 2018). These are a few examples of very recent UCCE disaster response efforts that also have included providing food assistance and establishing volunteer programs at evacuation shelters.

Even though UCCE has been playing a critical role in disaster response for decades, because of the size and geographic spread of the UCCE system, disaster management approaches and materials have tended to develop piecemeal on a program-by-program and often county-by-county and disaster-by-disaster basis. The

situation in many other state Extension systems is similar (Cathey et al., 2007; Kerr et al., 2018). While flexibility is desirable, to better serve community residents, it is important to understand UCCE's current involvement with disaster management programs and identify future disaster management needs.

## **Purpose and Objectives**

The purpose of our study was to identify existing disaster management programming and the future needs of University of California Agriculture and Natural Resources (UC ANR) personnel. UCCE is a part of UC ANR. In addition to UCCE personnel, UC ANR consists of Agriculture Experiment Station faculty, specialists, researchers, academic coordinators, and other staff on University of California campuses. The specific objectives of the study were to

- identify the types of disaster management support UC ANR personnel need at the individual level to ensure their own readiness,
- understand the ways UC ANR personnel have been involved in disaster management activities,
- identify the types of disaster management support UC ANR personnel need to better assist California communities, and
- identify disaster management-related professional development resources needed for UC ANR personnel.

## **Methods**

The Institutional Review Board at University of California, Davis approved the study. We used a descriptive cross-sectional census survey design for the study. The sample included all UC ANR personnel, which included UCCE county advisors, Extension specialists, Agriculture Experiment Station faculty, researchers and specialists on UC campuses, administrators, and staff. The sampling frame was developed from the most current UC ANR personnel email lists. The survey questionnaire was developed by our team, consisting of the state evaluation specialist and Extension professionals from environmental health and safety and natural resources areas. The survey questions focused on disaster management experience, activities, and professional development needs of UC ANR personnel. The face and content validity of the questionnaire were established by a panel of disaster management and evaluation experts, and reliability was established through a pilot test (Ary et al., 2019; Radhakrishna, 2007).

We administered the survey via the Qualtrics platform. We administered a pilot test to 30 randomly selected personnel from the sample, following up with three reminders at weekly intervals. Ten people responded to the pilot test. Pilot test results indicated no major issues except for question formatting and numbering, which we addressed. We administered the main survey to 1,389 UC ANR personnel excluding the 30 included in the pilot test. All received multiple reminders to take the survey (Dillman et al., 2014). There was a low response rate by the end of the last follow-up. To boost the response rate, we sent personalized emails to 25% of the remainder sample of nonrespondents. After multiple personalized follow-ups by two members of our author team, 224 completed the survey, yielding a response rate of 16%. We analyzed the quantitative data using descriptive statistics, and we analyzed the qualitative data from the three open-ended questions manually using the structural coding technique proposed by Saldaña (2016). A copy of our survey can be found at <https://ucanr.edu/sites/CalClimateChange/files/329166.pdf>.

To address the low response rate, which amounts to nonresponse error, we compared early and late respondents (Dooley & Lindner, 2003; Miller & Smith, 1983). Specifically, we compared early respondents (those who responded by two follow-ups) and late respondents (those who responded starting with the third follow-up) on three important questions from the survey: the extent to which they were prepared when facing disasters in their communities, whether they had been involved in disaster management efforts in the past, and the extent to which they felt the current UC ANR disaster resources were helpful for their disaster management programming needs. There were no statistically significant differences between the early and late respondents on the three questions at .05 level of significance, indicating that the sample was representative of our target population of UC ANR personnel.

Of the 224 respondents, a majority (57%) were women. The mean age of respondents was 49 years, and the mean length of time working in Extension was 12 years. A majority of the respondents (52%) were affiliated with the university through Cooperative Extension, 35% through the university campuses, and 13% through both Cooperative Extension and the university campuses. The respondents worked in agriculture (46%), natural resources (32%), nutrition and family (13%), and youth (9%) program areas. Thirty-five percent of respondents were county advisors, 17% program staff, 15% university faculty, 12% administrative staff, 11% Extension specialists, 7% researchers/technicians, and 4% academic coordinators.

## **Results and Discussion**

### **Objective 1. Identify the Types of Disaster Management Support UC ANR Personnel Need at the Individual Level to Ensure Their Own Readiness**

Of the 224 respondents, 95 (42%) had experienced disasters in their communities. Of the respondents who had experienced a disaster, the majority (78%) had experienced a wildfire. Thirty percent had experienced a drought, 30% a flood, and 16% a landslide.

Relative to disaster preparedness support, majorities of personnel reported needing better understanding of the state disaster response system (64%) and evacuation orders and procedures (63%), disaster preparedness equipment/materials (58%), coordinated disaster preparedness planning (58%), and the risk mitigation process (54%) and the process to best help vulnerable populations (52%) to ensure their own readiness (Table 1). Regarding disaster recovery support, majorities of the personnel reported needing support for postdisaster financial recovery (71%), processing of postdisaster financial claims (69%), reduction of postdisaster risks (56%), and postdisaster ecosystem recovery (53%) (Table 1).

**Table 1.**

## Types of Disaster Management Support Needed by UC ANR Personnel to Ensure Their Own Readiness

<b>Disaster management support type</b>	<b>%</b>	<b>n</b>
Disaster preparedness		
Better understanding of the disaster response system	64%	128
Better understanding evacuation orders and procedures	63%	125
Disaster preparedness equipment/materials	58%	115
Coordinated disaster preparedness planning	58%	115
Better understanding of how to mitigate risks (defensible space, etc.)	54%	107
Better understanding of how best to help vulnerable populations (elderly, ill, etc.)	52%	103
Better understanding of risks to the community	46%	92
Better understanding of what to take in an evacuation	40%	80
Practice in emergency response	39%	77
Community group support (neighborhood Firewise groups, etc.)	31%	62
Better understanding the mental health implications of disasters	27%	54
Better understanding why people don't evacuate	18%	36
Other	10%	20
Disaster recovery		
Help with postdisaster financial recovery	71%	130
Help with processing postdisaster financial claims	69%	126
Help reducing postdisaster risks	56%	102
Help with postdisaster ecosystem recovery	53%	96
Short-term mental health services	30%	55
Disaster survivor support groups	26%	48
Long-term mental health services	20%	36
Other	8%	14

*Note.* UC ANR = University of California Agriculture and Natural Resources.

Ricard et al. (2017) conducted an Extension personnel opinion survey in Connecticut on workplace and home emergency preparedness. They found in their study that workplace preparedness should be an institutional priority and that emergency and disaster preparedness training should be focused on both home and workplace preparedness.

## Objective 2. Understand the Ways UC ANR Personnel Have Been Involved in Disaster Management Activities

Slightly more than one third (37%) of respondents had been involved in disaster management in some way. Of those 37%, 55% had been involved with efforts before a disaster, 68% with efforts during a disaster, and 66% with disaster recovery activities.

Data regarding UC ANR personnel's involvement before, during, and after disasters are shown in Table 2. The predominant predisaster activities of UC ANR personnel included educating about disaster risk (64%), engaging in public outreach and extension (55%), conducting research related to disasters (26%), and conducting predisaster risk mitigation projects (26%). The major activities during disasters included evacuating or sheltering livestock (48%), helping with evacuation of communities (20%), managing volunteers serving the community (20%), and offering programming at evacuation shelters (8%). The other types of involvement during disasters included providing food and clothes, administrative support for activities, and information and serving as resource advisors. After disasters, the predominant types of involvement included engaging in public outreach and extension (46%), serving as a convener to address disaster issues (42%), and educating and supporting ecosystem recovery (40%).

**Table 2.**  
Types of Involvement of UC ANR Personnel in Disaster Management

Type of involvement	%	<i>n</i>
Before disasters		
Educated about disaster risk	64%	30
Engaged in public outreach and extension to keep activities and needs in the public eye	55%	26
Completed research related to disasters	26%	12
Conducted predisaster risk mitigation projects	26%	12
Engaged with elected and public officials to reduce risk of disaster	23%	11
Developed policy recommendations for disaster preparedness/risk reduction	23%	11
Facilitated public meetings in the community to identify and reach consensus on risk reduction priorities.	17%	8
Managed volunteers serving the community to reduce risk	15%	7
Other	21%	10
During disasters		
Evacuated or sheltered livestock	48%	12
Helped with evacuation of communities	20%	5
Managed volunteers serving the community during the disaster	20%	5
Offered programming at evacuation shelters	8%	2

Other	56%	14
After disasters		
Engaged in public outreach and extension to keep activities and needs in the public eye	46%	23
Served as a convener to address disaster issues (workshops, training, other meetings)	42%	21
Educated/supported ecosystem recovery	40%	20
Completed research related to disaster assessment and recovery	36%	18
Educated/supported community resilience and recovery	32%	16
Participated in disaster response teams led by other agencies	28%	14
Engaged with elected and public officials on disaster recovery	24%	12
Developed policy recommendations for disaster recovery	22%	11
Facilitated public meetings in the community to identify and reach consensus on recovery priorities.	18%	9
Helped clientele with recovery of livelihoods	10%	5
Managed volunteers serving the community after the disaster	10%	5
Helped community members enroll in postdisaster services	6%	3
Hired additional staff/students to work with recovery	2%	1
Other	14%	7

*Note.* UC ANR = University of California Agriculture and Natural Resources.

Other studies have also provided evidence of the vital role of Extension personnel before, during, and after disasters. For example, Cathey et al. (2007) commented on the role of the Louisiana Cooperative Extension Service following Hurricane Katrina in 2005. Extension personnel were at work immediately in disaster response, playing a critical role in helping commercial fishermen find their boats, distributing family-related recovery publications, assisting in rescuing cattle, and helping address critical needs at shelters.

### **Objective 3. Identify the Types of Disaster Management Support UC ANR Personnel Need to Better Assist California Communities**

Data regarding UC ANR personnel's disaster preparedness and response support needs are shown in Table 3. Related to disaster preparedness support, UC ANR personnel reported most needing support in understanding the risks to their communities (61%), mitigating the risks to their communities (58%), and having resources to educate members of their communities about disaster risks (52%). They indicated needing support during disasters regarding integration with disaster response services (69%), coordination with disaster response organizations (66%), and training on the incident command system (48%). Regarding postdisaster support, UC ANR personnel reported needing support for acquiring knowledge about disaster response resources available in California (74%), having a preestablished network within UC ANR to support personnel responding to disasters (62%), and having written disaster-related outreach materials in multiple languages (46%).

**Table 3.**

Types of Disaster Management Support Needed by UC ANR Personnel to Better Assist California Communities

<b>Disaster management support type</b>	<b>%</b>	<b>n</b>
<b>Before disasters</b>		
Help understanding the risks to the community	61%	108
Help mitigating risks to the community	58%	102
Resources to educate members of the community about disaster risks	52%	92
Connections with others in ANR who have experience in disaster response	45%	79
Connections with emergency personnel who respond to disasters	43%	76
Connections with volunteers in the community that respond to disasters	37%	66
More experience performing during traumatic situations	33%	58
Connections with elected officials who set disaster policy	28%	50
Other	5%	9
<b>During disasters</b>		
Integration with disaster response services (such as local office of emergency services, first responders, law enforcement, fire services)	69%	114
Coordination with disaster response organizations (such as Red Cross, Humane Society, local nonprofits)	66%	109
Training on the incident command system	48%	80
Coordination with organized animal evacuation efforts	39%	65
Other	10%	17
<b>After disasters</b>		
Knowledge about resources available in California to help with disaster response	74%	127
A preestablished network within ANR to help respond to disasters	62%	106
Written outreach materials relevant to disasters in multiple languages	46%	79
Assistance from others in UC ANR that have responded to disasters in their communities	39%	66
Training on how to deliver extension programs to traumatized audiences	32%	55
Other	6%	10

*Note.* UC ANR = University of California Agriculture and Natural Resources.

The disaster management support types identified in our study are in line with other disaster management studies in Extension. Cathey et al. (2007) suggested that being prepared with materials (e.g., appropriate



publications) to meet needs after a disaster, being prepared to deal with animal rescue operations, and having a volunteer management plan in place could have helped Louisiana Extension personnel during the Rita and Katrina disasters. Washburn (2006) suggested that Extension personnel should become members of the local and community emergency preparedness teams and be better prepared to share disaster information on preparedness and survival and to provide support and assistance before, during, and after a disaster. Downey et al. (2018) stated that Extension can lead volunteer management after disasters.

## **Objective 4. Identify Professional Development Resources Needed by UC ANR Personnel for Disaster Management Work**

Data regarding professional development topics of interest to UC ANR personnel are shown in Table 4. UC ANR personnel reported being in need of professional development related to understanding how UC ANR fits into broader disaster response systems (73%), what Extension resources are available for disaster response (63%), how the landscape of disaster risks in California communities is changing (62%), how communities can mitigate or manage disaster risks (62%), and how to develop preestablished networks within the organization for responding to disasters (52%). Further, a majority of the respondents (56%) indicated thinking that the role of UC ANR in managing disasters is changing, but only 16% had heard of the Extension Disaster Education Network (EDEN), and only one had used EDEN's disaster management resources.

**Table 4.**  
Disaster Management Professional Development Needs of UC ANR Personnel

<b>Professional development topic</b>	<b>%</b>	<b>n</b>
UC ANR's fit within the disaster response systems	73%	119
Extension resources available for disaster response	63%	103
Changing landscape/pace of disaster risks facing California communities	62%	102
Ways communities can mitigate or manage disaster risks	62%	102
Development of preestablished networks within ANR to respond to disasters	52%	86
Coordination with local and state entities	48%	79
Ways Extension programs in other states are incorporating disaster preparedness	47%	77
Facilitation of disaster recovery within the community	45%	74
Mobilization of the community to prepare for disaster	42%	69
Challenges faced by other UC ANR personnel in responding to disasters	33%	54
Trauma-informed disaster approaches	27%	44
Other	3%	5

*Note.* UC ANR = University of California Agriculture and Natural Resources.

Other state Extension systems are placing emphasis on professional development of their personnel related to disaster management as well as on coordinated team response capabilities. For example, Telg et al. (2008)

stated that Florida Extension was not well prepared to handle the hurricanes that hit the state in 2004 and that their personnel needed training in disaster preparedness, subject matter related to disaster management, and strategies for helping coworkers cope with disaster-related stress.

## **Conclusions, Recommendations, and Implications**

Our study revealed that UC ANR personnel have a variety of disaster management needs related to the systems, procedures, materials and equipment, and educational materials that should be in place for effective disaster management. A majority of the Extension personnel we surveyed had not been involved with disaster management activities in the past, and a majority also reported thinking that the organization's role in disaster management is changing and that the organization should be more involved in disaster management.

Only 16% of the respondents had heard about EDEN, and only one respondent had used EDEN's disaster management resources. EDEN was formed in 1994 on the basis of lessons learned after the catastrophic floods of 1993 (EDEN, n.d.). It is a collaborative multistate network focused on supporting Extension personnel in facilitating disaster management (Black, 2012; eXtension, 2013). Any proposed professional development efforts should increase awareness of EDEN's resources (Eighmy et al., 2012), including on trauma-informed disaster management, which could be leveraged by UC ANR. In addition, the western states have tended to lag behind others for multiple reasons, but given the current disaster landscape and the projections of disasters increasing as the climate changes, it could be valuable to coordinate better across states in the West, as has been learned from previous disaster experiences (McConville, 2013).

As our survey revealed, one of the more challenging aspects of disaster management for Extension personnel is understanding and fitting into the state-level disaster response channels. California uses a system known as the Standardized Emergency Management System. This system takes a bottom-up approach, starting locally. In many cases, residents alert the local government of an incident and the police or fire departments respond to such incidents. When disasters overwhelm the local government's capacity to respond, the government can request additional resources from other governmental entities through the state's mutual aid system. If the disaster grows larger, regional mutual aid coordinators and state-level staff can request additional resources from local governments in other parts of the state, state agencies, other states, the federal government, or other countries.

Besides the coordinated efforts at the local, state, and federal level, when disasters occur, residents also typically rely on grassroots organizations that provide immediate support at the local level. Cooperative Extension is a crucial institution for residents, particularly before and after a disaster. Kerr et al. (2018) emphasized, "No other entity has the geographic distribution, access to research-based practices, local credibility, capacity, and mission to address the depth and breadth of community needs after such events [natural disasters]" (Conclusions section). Black (2012) stated that Extension is well positioned to work on community disaster preparedness, mitigation, and response efforts and provided extensive examples of such a role. A majority of our study respondents indicated that UC ANR could, and in some cases already does, play a crucial role as a source of research and outreach related to disaster management. More support is needed in the form of both centralized coordination through something such as regional response teams and professional development to support UC ANR personnel in disaster resilience at both an individual level and also in their work to assist communities.

The results of our research have implications for Cooperative Extension personnel in the United States working

to more effectively respond to disasters in their communities by providing innovative, education-based approaches. The results of the research may be especially relevant to Cooperative Extension services in locations across the nation where wildfire is also increasing. Given the increasing frequency and scale of climate change–related disasters, including wildfires, in United States, it is critical that Cooperative Extension personnel feel prepared and supported to engage with their communities before, during, and after emergencies.

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