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After the Disaster Guidebook: Designing a Post-Disaster Communication Intervention for Rural Landowners

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Cover Page Footnote

Cover Page Footnote: Portions of this paper are based on a publication created by the first author under the supervision of the second author, in fulfillment of the requirements for a Colorado State University Extension Internship during the summer of 2021. A version of the After the Disaster Guidebook was then adapted in response to the Marshall Fire in Boulder County, Colorado, and published at <https://extension.colostate.edu/wp-content/uploads/2022/01/Boulder-County-After-the-Disaster-Guidebook-CSU-Extension-V3.pdf>. Acknowledgments: The authors express their sincere gratitude to the guidebook development team whose subject-matter expertise, mentorship, and contributions made “After the Disaster Guidebook: A Toolkit for Landowners Impacted by Wildfire” possible. This team includes Todd Hagenbuch, Director and Agriculture Agent, Routt County; Doug Dean, Director and Livestock and Range Agent, Tri-River Area; Carolina Manriquez, Northwest Area Forester, Colorado State Forest Service; Gloria Edwards, Coordinator of the Southern Rockies Fire Science Network; and Dr. Ragan Adams, Veterinary Extension Specialist, College of Veterinary Medicine and Biomedical Sciences, Colorado State University. Further mentorship on theoretical frameworks for community resilience and manuscript review was provided by Dr. David MacPhee, Professor Emeritus, Department of Human Development and Family Studies and Prevention Research Center at Colorado State University. The authors and guidebook development team, extend a special thank you to the key informants willing to share their professional emergency management experience or personal experience with recovery as landowners and wildfire survivors.

After the Disaster Guidebook: Designing a Post-Disaster Communication Intervention for Rural Landowners

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Abstract. Extension is well-positioned to facilitate communication strategies that foster community resilience and disaster recovery, particularly for rural residents. This paper proposes a new approach to post-disaster communication that strengthens rural community capacities in locally and culturally relevant ways. The findings revealed specific post-disaster information needs, preferences for local resources, and communication that encourages resilience through a document analysis and interviews with informants recovering from the 2020 Colorado wildfires. The practical recommendations discussed serve as a starting point for Extension professionals in other areas to consider ways to engage with their communities before, during, and after a disaster.

INTRODUCTION

Environmental disasters and climate change disturbances have increased in frequency and severity over the past decade, and experts expect this pattern to continue in the coming years (Ager et al., 2021). These trends have caused a shift in disaster risk reduction that moves away from “preventing and predicting” and toward community capacity building in response to both slow- and rapid-onset stresses and disturbances (Kais & Islam, 2016). For the United States Intermountain West, these disturbances have come in the form of accelerating drought conditions, intense wildfires, deadly flash flooding, and erosion over burn scar areas. In 2020, the state of Colorado and other western states experienced a historic wildfire season that resulted in thousands of scorched acres, evacuations, and the destruction of numerous homes and businesses (Masters, 2021). Although 2021 also saw destructive wildfires, recovery efforts in response to the 2020 wildfire season were already well underway in many areas.

During this time, Extension played a significant role in emergency management, evacuation, and disaster response. After the flames were out, county Extension offices were inundated with requests from landowners looking for post-fire educational materials and questions about who to contact for other services or resources. These inquiries prompted Colorado State University Extension to develop an online and print resource known as the *After the Disaster Guidebook*:

A Toolkit for Landowners Impacted by Wildfire, which could serve as a model for Extension response to similar disasters in other locations. The objectives of the study were to:

- Identify the types of challenges rural landowners and communities face after wildfires,
- Research state and local post-disaster recovery programs available to landowners,
- Utilize findings to create a statewide resource that can be populated with county-specific information to provide landowners on actions they can take to recover their lands after a fire, and
- Create a guidebook, both online and in print, to help people in disaster zones work toward recovery.

COMMUNITY RESILIENCE AND DISASTER COMMUNICATION

Norris et al. (2008, p. 130) define resilience as, “a process of linking a set of adaptive capacities to a positive trajectory of functioning and adaptation following a disturbance.” In the context of disasters, resilience can be applied at the individual or community level and characterized as the capacity to respond to a crisis event with a “stable trajectory of healthy functioning across time” (Bonanno, 2008, p. 102). The literature links individual resilience to disasters to age, education, and level of trauma exposure, as well as

life stressors, health, and social support (Bonanno et al., 2007). Social support has the potential to activate resilience processes by providing knowledge and assistance for practical needs; assisting with perspective for reasoning and problem solving; promoting positive emotions and attitudes associated with resilience (e.g., self-esteem, self-efficacy, optimism); facilitating adaptive coping behaviors; assisting in the regulation of negative emotional states through respite; and/or assisting in the discovery of greater meaning or purpose in life (Benight & Bandura, 2004; Fredrickson et al., 2003). An individual's access to and engagement with social support or social resources is a critical factor in developing a better ability to withstand the negative effects of post-disaster stress (Kaniasty & Norris, 1993; Palinkas, 2012).

On a broader scale, community resilience has been conceptualized as a community's ability to connect individuals to key social resources (Abramson et al., 2015; Sherrieb et al., 2010). Pfefferbaum and Klomp (2013, p. 279) formally define community resilience as "individuals working together to foster collective response and recovery." Community resilience is not a static end-state, but rather the collective response to trauma, community crisis, or challenges harnessed by a range of adaptive capacities, attributes, or systems allowing communities to "bounce forward" after a collective disturbance (Norris et al., 2008; Spialek et al., 2016). When applied to smaller communities and rural areas, community resilience can take shape through "strong traditions of volunteerism and social participation" (Miller, 2008, p. 272). The close social connections and repeated interactions of rural residents can facilitate the coordination of people and the flow of assistance and information (Cox & Hamlen, 2015; Miller, 2008).

In both urban and rural areas, most—if not all—community resilience models include some form of communication (Houston, 2015). Embedded within Norris et al.'s (2008) model, communication and information is an essential adaptive capacity for community resilience. Elements of this capacity include narrative characteristics, responsible media, skills and infrastructure, and trusted sources of information (Houston et al., 2015; Norris et al., 2008). For rural residents, county Extension offices are frequently the first point of contact for finding information about disaster preparedness, mitigation, and recovery (Koundinya et al., 2020). Paired with Extension's organizational service and response model, Extension is well-positioned to facilitate communication strategies that foster community resilience, risk reduction, and disaster response (Black, 2012; Cathey et al., 2007; Eighmy et al., 2012).

METHODS

Determining the relationship between communication and post-disaster information flow requires in-depth research,

particularly in rural communities. A content analysis was the primary method used for retrieving data from documents as well as key informant interviews to accurately assess crisis management responses and determine existing local resources. This method is a research technique that draws repeatable conclusions from text. This methodology provides insight into the decisions that informed which post-disaster resources were most relevant to rural residents who had been affected by a wildfire, as well as the layout and organization of the guidebook.

DOCUMENT ANALYSIS

A document analysis is an unobtrusive, systematic procedure of reviewing or evaluating print and electronic (i.e., computer-based and Internet-transmitted) material (Bowen, 2009). This procedure entails finding, selecting, appraising, and synthesizing the data contained within the material. After selecting, appraising, and synthesizing materials, the document analysis yields data—such as excerpts, quotations, or passages—that are organized into major themes and categories (Bowen, 2009; Labuschagne, 2003). This method is often used in combination with other qualitative research methods as a means of triangulation (Yin, 2014).

For the document analysis, the authors drew from post-wildfire resource documents released by Extension and partner agencies and organizations at the federal, state, and local levels. The authors collected most documents via snowball sampling provided by Colorado State University Extension professionals that worked with local agencies and provided resources to evacuees. The authors continued to gather materials until they reached saturation and were unable to identify new materials or resource lists. Then, they selected a total of 80 post-fire wildfire resources for analysis, including websites, fact sheets, and brochures that would be relevant to wildfire recovery in rural areas. Both authors then collaborated to develop an initial codebook detailing six broad categories in which to organize post-wildfire resources. These six categories included: general fire recovery, health and safety, home and family, landscape recovery, livestock and pets, and local and state contacts. After conducting key informant interviews, the resources collected during the document analysis would be synthesized within the guidebook or included as weblinks and agency contact information.

KEY INFORMANT INTERVIEWS

Although document analysis is a reliable method that can cover a broad range of topics, it has been critiqued for lacking detail (Bowen, 2009). The authors sought to provide a more robust approach; thus, they conducted interviews with key informants to gain insight into personal and professional experiences with wildfire recovery. In four different Colorado counties, authors conducted these interviews ($N = 6$) with

emergency management professionals and rural landowners recovering from the Pine Gulch, Cameron Peak, or East Troublesome fires that occurred in the state in 2020. In this study, three participants were women and three were men, and all participants were white.

The authors used a combination of theoretical and snowball sampling to identify participants. Researchers use theoretical sampling to find participants who have specific knowledge about the phenomenon of interest (Kaplan, 2017). Participants in this case were knowledgeable about rural wildfire recovery due to professional or personal experience. Additionally, Extension professionals aided in snowball sampling by providing names and contact information for potential interviewees based on relationships formed with emergency managers and landowners during the wildfire response. This method of selecting the sample was useful in understanding emergency response processes in multiple counties as well as how rural communities obtain information or resources after a disaster.

When possible, the authors conducted in-person interviews with landowners at their properties. They conducted interviews with professionals located in cities nearest to one of the three record-breaking wildfires. Conducting interviews in affected areas provided a unique opportunity to better understand and discuss wildfire impacts while also observing ongoing recovery efforts across affected counties. If in-person interviews were not possible due to property access or Covid-19 restrictions, the authors conducted interviews via Zoom. All in-person or Zoom interviews with professionals and landowners lasted 45 to 90 minutes. Appendix A contains sample interview questions, and Appendix B contains a description of the informants.

FINDINGS

Following the interviews, the authors coded the transcripts into Excel using a qualitative content analysis to identify themes associated with rural post-wildfire recovery that would aid in the development of the guidebook (Elo & Kyngä, 2008; Hsieh & Shannon, 2005). The first author took primary responsibility for coding while consulting with the second author on a regular basis to triangulate ongoing theme development and ensure coder reliability. To ensure consistency of the findings, both authors evaluated and resolved any discrepancies between coders. Post-disaster information needs, preferences for local contacts, and communication that encourages resilience were the three major themes that emerged to inform guidebook development, design, and layout. The authors then extracted representative quotes to elaborate on these themes and exemplify key findings that influenced development, such as which resources identified in the document analysis would be synthesized or featured in the guidebook.

POST-DISASTER INFORMATION NEEDS

Informant interviews revealed a wide range of informational needs for rural landowners recovering from disasters. From the perspective of those professionally connected to emergency response during and after the wildfire, there was a prominent need for both physical and mental health resources. Many residents, especially those with chronic respiratory conditions, reached out during the fire for more information on air quality and with questions about whether they would need respirators. Although residents did not reach out to informants explicitly seeking mental health services, those assisting with emergency response reflected on the shock, grief, or feelings of hopelessness they observed during interactions with evacuees. The necessity of mental health resources for rural residents after a disaster is critical given how close the link is between a sense of place and a social identity for rural residents (Abramson et al., 2015; Skerratt, 2013).

“Mental health is a big one after fires that no one talks about, especially in rural communities. Their home, business, and livelihoods were decimated overnight—that kind of grief is a heavy load to carry alone.” (Informant #1, May 2021)

For rural residents accounting for home or business losses, there were unique mental and emotional challenges. All informants who were landowners and evacuees mentioned challenges with insurance companies and seeking disaster assistance while also providing advice for future disaster survivors. One informant shared their experience with losing their home, a historic cabin, and a hunter’s cabin that served as a secondary source of income.

“My biggest challenge was really with reporting my losses to insurance. Trying to remember everything I had that is now ash or globs of metal and glass is tricky. It’s made even tougher by insurance companies pressuring me for an inventory list so they can settle in two weeks. Then after sending pictures of everything, insurance reps had to come out to make sure I actually lost what was pictured... can’t they see the roof is on the ground?” (Informant #2, June 2021).

Beyond property assets, lost or injured livestock also contributed to revenue losses for landowners post-disaster. If livestock did not directly succumb to the wildfire or related injuries, some were lost as a result of ash poisoning in food and water sources or new predators being pushed into the area. One informant reflected on livestock issues they had heard from other community members, caring for a neighbor’s injured cattle, and losing sheep to predators.

“Bringing back the sheep first [after the fire] was a big mistake. We knew we had mountain lions around which is why we have livestock guarding dogs, but we ran back to our friend’s house with the dogs thinking the sheep would be fine. When we got back, the sheep were missing. We got ahold of the game warden who told us to look for dig marks, and sure enough, a mountain lion had gotten to them and buried them” (Informant #3, June 2021).

In addition to a response to the new threats posed by predators, landowners must integrate flood preparedness into their post-fire recovery. During informant interviews, it was clear that preparing for flood potential was a top priority for informants with personal and professional connections to the 2020 wildfires. An informant professionally connected to recovery efforts shared more about county-level flood-mitigation efforts.

“Nearly one year later, [the] county is really working on trying to help landowners make sure their property is as safe as possible through GIS mapping to determine where drainages are and the flooding potential [the drainages] pose.” (Informant #4, June 2021)

These personal and professional perspectives were critical to the development team in narrowing down topics most important to rural landowners and which resources and contacts would be the most relevant to synthesize and/or feature in the guidebook.

PREFERENCE FOR LOCALIZED RESOURCES AND CONTACTS

The local and county-level work as described by Informant #4 did not go unnoticed by rural landowners working on post-fire recovery. Affirming Eighmy et al.’s (2012) and Koundinya et al.’s (2020) findings, evacuee informants cited county-level government and their local Extension offices as key sources of information aiding in their recovery. Informant #2 reflected on the way Extension acted as a critical link to getting a watershed assessment on their property after the fire that was then given to the county government, prompting action.

“Other programs have just been lip service, but Extension has been huge throughout this whole thing. They connected me to a watershed assessment that found that a 100-year event would put feet of mud on my property [and my neighbor’s]. I took that to [the] county and it prompted them to step up and build a berm to minimize flood or mudslide destruction.” (Informant #2, June 2021)

Informant #6 echoed similar thoughts about local and county-level resources being the most helpful in their recovery.

“I’ve been really impressed with [the] county [government] over the past year. Without them, I would have felt so much more lost and probably not as comfortable as I do now. That would be my biggest recommendation for future survivors is to really stay engaged with county government.” (Informant #6, July 2021)

Another benefit to seeking local or county-level resources was that they were able to give information and recovery ideas to the landowner that were more applicable to the resources and terrain in the area. One informant reflected on their experience seeking post-fire information from a source outside of the county.

“I have been really anxious about post-fire flooding and really doing my best to prepare. I called [out-of-state organization] trying to learn more and all they could give me were horror stories about people getting killed in post-fire flooding. They also told me to get a pontoon so I could float away from a [post-fire] flood. We are out in the desert here, where are we gonna float to exactly?” (Informant #3, June 2021)

Landowners’ clear preference for information addressing the local context of post-disaster recovery revealed a priority for including local resources and contact information throughout the guidebook. For information that could not be addressed solely by local organizations and government, state and federal resources were used as supplemental resources.

COMMUNICATION THAT ENCOURAGES RESILIENCE

Accessing information that is context-specific and that provides local assistance for practical needs is beneficial in activating individual-level resilience processes, such as enhanced social capital, self-efficacy, problem-solving, and coping skills (Abramson et al., 2015). In Informant #3’s experience, recommendations from an organization unfamiliar with the area did not provide location-specific advice, which was counterproductive to the informant’s locus of control in recovering from and preparing for natural disaster scenarios. As Informant #3 reflected on that experience, they shared perspectives on communication that would be more effective for future survivors.

“You know how to prepare for a fire, but nobody tells you about what you’re up against after the fire, which is hard to live through...we don’t want sympathy or horror stories. We just want someone to tell us that we can do this.” (Informant #3, June 2021)

After the Disaster Guidebook

An informant professionally connected to post-fire recovery echoed the importance of reestablishing the survivor's locus of control.

“So often, what’s lost in communicating [post-disaster information] is that there are so many things to do, so many calls to make, and things to keep in mind while dealing with shock. It’s easy to ‘communicate’ by throwing a wall of information and brochures at someone, but messaging in a way that puts the survivor back in control is often overlooked.” (Informant #5, June 2021)

However, post-fire narratives that retraumatize victims and sympathy messaging are not just limited to phone calls with outside organizations and stacks of brochures. Images of loss, destruction, and helplessness after a disaster dominate media coverage and were often reused in existing post-fire communication resources. While reviewing an existing post-fire publication, Informant #6 shared perspectives on triggering imagery.

“Was [the organization] only able to find stock photos of everything engulfed in flames? It’s kind of triggering, even a year later, because it makes me think about what my house must have looked like while I sat at an evacuation center.” (Informant #6, July 2021)

GUIDEBOOK DEVELOPMENT

The perspectives gathered during key informant interviews aided in the design and implementation of *After the Disaster Guidebook: A Toolkit for Landowners Impacted by Wildfire*—meant to be a truly-useful post-disaster resource. The name, particularly the subtitle, was inspired by Informant #3, who stated during their interview, “Once the shock wears off, we just want to get out our shovels and tools and get our life back.” The use of the term “toolkit” within the subtitle served to orient the audience towards viewing the guidebook as an interactive post-disaster recovery resource focused on enhancing the individual-level resilience process of self-efficacy.

Given that the disaster experience is marked by an event, such as wildfires or flooding, a phased approach is beneficial during the development of post-disaster communication (Houston, 2012). The *After the Disaster* development team sought to develop a guidebook that could be applicable for survivors at varying phases of recovery by drawing from Kamira’s (2007) recovery and reconstruction calendar, which describes four stages of recovery after a disaster.

Using this phased framework and the interview responses, the development team was able to organize the guidebook into the following phase-relevant sections:

Table 1. Disaster Recovery and Reconstruction Calendar (Kamira, 2007)

Phase	Definition	Time
Disorientation	Survivors struggle to orient themselves in the post-disaster environment.	The first 10 to 24 hours following the event.
Acceptance of New Reality	Survivors rationalize the damage and begin to adjust to their post-disaster surroundings.	Extends up to 100 hours or several days after the event.
Disaster Utopia	Survivors adjust to a more simplistic societal environment that is limited by the restoration of lifelines and social services.	Extends up to 1,000 hours or two months after the event.
Reentry to Everyday Life	Following the restoration of lifelines and social services, survivors begin working on reconstruction.	Extends up to 10,000 hours or one year after the event.

- Immediate Safety,
- Communication,
- Mental Health and Self-Care,
- Returning to Your Property,
- Insurance and Finance,
- Cleaning and Debris Management,
- Caring for Animals After Wildfire,
- Landscape Recovery, and
- Post-Fire Flooding.

Assuming that the guidebook would be distributed to survivors at evacuation centers in the disorientation phase, *After the Disaster* opens with a *Note from Us*, which serves as a way for Extension to connect with the reader by using language that is empathetic and promotes individual-level resilience processes such as hope, problem-solving, and social support. Following the note from us, *Immediate Safety* offers advice on physical safety, including county-level emergency dispatch and public health contacts. The *Communication* section includes an interactive notes page for the survivor to record event details, a phone call checklist of suggested calls to make after evacuation, and a customizable to-do list page. The purpose of this section was to encourage

resilience processes such as self-efficacy to assist survivors in reestablishing their internal locus of control. Next, the *Mental Health and Self-Care* section includes evidence-based coping strategies recommended by disaster survivors, links to mental health factsheets, and a list of local mental health contacts (Masterson, 2012).

The sections that followed, such as *Returning to Your Property* and *Insurance and Finance*, contained information relevant to the “acceptance of new reality” phase of recovery. Generally, these sections follow the same format as the previous sections: they include relevant tips, factsheets, and local contacts. Furthermore, interactive checklist pages such as post-fire supply lists, restoration tasks, and frequently asked questions for insurance representatives are available in hopes of promoting self-efficacy and problem-solving abilities. We created the remaining sections to correspond with the disaster utopia and reintegration into everyday life phases of recovery. These sections maintained the same formatting of relevant tips, links to factsheets, and local contacts, but shifted away from checklists to place a greater emphasis on generating higher levels of social capital and promoting problem solving. This approach to the formatting and organization of the guidebook allowed for the incorporation of post-disaster information and the promotion of resilience processes while reducing cognitive load for the survivor (Plass & Kalyuga, 2019).

The guidebook’s design elements (e.g., colors, shapes, and imagery) incorporated Informant #6’s perspectives on traumatic imagery while drawing from Plass and Kaplan’s (2016) emotional design framework. Emotional design refers to the use of natural design elements to elicit positive emotions that improve learning or skill development. Consistent with the use of language that promotes hope and optimism, the author made a concerted effort to avoid using visuals (e.g., flames, fire damage, chaotic evacuations) and colors (e.g., red, orange, brown) associated with the event that would retraumatize survivors. Instead, we included images taken during a site visit to one of the burn scar areas—images that show the regrowth of wildflowers and grass as the landowner and Extension staff replanted shrubs throughout the property. Additionally, the guidebook utilized a blue-green color scheme that would elicit positive emotions such as hope, optimism, and calmness—all of which are crucial to activating individual resilience processes. This color scheme was also chosen to align with Colorado State University’s branding standards.

CONCLUSIONS AND IMPLICATIONS

The study’s key findings have both theoretical and practical implications, demonstrating the importance of post-disaster communication as a dynamic, context-specific process. This study supports the literature that emphasizes the critical role

Extension plays in facilitating communication strategies that foster community resilience, particularly in rural areas after disasters (Black, 2012; Eighmy et al., 2012). However, there are some limitations worth discussing. First, the sample size for key informant interviews was small, and these findings may not be generalizable to areas outside of the United States Intermountain West or to other types of natural disasters. For this reason, Extension offices wishing to adopt a similar approach to post-disaster communication should work to include a greater breadth of perspectives from community members and emergency responders to create a guidebook that communicates disaster recovery in locally and culturally relevant ways. Second, and relatedly, informants of similar race, ethnicity, and socioeconomic status are overrepresented within the interviews, thus filtering aspects of the disaster recovery experience through this lens. For this reason, Extension offices looking to implement a post-disaster guidebook in their communities should take into consideration how access to post-disaster recovery resources differs for marginalized groups in their community.

Following a natural disaster, community resilience is dependent on clear, targeted communication that is relevant to disaster recovery phases and that activates individual resilience processes. With the threat of environmental and climate disasters increasing, it is critical to determine how Extension professionals can continue to facilitate communication that effectively supports wildfire recovery. As a result, the recommendations provided here are not intended to be a strict prescription or endorsement of a “one-size-fits-all” approach; rather, they are intended to provide Extension professionals with a starting point for thinking about how to engage with their communities both before and after a disaster strikes.

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APPENDIX A: SAMPLE INTERVIEW QUESTIONS

Interview questions included:

- Can you begin by telling me how long you have lived and worked in the community?
- Please describe the course of the events of the wildfire you experienced from your perspective.
- What impact did the wildfire have on you personally or professionally?
- What types of support, information, or resources did you (or community members) need most after the wildfire?
- Now that it has been almost one year since the wildfire, are there any other types of information, resources, or support you (or the community) share are still looking for?
- What types of support and resources were the most helpful to you (or community members) during wildfire recovery that you would recommend for the guidebook?

APPENDIX B: INFORMANT BACKGROUND

	Position	County Name	Length of Residency	Personal Connection	Professional Connection
Informant #1	Extension Agent	Grand	10 years	No	Yes (Emergency response)
Informant #2	Landowner	Garfield	30+ years	Yes (Evacuee)	Yes (Business evacuated)
Informant #3	Landowner	Garfield	20+ years	Yes (Evacuee)	Yes (Business evacuated)
Informant #4	County Employee	Mesa	20+ years	No	Yes (Emergency response)
Informant #5	City Employee	Mesa	10+ years	No	Yes (Emergency response)
Informant #6	Landowner	Larimer	10 years	Yes (Evacuee)	No