The Emergency Manager as Risk Manager

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Abstract Emergency management as an institution has grown in size and scope in recent decades, but has this emergent profession brought better public decisions about managing hazards and risks? The evidence is mixed because though emergency managers have acted wisely and heroically, they are subject to institutional constraints as well as the same decision biases and barriers that affect other experts and professionals. We propose that emergency management can be improved and hazard vulnerability lessened more readily through better decision processes than through the traditional approach of incremental improvements in the quality of information. The current fascination with "big data" focuses on more and better information, but emergency and hazards managers should ensure that they use the data they already have access to well.

Keywords Emergency management · Professions · Institutions · Decision making

Introduction

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through the traditional approach of incremental improvements in the quality of information. The current fascination with "big data" focuses on more and better information, but emergency and hazards managers should ensure that they use the data they already have access to well.

The term emergency management arose in the 1980s as the elements of civil defense associated with preparation for foreign attack ran out of steam and existing terminology no longer encompassed what a new breed of emergency managers actually did. One oft-cited definition describes emergency management as, "the discipline and profession of applying science, technology, planning and management to deal with extreme events that can injure or kill large numbers of people, do extensive damage to property, and disrupt community life" (Hoetmer 1991, xvii). Emergency management is both a job function and a body of knowledge in support of that function (Phillips 2003). The field has increasingly developed the characteristics of a profession, such as certifications, degrees, associations, and a shared, specialized body of knowledge (McEntire 2006; Jensen 2013; Wilson and Oyola-Yemaiel 2001). According to a survey of county level emergency managers published in 2009, 13.5% of EMs have postgraduate degrees, 44% have a state certification, and 41% have participated in training from FEMA. Seventy percent had received training in the National Incident Management System (NIMS) (McGuire 2009, 80).

Professions accumulate, transfer, and certify knowledge, but they also create boundaries to knowledge as a way to define themselves. As it professionalized and developed its own vocabulary, institutions, and knowledge base, emergency management has become isolated from developments in psychology and environmental management that could apply to its distinctive tasks. This chapter makes the case that emergency management would benefit by adapting structured decision making tools from other fields to help emergency management scholars and practitioners prepare for uncertain events given limited resources and conflicting values.

Today's Emergency Manager

The emergency manager's chief institutional constraint is that she operates as a coordinator rather than as the top official in a hierarchy, and does so with limited resources but wide responsibilities. The job of emergency manger exists at all levels of government, and it ranges from a part time position to a supervisory position overseeing multiple staff members in the largest jurisdictions or at the state level. "Emergency" is a misnomer since her duties extend far beyond the scene and timeline of a single event. Responders from police, fire, and medical services are the first ones dispatched to the scene of an emergency (McEntire 2007, 169). In contrast, the emergency manager is better suited for planning for acute yet prolonged harms—disasters, in other words—and for dealing with their consequences once the initial crisis has passed. In some jurisdictions the emergency manager leads the response to a fire, flood, or hurricane, but it most cases local elected officials, city managers,

and police and fire chiefs step in. During a crisis, the emergency manager is often put in the unenviable position of the hapless Michael Brown during Hurricane Katrina – all eyes are on the EM, but she has none of the authority needed to mount an adequate response. At the federal level, FEMA does not own most of the assets used in disaster response, and states and localities face a similar problem because the equipment, vehicles, and personnel, as well as the necessary legal authority, often reside in other agencies, if in the government at all.

Despite greater attention to the response phase of a disaster in both scholarship and in the public eye, an emergency manager's responsibilities are much broader, usually structured around the cycle of preparedness, mitigation, response, and recovery (Fogli and Guida 2013; Thompson et al. 2006; Van Wart and Kapucu 2011). At the local and even state level, much of an emergency manager's day is spent understanding more about a community's hazards, planning what to do when the inevitable strikes, and bringing together government officials and community members to prepare for the next event or to recover from the last one (McEntire 2007, 173–174; Murphy 2007). Emergency managers are busy people who face a long list of "what ifs" (Paton and Flin 1999).

Beyond their normal duties, some EMs are assigned a grab bag of other tasks such as code enforcement, building inspection, public works, or facilities management. Beyond the sheer number of responsibilities, emergency managers face substantial political and institutional constraints, including long time horizons for action, uncertainty about whether a major disaster will happen on their watch, and limited budget and staff resources that may be sacrificed to higher priority needs of other agencies (Donner 2008). To do the work of planning for disaster, the EM remains "heavily dependent on other departments, preparedness councils, mutual aid partners, regional consortiums, and emergent groups" (McEntire 2007, 168). Without substantial resources, the emergency manager is left to lead by collaboration and by calling attention to a problem, rather than by command and hierarchy (Cole and Murphy 2014). Numerous studies have pointed to the need for more attention to how EMs can collaborate with government agencies and public groups (McEntire 2007, 168–169; McGuire 2009; Waugh and Streib 2006).

For example, the shared-governance environment of flood planning and management amplifies the need for collaboration, yet many emergency managers are housed in local public safety entities (e.g., sheriff's office) that rely on strong, centralized authority in daily operations. A survey of 30 county-level emergency managers in coastal Oregon and Washington conducted in 2001 and reported on in Wernstedt and Hersh (2004) highlights this dilemma. When asked to assess the reliance of their county on promoting compliance with zoning and building codes aimed at flood protection and mitigation—on a "sticks and carrot" scale of 1 representing complete reliance on sticks (inspections, penalties, stop-work orders) and 10 complete reliance on carrots (use of incentives, discretion to relax requirements in certain situations, negotiation)—responses from emergency managers ran the gamut. Thirty-eight percent of the 30 surveyed indicated largely a reliance on sticks (a 3 or below on the scale), 13% largely a reliance on carrots (an 8 or above on the scale), and the remaining 49% indicated a reliance on a mix of carrots and sticks.

In the face of so many demands and needing to engage a wide range of stakeholders in diverse political settings, scholars of public administration have called on emergency managers to embrace strategic management as way to organize their many tasks and efforts to promote compliance. Strategic management is defined as "forward thinking, professionalization, capacity building, goal identification and achievement, increased public support, increased funding, and greater accountability" (Choi 2008). At its best, strategic management focuses attention on what is most important, but at its worst it offers another to-do list.

Beyond institutional constraints, emergency managers face the same cognitive constraints on their decision making process that other leaders face. These constraints follow from the use of rules of thumb that people employ in assessing probabilities. In many situations, these rules might work perfectly well, but in new or non-routine contexts they may distort decision making. A large literature in the psychology of decision-making has explored the promises and pitfalls of such decision shortcuts or "heuristics" in undertrain and non-routine conditions (Gilovich et al. 2002; Kahneman et al. 1982; Kahneman and Tversky 2000) in a variety of contexts, including weather and climate (Baker 1995; Gigerenzer et al. 2005; Konold 1989; Sink 1995). For example, when presented with hypothetical scenarios, Wernstedt et al. (2019) found that emergency managers took different actions in response to weather forecasts when the projected outcomes were framed as gains than when they were framed as losses. When a decision is framed as a gain, emergency managers are more likely to prefer a sure outcome. When a decision is framed as a loss, they are more likely to gamble. Neither choice is superior to the other, but the different responses show that even expert managers use heuristics that are subject to the effects of framing (Wernstedt et al. 2019).

Group decisions often share and, in some cases, exacerbate these types of individual-level biases (Kerr et al. 1996; Kerr and Tindale 2004). Research shows that individuals may be perceived as more competent, knowledgeable, and credible when they share information others already know to be true rather than offer alternative perspectives (Wittenbaum et al. 1999). As a result, ad hoc or unaided judgments may not yield informed or sustainable decisions. A literature on group decision processes outside the emergency management realm suggests that some groups may maintain conformity at the expense of alternate and possibly useful positions in order to maintain group cohesion (Gregory et al. 2001; McDaniels et al. 1999).

There is no reason to believe that emergency managers behave any differently in either individual or group settings. Nicholls' (1999) study of climate forecasts warns specifically about group conformity among weather and climate experts, noting that groups can strive to maintain cohesion among group members, rather than promote creative problem solving. In crises, this privileging of cohesion, and the insularity of group thinking it can encourage, can exacerbate stress and decrease the quality of decision making.

Conflicts over alternative courses of action pose another challenge to decision-making. Wernstedt and Hersh's (2004) survey of emergency managers suggests that many of the most cost-effective flood planning and management measures—

development and enforcement of building codes, zoning, and implementation of a repetitive loss ordinance—attract the most opposition from local community members. Emergency managers report numerous political obstacles to reducing natural hazard risks, such as concerns over litigation, residents' resistance to higher taxes, developers' opposition to new restrictions, advocacy for private property rights, and fear of home condemnations.

Finally, media and political attention can refocus emergency managers' attention to the latest or most spectacular event and away from the most serious hazard that a community faces. Ferrier and Haque (2003) propose a measure of the number of disasters in a community multiplied by a measure of magnitude as a more objective measure of what disasters deserve attention than the more newsworthy event that the media typically provides. This "fast and frugal" metric can serve as a starting point for discussions about how to respond to risks.

Better Decision-Making Rather Than Just Better Information

Much of the focus on improving emergency management has been on providing better, more accurate, and timelier information about warning and hazard vulnerability (Carver and Turoff 2007; Cutter 2003; Van De Walle et al. 2014). The scholarly literature advises the "emergency manager of the future" to master decision support systems, software, big data, and communications technologies (Gadomski et al. 2001; Pine 2004; Tufekci and Wallace 1998). In reality, however, emergency managers have trouble interpreting nuanced data such as storm speed and intensity, and with reconciling information from multiple sources (Baumgart et al. 2006). Making choices under conditions of uncertainty also poses difficulties to emergency managers, as it does among the general public. For example, the so-called numeracy problem—an inability in the general population to interpret basic numbers and probabilities correctly in decision contexts (Peters et al. 2006)—appears in the expert community of emergency managers, as well. For example, a recent survey of more than 200 emergency managers around the country revealed conflicting responses to flood likelihoods when expressed as frequencies (e.g., 1 in 10) vs. as probabilities (e.g., 10%) (Wernstedt et al. 2019).

While better quality information that is communicated clearly can mitigate this problem, the focus on information quantity and quality ignores much of the contemporary literature on decision support from the decision sciences. This literature has found that the process by which decisions are reached can matter as much or more than the fidelity of the information that goes into the process. The best information can feed into decision processes that come undone because of the way in which the decision is reached. The rush to search for agreement can lead to downplaying conflicts and finding a solution that is not widely supported or sustainable (Kenney et al. 2015, 3). Good public management practice allows for consultation, community engagement and collaboration with stakeholders (Emerson et al. 2012). Open dialog can run into predictable problems when it is time to make a decision, however.

How information is framed, and how intuitive mental shortcuts are used can impact decision processes and short circuit more thorough analysis (Wilson and Arvai 2010). Simply improving the amount or quality of information is particularly ill-suited to complex decision scenarios requiring trade offs among different values (Arvai et al. 2012). Emergency managers routinely face complex situations, since they chronically need to decide how to allocate finite time and resources among different hazards, different timescales, and different geographic regions and communities. The decision of how, whether, and when to prepare is not an automatic one that is determined by science and only immediate needs, but instead a decision process informed by science and a desire to satisfy competing values in a particular place and time and with an eye to future contingencies.

For example, emergency managers regularly use weather forecasts. Such information can decrease the uncertainty endemic to many decisions—for example, a 72-h forecast of heavy precipitation may increase the justification and allow time for positioning sandbags or putting emergency personnel on high alert, thus improving flood response. Deciding what to do is not straightforward, however, because financial and reputation risks suffuse any decision to act. In particular, emergency managers face two kinds of potential regret.

First, the emergency manager may choose to act on a forecast and encourage a response from community members, thus incurring costs, which some will see as wasted resources if the forecasted event does not occur or is less damaging than anticipated. For example, one emergency management blog warns about the dangers of predicting a "snowmageddon" in Colorado (Baron 2013). After all, Coloradoans are used to large snowstorms. Predicting such a dire event could aid preparation, but if the preparation requires the expenditure of financial and other resources and the big event doesn't occur, citizens may blame the messenger, criticize the waste of resources, and/or be less likely to believe the next forecast. We call this an "error of commission," committing to an action that in hindsight proves unnecessary.

Second, the emergency manager may choose to forego action in response to a forecast, not giving the forecasted event enough credibility to risk an action. If the forecasted event occurs and the emergency manager failed to take actions that may have reduced impacts, an "error of omission" occurs. The most famous example of an error of omission is the case of the Italian scientists who, in 2012, underestimated the threat posed by tremors that preceded the deadly L'Aquila earthquake. The scientists were convicted of manslaughter for their role in giving false reassurance, though they were later exonerated.

Wernstedt and Hersh's survey results from Oregon and Washington show, not surprisingly, the emergency managers worry more about errors of omission. Eight-one percent of the emergency managers indicated a "very high concern" with committing such an error by not sharing information with the public about a forecast of high river flows, and then having the high flows occur. The remaining 19% indicated a "high concern" with such a situation. Yet, 36% of the emergency managers also expressed a "very high" or "high" concern with an act of commission, wherein they shared information about a long-range forecast of high flows but the high flows did

not occur. Most surprisingly, 59% of emergency managers expressed a "very high" or "high concern" with sharing information about a long-range forecast of average flows, and then having high flows occur. For these emergency managers, the very presence of forecast information presents risks to consider.

Structured Decision-Making and Emergency Management

Structured decision making (SDM) processes offer an avenue to improve how emergency managers lead community decision processes. SDM approaches divide a decision problem into stages and use facilitators to allow participants to more explicitly define objectives, detail performance metrics, construct alternative courses of action, and confront trade offs. Empirical studies of SDM show promise for mitigating some of both individual and group-level decision constraints in environmental resource management contexts in particular (Arvai and Gregory 2003; Gregory and Long 2009; Hammond et al. 1999; Gregory et al. 2012)

Some of emergency managers' decisions are routine, such as setting annual budgets or attending meetings, while others are driven by crisis and an immediate response to an event. Another part of the emergency manager's job, however, is to guide community planning processes for how to prepare for disaster, ideally bringing together diverse perspectives on risk from emergency management, hazards planning, floodplain management, the general public, resources agencies, public safety officials, and other stakeholders. Where should a city locate infrastructure? How should the community aid residents living in flood-prone areas? What should the city do to monitor stream flows and snowpack? How much time should schools devote to planning for emergencies? City or county level emergency managers are involved in all of these decisions, although they help guide stakeholders to a decision rather than making the decision on their own. SDM could play a role in all of these elements.

SDM processes come in many shapes and sizes, but they all address four principal issues (Keeney et al. 2015, 4–9; Arvai et al. 2001). First, the **scope** of the decision must be arrived at before generating decision options, otherwise the set of options may be too narrow or two broad. Should the decision process arrive at a single best option, or should it generate a range of options? Sometimes, the job of the emergency manager is to clarify the choices that elected officials can make in preparation for a disaster. Understanding the scope of the decision will require identifying the stakeholders (Gregory et al. 2013). Are particular neighborhoods involved in a decision to invest resources in preparing for a flood? Will the schools need to be altered because the community will rely on their buses for evacuation? Is equity among socio-economic groups a concern and, if so, are the groups affected represented in the process? Narrowing the scope of the decision also requires identifying apparent and fixed constraints (Hammond et al. 1999). Apparent constraints are real, but more flexible than they might appear at first. For example, a budget constraint can be moved within certain bounds with the consent of top officials.

Fixed constraints cannot easily be changed. These might be the land area above a flood plain, or the amount of time and attention particular officials have.

The scope of the decision should recognize which constraints can be loosened, and which are fixed. In addition some decisions may be linked. For example, increasing the number of tornado shelters in a community might depend upon building a new public school with a basement that could house people. The decision process should recognize that tornado preparations and the schools budget are linked. And an information base that provides the stakeholders with a consistent set of information must undergird all of this. This seems obvious, but may be less common than assumed in some longer range emergency planning. In our survey of participants in the 2008 FEMA Higher Education conference, for example (Wernstedt et al. 2009), one of our respondents observed, "Communication between the emergency preparedness and state climatologists occurs only on an event-by-event basis. As far as I know, the state climatologist does not participate in emergency planning." Absent such communication, the scope of the decision under consideration may be distorted.

Once the scope of the decision has been identified, the next step is to determine the **range of objectives**, and then to operationalize these objectives. When people are asked what their objectives are, they often give broad answers such as sustainability, resilience, or prosperity. One way to elicit more specific objectives is to ask why particular broad objectives are important. A group might say that they want a resilient neighborhood because they want to preserve the neighborhood's historic architecture. The manager can take the statement about preserving the neighborhood and separate ends objectives such as preserving a neighborhood's character from means objectives such as preserving a particular building or streetscape or building a barrier around a historic structure. Visual diagrams can show a hierarchy ranging from means objectives and possible means ends to universally agreed-upon ends objectives. It is important to make objectives as specific as possible in terms of their direction (more or less) and measureable amount. For instance, a community may want to preserve a historic school and church in the face of rising storm surges, or it may want to raise a road so that it is protected against a 100-year flood.

The next step is to identify a **range of alternatives** to achieve the objectives. At this stage, it helps to be open to creative solutions, even unpopular ones, since the point is to compare the full range of alternatives. Emergency managers might hold a meeting focused on alternatives, or they might simply collect alternatives in conversation with various stakeholders and later present them at a problem-solving meeting. Sometimes the emergency manger's role is to bridge a network of people involved in preparing for hazards and disasters. In developing alternatives, it is important that everyone involved identify and agree upon how to measure them. Building a dam carries a financial and perhaps environmental or land use cost. Leaving a shoreline unprotected also has potential costs in the future as well as benefits for recreation or amenity value. Considering alternatives also requires thinking about their consequences and the role of uncertainty. People can have difficulty quantifying or understanding how uncertainty impacts their decisions. Emergency managers may want to bring in outside experts to help explain uncertainty, such as in climate or weather forecasts.

Once alternatives are specified, the final stage is to identify the **trade offs** that stakeholders and decision makers will need to make. Managers often want to turn zero sum games into win-win solutions, but sometimes making a decision requires making trade offs. The goal of identifying trade offs is to get a group to consider how much of one objective they are willing to give up to accomplish another. Trade offs might be sacrificing one objective for another, or they might be tolerating a particular degree of uncertainty. In other cases, trade offs are simply costs of time and attention. One way to visualize trade offs is to portray them in a consequence matrix where various attributes can be compared directly (Arvai and Post 2012; Winkler and Clemen 2004). Attribute-by-attribute comparisons are preferred to simple rankings because they make clear the trade offs involved along multiple dimensions. Decision science research shows that people are at best only adequate rational maximizers of multi-attribute utility (Kahneman 2011). There is reason to believe that people more typically develop their preferences non systematically in response to various stimuli and associations rather than arriving at coherently ranked alternatives measured by general utility (Slovic 1995).

When conflict levels are high, conflict resolution and alternative dispute resolution techniques may be applicable. When conflict is low, pointing out trade offs can help bring to the surface things that people take for granted. As an example, a traditional approach to creating a historic preservation district might focus on architectural details and materials. A structured decision process for making trade offs would compare the benefits of a historic preservation district with the effects on the speed and cost of disaster recovery. Historical preservation and recovery might be in tension, or there might be ways to lessen the financial and recovery timeline effects of preservation districts during a recovery period. Without making the trade off explicit, though, decision makers may not weigh alternatives with a full view of the impact of their decisions.

Emergency managers might lead groups through all four steps in a collective process, or they might build a range of objectives, alternatives, and trade offs through separate conversations and present the results to stakeholders as part of a deliberative process. Either way, the SDM process has the potential to mitigate individual and group decision biases, while at the same time incorporating the input of stakeholders with different perspectives on risk. People tend to settle on an available alternative that is reasonably acceptable rather than sorting through all options, what behavioral scientists call “satisficing” rather than fully satisfying their wants. An explicit deliberative process allows for more consideration of more alternatives than they would normally attend to. Furthermore stakeholders from one group, such as golf course resort owners, might not see the trade offs involved in reducing their water consumption while maintaining the water consumption of agricultural concerns. A formal process allows groups to see things from the perspective of others. If groups sometimes rush to consensus to maintain harmony and speed up the decision process, the SDM process adds speed bumps and makes clear trade offs so that minority or quieter views are less likely to be left out than if the process were rushed in an attempt to jump to ranking outcomes.

SDM in Practice? Preparing for the Oregon Floods

Formal structured decision-making processes have been employed in environmental resource management settings, from making decisions about where to begin logging operations, to decisions about how a community can balance energy needs with environmental sustainability. Emergency management has not adopted SDM techniques in a formal way, but the best emergency management decision processes share some of the basic features of SDM, such as collectively defining the scope of a problem, considering objectives, constructing alternative courses of action and attaching performance metrics, and confronting trade offs. We argue that emergency management could benefit from a greater use of SDM, whether a highly formalized process or a more informal use of a conscious decision process to make the best possible use of information.

Emergency managers are awash in scientific and technical information about hazards, but making use of the information in an efficient and effective manner presents challenges. In the search for more evidence-based decisions, many managers focus on more and better information, but they would do well to devote some attention to the process by which they make decisions using that information. In almost all situations, this decision process will not take place solely among emergency management staff, but rather it will engage a wide range of emergency management stakeholders from across the community.

To understand how emergency managers might better use scientific and technical information, we examined the use of seasonal climate forecasts produced by the National Oceanic and Atmospheric Administration and distributed to emergency management agencies. These forecasts are important because they measure the strength of seasonal climate phenomena, such as the El Niño and La Niña anomalies, which are associated with a greater likelihood of extreme events such as droughts and floods in particular areas. Such forecasts hold out the potential for emergency managers to know more about the likelihood of floods in particular regions, yet they are rarely used. Wernstedt and Hersh (2004) suggest that this does not reflect a lack of familiarity with seasonal forecasts. To the contrary, only 12% of the 30 emergency managers they surveyed indicated that a lack of awareness or access to seasonal forecasts was a critical or near critical constraint to forecast use. Rather, the principal constraints their respondents noted related to making decisions under uncertainty, both with respect to whether the forecasted event would occur and whether the event would occur in a vulnerable location.

More recently, Roberts and Wernstedt (2016) contacted 62 Oregon emergency managers in 2012 and found that while many were familiar with seasonal climate forecasts, only two reported using climate forecasts that led them to take action before a flood. In those two cases, the presence of a conscious decision process was important in attaching the information to actions that people responsible for preparing for flood hazards could take. While no one used formal SDM processes in these two situations, the utility of a formal decision process suggests that emergency managers could do more using similar processes or even more formalized ones in the future.

In one of the cases in fall 2010, Lane County, Oregon local emergency manager Linda Cook (2012) learned that the winter and spring would bring La Niña conditions to western Oregon. Winter weather is of perennial interest in Oregon, and a strong La Niña is associated with a greater than normal likelihood of precipitation in the Pacific Northwest. Each October, Cook organizes a winter weather meeting to discuss how to prepare for the season with county officials. The group is in broad agreement about the scope of the decision: to figure out what to do over the next 3 months to prepare for winter weather, and to coordinate plans. At each meeting, the group revisits the range of objectives they will pursue. Everyone wants to keep residents of the country safe, and everyone wants to minimize the damage to property that floods cause. The alternatives for achieving these objectives depend on the weather and climate conditions that season as well as the competing priorities in each of the city's agencies.

Faced with rising rivers, Cook (2012) told 54 attendees from the county's public agencies at the October 2010 meeting to be on the lookout for heavy snowpack followed by a warming trend and eventual flooding. She delivered some of the forecast presentations herself, and relied on National Weather Service briefings for others. What to do? The county could decide to proceed as usual, or they could shift some attention and resources to preparing for the wet season. The group reached a consensus that the danger of floods was greater that year than normal, and they decided to increase their preparations. Some agencies updated maintenance of river gauges, while others cleared stream course debris. The school district promised to lend buses and equipment if needed. Still other agencies stocked sandbags. All were more attentive to developing winter conditions. The trade offs were primarily reduced budgets and decreased attention for other activities, but making these trade offs was easier after the group deliberately reviewed the forecast information, deliberated, and reached consensus as a group about how to prepare.

In the end, the rains fell during the winter of 2010–2011, but Lane County was spared severe flood damage. The county had taken a number of steps that paid off, from checking river gauges to monitoring the weather more closely so that people could shore up defenses or move out of harm's way before the flood.

Conclusion

The decision-making challenges of the emergency manager are similar to the challenges in other professions. The solutions, however, must be tailored to the resource-constrained and highly collaborative EM environment. What to do? One emergency manager told us that, "After 9–11 we had a lot of meetings and relationship building, but now we don't have as much time for relationship building" (Roberts and Wernstedt 2016). Improved decision making processes, borrowing from structured decision-making techniques, will require a modest investment of time and resources,

but they have proven benefits. When resources are scarce, standardizing processes across decision contexts can be especially valuable. Evidence shows that experts and the public are happier with the quality of their decisions when they use structured techniques. In addition, standardized decision processes will require modest investments in the capacity of emergency management agencies. Finally, the career trajectories of emergency managers will need to reward participation in decision processes and leadership in taking decisions that may not bear fruit immediately.

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