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Learning processes, public and stakeholder engagement: Analyzing responses to Colorado's extreme flood events of 2013

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ABSTRACT

In early fall of 2013 in the Front Range of Colorado, several communities experienced intense rainfall over a three-day period, exceeding annual average precipitation rates. Extensive damage occurred to roads, infrastructure, parks, river corridors, homes and business throughout the region. Across the U.S. and in other nations, as population increases in flood-prone areas, flood risks and vulnerability are increasing as well. Successful response to extreme events may be due to policy learning—changes of beliefs, attitudes, behaviors, and goals – in response to new information and experiences. This learning can at times lead to adaptation of local policies to increase the resilience of communities faced with risk from extreme events. The extent of policy learning may depend on how communities engage with stakeholders and the public in post-disaster recovery. Using a comparative in-depth case study approach of seven Colorado communities, this study examines how communities actively engage stakeholders and the public in decision processes after an extreme event.

1. Introduction

As summer of 2013 turned to fall in the Front Range of Colorado, over 16 inches of rain fell in a three-day period in some areas, totaling more than annual average precipitation rates (Henson, 2013). Towns such as Boulder, Lyons, Longmont, and others that sit at the mouths of mountain canyons, experienced flash flooding. When the rain and water moved east toward the plains, other towns such as Evans and Milliken were devastated. Infrastructure throughout the region was damaged, if not destroyed. Immediate road repairs cost over $450 million and costs are expected to rise as permanent repairs are completed (Whaley, 2013). Many residents' homes became uninhabitable, and many residents were under no-flush restrictions, with Evans under such restrictions for eight days. In Lyons over 20% of the housing was destroyed or severely damaged and over 1000 residents in Evans lost their homes. Beyond these most basic problems, business, community parks, and open space were also affected.

As population density increases in flood-prone areas, community vulnerability to flood risk is escalating. Along with this trend, in the U.S. the responsibility to design strategies and policies to mitigate flood risk is shifting from the federal government to states and localities (Brody et al., 2009). In the wake of a flood, communities must make decisions about whether,

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where, and how to rebuild, as well as whether to adopt changes in zoning and floodplain uses. Communities may need to repair or rebuild key public infrastructure, roads, storm sewers, and wastewater management systems. Floods may allow communities an opportunity to learn from their experiences and adjust their policies going forward. Flood management decisions may lead to increased community resiliency or continuing vulnerability to future flood events. By reflecting on past policies, modifying former policies, or adopting new policies, communities may become less vulnerable to future flood risk. How communities engage with stakeholders and the public during these recovery processes may impact local-level flood management practices. By examining the policy and decision processes conducted in response to the September 2013 floods in seven Colorado communities, this study examines how communities actively engage stakeholders and the public in decision processes. To understand if and how communities eventually learn during their recovery processes, is critical to first understand the decision processes that occur that may either encourage or limit learning from the experience of the floods.

2. Learning in response to extreme events

Learning in response to an extreme event may take many forms. Communities may identify policy failures or draw new conclusions about relationships, networks, and organizational structure (organizational learning). Policy learning – changes of beliefs, attitudes, goals, or behaviors – in response to new information may occur in response to extreme events (Sabatier and Weible, 2007; Albright, 2011). These overlapping concepts of learning may encourage adaptation of local policies to increase the resilience of communities faced with risk from extreme events. There are several potential driving factors that may explain variation in learning in response to extreme events: extent of flood damage, resource availability (e.g., financial, technical, human capacity), structure and openness of decision-making processes, and type of stakeholder participation in recovery (Brody, 2003; Johnson et al., 2005; Brody et al., 2009; Albright, 2011; Vulturius, 2013). Researchers argue that collaboration and collaborative processes are key components to the formation of the development of resilient cities (Godschalk, 2003).

2.1. Policy change and learning

The policy change and crisis literatures posit several potential causal mechanisms that may explain the occurrence of policy change and learning in the aftermath of an extreme event or crisis (Nohrstedt and Weible, 2010; Sabatier and Weible, 2007). One such framework, the Advocacy Coalition Framework (ACF) is based on groups or coalitions of stakeholders and defines policy-oriented learning as changes in beliefs held by these coalitions of policy actors (Sabatier and Jenkins-Smith, 1999). Several additional concepts inform the theoretical landscape of learning in response to an extreme event, such as social learning, political learning and instrumental learning (Bennett and Howlett, 1992; May, 1992). While the reflection of past experiences and the collection of new information are central to a variety of learning concepts, the content of what is learned and who learns varies across theoretical frameworks (Birkland, 1997, 2004, 2006; Busenberg, 2001; Sabatier and Jenkins-Smith, 1993; May, 1992; Bennett and Howlett, 1992).

The extent and type of learning that occurs in response to an event may depend on the complexity, severity, and distribution of the policy problem (i.e. the extent of flood damage); the level of conflict among advocates competing for their recovery policy goals; resources and shifts in resource availability; and the occurrence of professionalized meetings or broader community participatory processes (i.e. meetings or workshops) at which individuals from potentially competing advocacy coalitions meet (Sabatier, 1999). The accumulation of information and its subsequent exchange among competing coalitions may play a significant role in encouraging learning. Collaborative decision-making processes, if they occur, may provide such fora or venues for learning to occur.

2.2. Participatory and decision-making processes

In the wake of extreme flooding, communities will be faced with decisions about how to respond and what future plans to make regarding emergency management, rebuilding, and similar issues. Community staff and elected officials must decide how and to what extent to involve stakeholders in decisions regarding flood recovery (Kweit and Kweit, 2004). Herein, we define stakeholders as both government and non-state actors who have an interest and voice in the decision-making process. How a community conducts participatory and decision-making processes in response to floods may help explain what type and to what extent policy learning occurs. This study, therefore, examines the links between a shock (i.e., the floods in Colorado), damage incurred, resource availability, and subsequent local-level participatory processes to inform flood recovery.

Participatory or stakeholder processes vary along multiple dimensions, including type of participants (e.g., government, civil society organizations, experts, citizens); scale of process (e.g., local, regional, national) (Margerum, 2008); the level or type of governance (e.g., government-led, citizen-led, hybrid) (Moore and Koontz, 2003; Steelman and Carmin, 2002); and degree to which participation directly leads to decision outcomes (e.g., public hearings, public advisory committee, consensus meetings, citizen juries) (Beierle, 2002; Rowe and Frewer, 2000; Hansen and Mäenpää, 2008). According to Arnstein (1969), the depth of participation (as discussed in the "ladder of participation") can vary from minimal, with passive

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