Home buyouts: a tool for mitigation or recovery?

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Abstract

Purpose – Home buyout programs are typically funded by the federal government and implemented by local agencies. How these agencies design and implement buyouts has considerable impacts on participating households and communities, making understanding the internal processes of implementing agencies a critical component of buyout research. This study addresses this issue by exploring the early design and implementation phases of a buyout program in Harris County, Texas, following Hurricane Harvey.

Design/methodology/approach – Data were collected via semi-structured interviews with buyout staff and government stakeholders. Data were analyzed in two phases using grounded theory methodology and holistic coding.

Findings – There was considerable tension regarding the role of buyouts in mitigation and recovery. Participants conceptualized buyouts as mitigation programs, but recognized that residents, in contrast, viewed buyouts as a tool for household recovery.

Research limitations/implications – This study adds to questions raised in the literature about the efficacy of buyouts and other relocation efforts implemented in response to disasters and global climate change. Future research should work to build systematic knowledge regarding design, implementation, and impacts of buyouts on affected households and communities.

Practical implications – Tension in the purpose of buyouts may be the cause of consistent shortcomings in buyout implementation including attrition, checkerboarding, and transfer of risk. Funding, timing, and the scale of buyouts do not align with household recovery needs and priorities, limiting the mitigation potential of buyouts.

Originality/value – This study identifies a fundamental tension in the purpose of buyout programs that has yet to be discussed in the literature.

Keywords Hurricane Harvey, Disaster impacts and adaptation, Post-disaster relocation, Housing recovery

Paper type Research paper

Introduction

For over forty years, government agencies in the U.S. have implemented home buyout programs as a means of relocating households away from areas facing repeat or severe flooding. Empirical studies of buyouts note that there is little to no evidence of policy learning in this realm; each program is designed independently by a local implementing agency, with limited learning from past programs, minimal guidance from federal funding agencies, and no agreed-upon best practices (Greer and Binder, 2017). This lack of guidance extends to questions of post-buyout land use (Zavar, 2016), for which decision-making is typically ad hoc and not incorporated into early buyout program design (Zavar and Hagelman, 2016).

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Implementing agencies (typically government agencies at the state, county, or municipal level) apply for and manage federal buyout funds and are responsible for the design, implementation, and oversight of buyout programs. Though implementing agencies have considerable latitude, their internal processes are a particularly understudied component of buyout programs. This represents a significant gap in our understanding, especially given that even seemingly minor program design decisions can substantially impact how survivors' experience of buyout programs (de Vries and Fraser, 2012; Binder and Greer, 2016). Given the increased use of buyouts in recent disasters (FEMA, 2012; Lewis, 2012), and the onset of climate-induced buyouts (Koslov, 2016; Pilkey *et al.*, 2016), it is increasingly important that we examine the role, experiences, practices, and priorities of agencies implementing buyouts in order to improve buyout program outcomes for affected households, communities, and governments. This study addresses this gap in our understanding of buyouts by examining a buyout program in Harris County, Texas, from the perspective of the implementing agency and relevant government stakeholders. Just as previous studies have focused exclusively on the experiences of residents in buyouts, this study contributes to the literature by presenting data from an alternative, and underrepresented, vantage point.

Harris County, which includes the metropolitan area of Houston, Texas, is characterized by low-lying coastal plains and an extensive system of bayous. Harris County is vulnerable to inland riverine and coastal flooding – challenges exacerbated by a history of flawed urban planning (Zhang *et al.*, 2018; Qian, 2010). When Hurricane Harvey struck in August 2017, it dropped over 40 inches of rain in some areas, flooding an estimated 120,000 structures in Harris County (Di Liberto, 2017). Because of the widespread damage, Harris County Flood Control District (HCFCD), the buyout implementing agency, significantly expanded their buyout program. Prior to Harvey, Harris County utilized funding from FEMA's Hazard Mitigation Grant Program (HMGP) and the county budget to purchase approximately 3,300 properties, most of which followed Tropical Storm Allison (2001) and the Memorial Day floods (2015). Given the magnitude of Hurricane Harvey and the history of buyouts in Harris County, this serves as an ideal setting to learn more about the design and implementation of buyout programs, particularly the early implementation stage of the (expanded) program, during which key priorities are set and foundational decisions are made. Using Harris County as a case example, this study examined the internal processes of the implementing agency in designing, adapting, and implementing the buyout program in Harris County post-Harvey. Specifically, this study addressed the following research questions: 1) How are buyout programs conceptualized by implementing agencies? 2) How do these conceptualizations translate into programmatic decisions and processes?

Methods

We conducted fieldwork at three time points between November 2017 and November 2018, beginning in the nascent phases of post-Harvey recovery and planning. Following the process outlined by Rubin and Rubin (2012), we conducted 18 semi-structured interviews with staff from the local implementing agency (HCFCD) and key stakeholder agencies assisting with post-Harvey recovery (Table I). We conducted in-person interviews when possible, and phone interviews when necessary. Interviews lasted 45 min on average. Questions explored program development and design, including staff's understanding of the purpose of buyouts, the role of key decision-makers, identification of program priorities, criteria for evaluating program success, consideration of equity in design and implementation, and community outreach and involvement. We also asked participants to reflect on their experiences interacting with homeowners and, specifically, to reflect on the ways in which homeowners had expressed their views on the buyout process. In addition to

Level of government	Agency	Role in buyouts
Federal	FEMA	Primary federal funder for buyouts in Harris county. Approves plans submitted by the state, including funding allocation for buyouts
State	State hazard mitigation office	Serves as the liaison between FEMA and the local community. Plays a key role in determining which projects are recommended for funding
	Texas water development board	Administers the flood mitigation assistance grant program and the severe repetitive loss grant program on behalf of FEMA
County	The Harris county flood control district (HCFCD)	Implementing agency, housed in the Harris county planning division. Responsible for all ditches, detention basins, bayous, and bays in the county, including those located within the city of Houston. Manages land post-buyout
	Harris county real property division	Responsible for tasks associated with property transfers. Includes relocation managers and agents who work directly with homeowners
City	Mayor's office and city council	Play a decision-making role on buyout-related issues, including the allocation of funding
	Floodplain management office	Maintains the city's floodplain management plan, permits all construction within the city's special flood hazard area, provides floodplain information to the public
	Houston public works	Partners with HCFCD to implement buyouts within city limits. Manages city mitigation reconstruction and elevation programs
	Houston parks and recreation	Manages post-buyout land located within park areas

Table I.
Home buyout stakeholders by level of government

the interviews, we collected information from informal conversations with program stakeholders, program documents (public and internal documents provided by participants), media reports, and site visits to areas where buyouts had been implemented or were planned.

We first analyzed interview data using grounded theory methodology (Corbin and Strauss, 2008), selected due to its applicability in exploratory research. Through the process of open coding, several initial themes emerged related to the development and design of the buyout program, challenges in planning and implementation, and community response. While these themes reflected potentially valuable findings, we discovered an emergent theme related to the fundamental nature of home buyout programs that warranted additional attention. Specifically, we identified a tension in participants' descriptions of buyouts as mitigation or recovery programs, suggesting a conceptually interesting case of overlap in the phases of emergency management (Neal, 1997). To explore this further, we re-analyzed the data using deductive theory coding based on established definitions for mitigation and recovery. For this second phase of analysis, the findings of which are presented here, we engaged with Kates and Pijawka (1977)'s disaster recovery theory to identify time frames and activities associated with the emergency management phases. We then compiled mitigation and recovery definitions from leading scholars in the disaster sciences, coupled these with federal policy definitions, and developed a codebook based on these definitions (see Table II for the definitions used in devising the codebook). We then employed a formalized holistic coding approach (Saldaña, 2012) on the interview data. To increase validity, we triangulated data across multiple participants and data sources.

Citation	Mitigation definitions	Recovery definitions
Stafford Act (1988)	"Any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards" (44 C.F.R. 206.401).	
Quarantelli (1998)		"The word recovery often seems to imply that attempting to and/or bringing the post disaster situation to some level of acceptability. This may or may not be the same as the preimpact [sic] level" (2).
Godschalk *et al.* (1999)	"advance action taken to reduce or eliminate the long-term risk to human life and property from natural hazards" (5).	"post disaster actions, such as rebuilding of damaged structures, to restore normal community operations" (5).
Newton *et al.* (2006)	"In the natural hazards community, mitigation is defined as the wide array of actions that can be taken to reduce vulnerability. Such mitigation actions can be considered either structural (e.g. diversion channels, fire breaks, etc.) or non-structural (e.g. awareness, information, policy, etc.)" (219).	
Smith (2013)	"Steps taken in advance of disaster strikes aimed at decreasing or eliminating the loss. Various long-term measures, such as the construction of engineering works, insurance and land use planning are used" (43).	Recovery is a "four stage process that helps the community back on its feet, hopefully in a better state to cope with future events." Stages include Relief, Rehabilitation, Reconstruction, and Learning review (43).
Montz *et al.* (2017)	"[Mitigation] activities can reduce susceptibility to the hazard event at least up to the design level even if the risk, or probability of occurrence, is high" (42).	
Phillips *et al.* (2017)	"A set of strategies to reduce future risks" including structural and non-structural (284).	"Short-term recovery stage would include restoring key utilities and infrastructure and placing people into temporary housing. Long-term recovery involves the community in tackling how, when, and where to rebuild, lays out a timeline to do so, and organizes people, resources, and organizations in moving toward a consensus-based vision of normalcy" (255).
Schwab *et al.* (2017)	"Any sustained action to reduce or eliminate long-term risk to people and property from hazards and their effects" (29).	"Actions that begin after the disaster, when the most urgent needs have been met. Recovery actions are designed to put the community back together" (25).

Table II.
Mitigation and recovery definitions by source

(*continued*)

Citation	Mitigation definitions	Recovery definitions
FEMA Glossary (2019)	"Includes activities to reduce the loss of life and property from natural and/or human-caused disasters by avoiding or lessening the impact of a disaster and providing value to the public by creating safer communities."	"Encompasses both short-term and long-term efforts for the rebuilding and revitalization of affected communities."
U.S Department of Homeland Security Mitigation Framework Leadership Group (2019)	"Mitigation investments include direct investments made to reduce risks posed by hazards to buildings and infrastructure, for example, buying out structures located in a high-risk area, prone to natural hazards."	

Table II.

Findings and discussion

Here, we present data and discussion related to buyouts as both mitigation and recovery programs. We then describe the tension inherent in buyouts as they are perceived and practiced, and conclude with a discussion of the implications of that tension.

Underlying assumptions of the implementing agency: buyouts as mitigation

Previous studies and policy documents historically categorize buyouts as disaster mitigation programs, suggesting they are intended to reduce risk to people and property by permanently relocating them away from hazardous areas (Godschalk *et al.*, 1999). Mitigation efforts aim to "reduce the loss of life and property from natural and/or human-caused disasters by avoiding or lessening the impact of a disaster and providing value to the public by creating safer communities" (FEMA, 2019, np).

In keeping with these definitions, interview participants from government agencies involved in the buyout in Harris County consistently described the program as an effort to reduce community-level risk by strategically removing structures located "deep in the floodway", responses that characterize buyouts as mitigation programs designed to reduce or eliminate losses from future events (Godschalk *et al.*, 1999). This view was reflected in program documents, reinforced in the language of the deed restrictions applied to buyout properties, and included in online and written communications with residents, with HCFCD describing the purpose of their program as "the elimination of potential flood damages to houses or other types of structures by acquiring them and removing them" (Harris County Flood Control District, 2019). This conceptualization of buyouts as a mitigation measure was evidenced in key design decisions and implementation processes.

Prioritizing mitigation in the selection process

Study participants and HCFCD documents often described buyouts as a mitigation tool aimed at addressing issues with drainage in watersheds (Harris County Flood Control District, 2018). Participants stressed that buyouts are one mitigation measure among many, and highlighted the importance of selecting the most appropriate measure for each area or property. Buyouts were weighed against other potential mitigation measures, and properties and neighborhoods were only selected for inclusion in the buyout after a thorough assessment indicated that the buyout was the best tool to meet the area's long-term mitigation needs.

> There might be some homes that have severe repetitive losses, that have tons and tons of claims, that frequently flood, but we do not consider it for a buyout because maybe a bigger outfall pipe needs to be put in, or maybe if that house was just built a little bit higher it would not be flooding. And to go in. . .turn a whole. . .neighborhood into an open field forever just because the homes were built one foot too low is hard.

Study participants also considered the depth of previous flooding and proximity to existing open spaces or previously purchased buyout properties in identifying which houses to include in a buyout. This approach reflected, in part, lessons learned from previous buyouts that resulted in *checkerboarding,* a situation where some households in a buyout area choose not to relocate, thus impacting requirements for maintenance and provision of services and limiting mitigation options. To avoid such challenges, HCFCD prioritized properties that would increase the size and functionality of existing open spaces and improve the floodwater absorption capacity of the area.

> we're looking at . . . a target of homes that are in the ten-year floodplain as sort of the base . . . we're looking at folks that are just really deep into the floodplain and then within that, where that land use would make sense. So, if you are adjacent to current green space, we think that's a priority because . . .if I got a park right here and I've got a street or houses that line it that are in the 10-year and it flooded it's really easy for me [to]. . . maintain that space because it's adjacent to space I'm already maintaining.

Buyouts to avoid future financial losses

These property selection assessments were one step in a broader cost–benefit analysis associated with removing the properties from flood-prone areas, thereby eliminating repetitive losses. Among study participants, the most commonly cited reason for implementing the residential buyout program was to avoid future financial losses from floods and other hazardous events.

> The purpose [of the buyout] is to relocate residents that live in flood prone areas. And, because they're mostly insured, and FEMA keeps having to pay those flood insurance claims over and over. . .it's a lot cheaper just to buy out the properties, demolish the homes, and then there will never be another claim on that property again. So, it gets everybody to higher ground and saves FEMA money.

> by removing these [houses] you also reduce risk of . . .damage to infrastructure that you have to repair because we're not buying individual homes. . . And if we can we'll remove the utilities and the public infrastructure that's there, so that does not have to be maintained and replaced anymore.

At the county level, this priority was institutionalized through routine assessments of avoided losses after major storms. After significant flood events, properties purchased through previous buyouts were assessed. These analyses were then used to quantify losses avoided through previous property acquisitions and cited as a justification for future buyouts.

> So, in 2015 the Memorial flood, 500 homes would have flooded if we would have not bought that 2,600 or 2,700 [houses], so look at the return. 2016. . .for the Tax Day, 1,500 homes would have flooded if we would have not bought [them], and Harvey, around more than 2000 homes would have flooded if we would have not bought [them out]. So, that's why we are so strong with our policy, that we can prove that it worked. . . We do an analysis after each storm event. . . Then you can go from there and do an economical [sic] analysis [to] show how successful it is at reducing flood damages.

Buyouts to correct past land use mistakes and create future opportunities

In many cases, the buyout was described as a last resort where other mitigation measures were not viable. By emphasizing that some "homes were just built in the wrong place" prior to

detailed floodplain mapping in Harris County, several participants suggested that buyouts are the only practical method of mitigation in areas plagued by past land use mistakes.

> The purpose? . . .it's really to take properties that should have never been developed and turn it back to its natural function as a floodplain. . .there were no regulations on building in a floodplain until the mid-1980's. . . a lot of areas were developed that should not have been developed and we're just correcting that problem.

> The one that I think is the most meaningful is when a community looks and says we really should not have building stock in this location. . .you know I always think that is the best approach. Acquisition is our one project that we fund in our hazard mitigation grant program that does not have any residual risk, so it is a complete elimination of risk.

As a corrective measure, buyouts offer communities the opportunity to redesign and reclaim floodways from development, thus mitigating against future inundation events. In these instances of correcting past development in the floodplain, buyouts are often cited as the most financially prudent approach. Not surprisingly, then, future land use played a prominent role in participants' descriptions of successful buyout programs. Although participants expressed concerns about the long-term maintenance of acquired properties, many discussed hopes for community benefits related to the reuse of acquired land. Importantly, government personnel highlighted that successful post-buyout lands serve the community through both flood reduction measures like detention basins and amenities such as recreation spaces[1].

> a successful buyout program will combine green space, . . .walkability, hike or bike trails . . . and detention. I mean, we got to build in some amenities. . .a successful buyout program will not be checkerboard through a neighborhood, it will keep the neighborhood intact . . .we want it to be pretty and we want it to . . .help with flooding.

> In my mind, like when you say successful buyout program, I see parks. I see soccer fields. . . The community is making use of that land whether it is making use of it in that it sits open, so it becomes flood storage and is, you know, a natural habitat, or it's being used in that it becomes a recreational benefit for the community. But then it is land that is being utilized in some way.

Perceived expectations of homeowners: buyouts as recovery

Government representatives, then, primarily considered buyouts as mitigation tools, and that assumption was evidenced in the goals, priorities, and practices of the buyout program. When asked about homeowners' perspectives and expectations of the buyout, however, participants' language shifted considerably to align more closely with traditional definitions of recovery. Residents' expectations, as characterized by government representatives, were that the buyout would allow them to quickly and effectively bring their "post disaster situation to some level of acceptability" (Quarantelli, 1999, p. 2).

Study participants, in keeping with commonly accepted characteristics of recovery, recognized that homeowners wanted to return to some semblance of normalcy (Godschalk *et al.*, 1999; Phillips *et al.*, 2017; Quarantelli, 1998; Schwab *et al.*, 2017), including reestablishing housing stability (Phillips *et al.*, 2017), as quickly as possible. As one participant stated, "They expect to be bought out really fast. . . What they expect is to be bought out quickly, and to be paid fairly for their home." Although they understood and sympathized with homeowners' priorities, they countered that buyouts simply are not designed to address recovery-based needs.

> [Residents] expect it to be an emergency relief program. They expect it to be, we flooded—we flooded bad, get me out of here. And that's not what it is. Everybody wants to be bought out yesterday so that

> they can move on with their lives. Sadly, that's not what this program is, and I do not think there is any way it could be.
>
> It's not an immediate relief program. . . it's . . .stepwise - we're reducing flooding . . .not for the house that we're buying, but for the surrounding area by doing the buyout program. The program is not buying a house - that's not the goal of the program. While that's what you see, the actual goal of the program is to reduce flooding for the larger area.

Perceptions of buyouts as recovery tools were reinforced by public officials' comments made in the immediate weeks following Hurricane Harvey. High-ranking government officials publicly discussed the need for expanding the existing home buyout program as a way of jumpstarting recovery for households flooded by Harvey (Morris, 2017; Zaveri, 2017), a view not shared by study participants at the city or county agency level. By early September, Roy Wright, FEMA's Deputy Associate Administrator for Insurance and Mitigation, and Houston Mayor, Sylvester Turner, both publicly confirmed buyout programs were being discussed between the various levels of government (Zaveri, 2017; Hunn, 2017). Days later, Stephen Costello, Houston's "flood czar," predicted the city and county would engage in "a pretty aggressive buyout program" in response to Harvey (Satija and Collier, 2017). These early messages from government leaders on potential home buyouts implied that the buyout program would be accelerated to provide relief to impacted residents. Although these public officials often described buyouts using language consistent with mitigation measures, the message conveyed was that buyouts were a solution to the crises faced by homeowners *now* (Kates and Pijawka, 1977).

Consequences of programs in tension

There is an inherent tension, then, between government agencies and residents in their expectations of buyout programs. Government personnel viewed the buyout as a mitigation measure intended to limit future losses and reduce community exposure, and as an opportunity to improve land uses to those ends. When asked about homeowners' perspectives and expectations, however, they typically described how homeowners expected the program to align more closely with traditional definitions of recovery. Programmatic decisions reflected the mitigation-focused priorities of government agencies, even while recognizing that those approaches could not satisfy residents' expectations. This represents a critical tension in buyout programs more generally, as the programs residents expect are not the programs that implementing agencies are prepared or equipped to deliver. In the following sections, we describe several factors that contribute to this tension and discuss the implications for all stakeholders.

Key contributing factors

In our data, three emergent and interrelated factors exacerbated these tensions: funding, timing, and scale. Participants described multiple challenges related to navigating federal funding sources and cycles that they saw as significant hindrances to the program's success. Federal disaster funding operates on long, slow cycles such that, at the time of this study in 2018, the county was still waiting to receive federal funds allocated after a 2016 storm. Participants blamed these time lags for several significant challenges at the county and city levels. After Harvey, government stakeholders were left to plan for a significantly expanded buyout program (according to a study participant, approximately 3,500 homeowners expressed interest in buyouts in the first three months after Harvey, which is more homes than the county had bought out in the previous 30 years of the program) without knowing what funds would be available for buyouts, where the funds would come from, or when they would be available.

At the time of this study, HCFCD had received three distributions of funds (enough for the purchase of approximately 800 homes), with the largest allocation (for 500 homes) arriving in September, one year after Harvey. Although these funds moved quicker than expected, study participants suggested that the timing was still too slow for many residents who were focused on repairing their homes and returning their lives to some semblance of normalcy. As reported by one participant, the expected buyout timeline for residents was "as quickly as possible". Although participants understood why homeowners had this sense of urgency, they lamented that it was incompatible with the buyout program as it was administered:

> I think people thought that FEMA was going to come and write them a check the next week, and. . . our programs do not run like that. . . there's an application process and it's state administered, and I have to have funding available. I mean there's just all these things in between the bureaucracy of the program, but . . .I think the first thought is FEMA buys houses. Well no, FEMA does not buy houses. . . Local communities buy houses using federal funds, but . . .if I asked people in general what they thought, its FEMA's going to buy me out and they're slow, but I want out now or I wanted out three months ago. I wanted out the day after.

> They want it to happen right away. They are ready—they're ready to move on. . .I mean in most cases it's totally traumatic for them. They're ready to get back to normal and they want to get there as quickly as possible. And we have to explain to homeowners that's just not the nature of the grant program. It's not something that happens instantaneously.

The timing of buyout funding, then, reflects mitigation activities that are out of sync with the needs of recovering households. These issues are further complicated by varying scales at which stakeholder groups operate. In implementing the buyout program, HCFCD prioritizes the reduction of flooding across large tracts of land, considering the issue of flooding from a community-wide perspective and at the county scale. This viewpoint is reflective of disaster reduction programs such as the Hazard Mitigation Grant Program, and instruments like the National Flood Insurance Program's risk maps that encourage a generalized view of the hazard rather than a more local-scale view. Homeowners, conversely, are operating on a more personal scale: their household. For residents, they are expecting the buyout program to serve as a personal relief strategy, or a means of recovery. These varying scales of perspective, coupled with the timing of funds and time frames of buyout program implementation, contribute to the tensions inherent in buyout programs.

Implications for households, communities, and governments

Though implementing agencies have considerable authority in designing and managing buyouts, the challenges described above often mean that buyout programs fail to meet the expectations of *all* stakeholders, government agencies included. These challenges, in turn, translate into real consequences. These interconnected consequences hinder risk reduction, reduce mitigation capacity, and limit the efficacy of buyouts.

From the perspective of implementing agencies, attrition is the primary consequence of this tension. Though many homeowners expressed interest in buyouts after Harvey, they could not put their recovery on hold to wait for appropriate funding to arrive. Participants were concerned that, as time passed, these homeowners would use available funding (e.g. insurance and FEMA Individual Assistance grants) to repair and rebuild their homes, making them less willing to relocate (Binder and Greer, 2016), or that they would sell their homes to private investors who would redevelop and repopulate the properties, thereby transferring risk to new households. In either case, the mitigative potential of the buyout program would be significantly compromised.

> I've had conversations with a lot of the folks who. . .volunteered. . .At the same time that they volunteer [for a buyout] they put their home on the open market, and really the first decent offer they

> get a lot of times they go with that. A lot of times investors are trying to come in and purchase those properties that are damaged and then repair them and put someone else in them who may or may not be aware of the flooding problem. Sometimes they're walking away from the home all together, letting it go back to the mortgage company and then of course the mortgage company is going to put someone back into it. . . If we had that funding and we knew that we could move, we still would not have 100 percent participation, but I'm sure we'd have a lot more volunteers that we would be able to assist and. . . help them move to higher ground and convert that property back to its natural function.

> That's the biggest thing right now - funding. We need funding because the longer it takes, the more owners are going to repair and spend that flood insurance money if they had flood insurance money or spend disaster assistance money if they got that. And what I've seen is typically the more time and money an owner puts into a property the less likely they are to continue to volunteer for our program because they say, well, you know, we put $100,000 dollars back into this or $150,000. And it took us six months to do this and we got it back were we want it. We think that Hurricane Harvey was a freak event and we're not going to flood again. Or they've already sold it to an investor, they let it go back to the bank, or sold it on the open market to someone else who's in that situation.

With the lag between Hurricane Harvey and the allocations of federal funds, homeowners who originally volunteered to participate in the program declined once the money was available. One study participant stated that "about 20 percent of the owners that were approved either changed their minds, had already sold, [or] for whatever reason, did not wish to participate anymore" for allocations one and two. By the third allocation, participants estimated that nearly 50 percent of the potential buyout participants decided not to move forward with the program.

> The really frustrating part is the amount of time it takes to get the funds. That's always the biggest issue. And the fact that had we had the funds initially, when folks volunteered, we would've had a lot more people that we would be able to purchase.

> Timing being so extend[ed] there are some folks who could and would accept a buyout on the day after the flood if they are looking at combining proceeds from various streams that are available to them. . .Before they take the SBA loan, . . . before they spend their insurance claim on repairs, before they spend their personal resources on temporary living . . .But if you got somebody who's upside down on their mortgage and also has [a] SBA loan and has already spent all their personal resources and already spent . . . their disaster relief check or insurance check, they're a tough customer. They cannot afford to take the buyout and the reason they cannot afford to take it is because we're too slow. We recognize that that's such a barrier and it's really a shame because it's all a waste of resources - both their personal resources and federal dollars, local dollars, and it makes a program less successful.

In Harris County, the expectations and realities of households in the process of recovery regularly challenged implementing agency staff. Despite staff efforts, many potential buyout participants withdrew in favor of other recovery options. This attrition increases the likelihood of checkerboarding, which, in turn, increases maintenance costs and necessitates the restoration of services and infrastructure. Large-scale mitigation efforts must be put on hold, significantly compromising the mitigative potential of the buyout and likely resulting in underutilized vacant lots *in lieu* of more productive land uses (Zavar and Hagelman, 2016). Further, households remain at risk.

Conclusions

This study examined the role of implementing agencies in the design and implementation of buyout programs, an understudied aspect of buyouts that directly impacts outcomes for households and communities. Using a buyout program in Harris County, Texas, as a case study, we found a fundamental tension in perceptions of the purpose of buyouts, specifically regarding whether buyouts were a tool for mitigation or a tool for recovery. This tension has

not been previously discussed in the literature with respect to buyouts, though it serves as an additional example of the discrepancies between federal disaster policy and local implementation (Leckner *et al.*, 2016). In terms of theory, buyouts are an example of a single intervention that is, in effect, attempting to span two phases of the disaster cycle; they are funded, managed, and defined as long-term, non-structural mitigation programs, but often implemented in the recovery period with homeowners who cannot afford to put their recovery – and their lives – on hold while they wait for a potential buyout. The current system for funding buyouts often spans years, which means that buyouts, in keeping with mitigation programs generally, operate on longer timelines than recovery programs (Kates and Pijawka, 1977). Yet buyouts, including those in Harris County, are nearly always implemented in the post-disaster recovery phase, a period characterized by compression and upheaval. Likewise, there is a conflict of scale, also illustrated by the Harris County case; HCFCD views the buyout program as a holistic, comprehensive flood reduction strategy for the entire county, whereas individual homeowners are described as considering the program as a household relief strategy.

In terms of practice, our study suggests that this tension creates significant challenges for both government agencies and homeowners, and it may be the cause of several common and consistent shortcomings in buyout implementation. Buyouts have the potential to significantly reduce hazard risk, save taxpayer dollars, and facilitate land use changes that reduce flooding and provide amenities to surrounding neighborhoods (Lowrie and Kutner, 2016). These outcomes, though, are dependent on resident participation. Buyout program administrators want property owners to wait for buyout offers so they can achieve mitigation goals, but they must often make their case for participation while waiting months or even years for the funds to become available. In contrast, residents want to regain a sense of stability and certainty regarding the future of their post-disaster housing, priorities acknowledged by participants in this study and in previous work with residents involved in buyouts (de Vries and Fraser, 2012; Binder and Greer, 2016). Clashes of priorities in the post-disaster recovery period lead to attrition and checkerboarding, and to transfer of risk when homeowners decide to sell on the private market instead of waiting for a buyout. Funding, timing, and the scale of buyouts are mismatched with household recovery needs and priorities. In consequence, few of the potential mitigative benefits of buyouts can be fully realized, and recovery processes are further complicated for affected homeowners.

This study opens several avenues for future research. First, while this paper is focused primarily on the experiences and perspectives of government representatives, it is important to note that a growing body of literature suggests that relocation through buyouts is associated with a range of social costs for households that extend well into the recovery period (Barile *et al.*, 2019; Binder *et al.*, 2019; Binder and Greer, 2016). Further, housing costs and other factors may result in buyouts participants relocating to equally or more vulnerable communities, raising questions about the efficacy of buyouts in reducing risk (McGhee *et al.*, 2019). Given these findings, it is imperative that future buyout research take a holistic approach to understanding the process, experiences, and impacts of buyouts over time, and from the perspective of multiple stakeholder groups. The perspectives of survivors on buyout program design, communication from the buyout program administrators, and program timelines require additional study. Second, it is important to recognize that buyout impacts extend beyond the participating households and communities. Future research should consider buyouts as a policy intervention that affects communities not selected for participation and communities located near buyout zones (Barile *et al.*, 2019; Binder *et al.*, 2019). Given the concerns about inclusion, transparency, tax bases, home values, and land use after buyouts (Lowrie and Kutner, 2016), communities that unsuccessfully advocate for inclusion in a buyout are critical to our understanding of the broader impacts of buyouts. Third, changes within buyout programs are poorly documented, reducing the opportunity to

learn from past buyouts (Greer and Binder, 2017). There is considerable value in longitudinal studies where researchers embed themselves with buyout administrators for the life of a buyout program (which may range from a few years to a few decades) to learn about the process and track outcomes for both the program and participating households. Lastly, we suggest that future researchers continue to compare buyouts to build systematic knowledge regarding design, implementation, and effects on participating households and affected communities.

Note

1. Although future land use was a priority for HCFCD, participants reported that they had not actively solicited input from residents on these decisions. Though omitting or overlooking resident engagement in this aspect of the buyout was certainly understandable under the circumstances (HCFCD was a rapidly expanding, understaffed office), previous scholarship has identified residential support for post-buyout land use as an important factor to ensuring that open-space land uses are consistent with residential needs and serve the communities where they are located (Zavar, 2016).

References

Barile, J.P., Binder, S.B. and Baker, C.K. (2019), "Recovering after a natural disaster: differences in quality of life across three communities after Hurricane Sandy", *Applied Research in Quality of Life*, doi: 10.1007/s11482-019-09722-3.

Binder, S.B. and Greer, A. (2016), "The devil is in the details: linking home buyout policy, practice, and experience after hurricane Sandy", *Politics and Governance*, Vol. 4 No. 4, pp. 97-106.

Binder, S.B., Barile, J.P., Baker, C.K. and Kulp, B. (2019), "Home buyouts and household recovery: neighborhood differences three years after hurricane Sandy", *Environmental Hazards*, Vol. 2, pp. 127-145, doi: 10.1080/17477891.2018.1511404.

Corbin, J.W. and Strauss, A. (2008), *Basics of Qualitative Research* 3rd ed., Sage Publications, Los Angeles, CA.

Federal Emergency Management Agency (2012), "Hazard mitigation assistance - property acquisition (buyouts)", available at: http://www.fema.gov/application-development-process/hazard-mitigation-assistance-property-acquisition-buyouts (accessed 30 September 2013).

Federal Emergency Management Agency (2019), "FEMA glossary", available at: https://training.fema.gov/programs/emischool/el361toolkit/glossary.htm (accessed 5 March 2019).

Godschalk, D.R., Beatley, T., Berke, P., Brower, D.J. and Kaiser, E.J. (1999), *Natural Hazard Mitigation: Recasting Disaster Policy and Planning*, Island Press, Washington, DC.

Greer, A. and Binder, S.B. (2017), "A historical assessment of home buyout policy: are we learning or just failing?", *Housing Policy Debate*, Vol. 27 No. 3, pp. 372-392.

Harris County Flood Control District (2018), "Bond program information and community engagement", available at: https://www.hcfcd.org/media/2961/final-bond-program-cutsheets-081418.pdf (accessed 15 November 2018).

Harris County Flood Control District (2019) "Glossary", available at: https://www.hcfcd.org/glossary (accessed 15 November 2018).

Hunn, D. (2017), *FEMA on Track to Pay $11 Billion in Hurricane Harvey Insurance Claims*, Houston Chronicle, 13 September, available at: https://www.houstonchronicle.com/business/article/FEMA-on-track-to-pay-11-billion-in-Hurricane-12196002.php (accessed 15 November 2018).

Kates, R.W. and Pijawka, D. (1977), "From rubble to monument", in Haas, J.E., Kates, R.W. and Bowden, M.J. (Eds), *Reconstruction Following Disaster*, MIT Press, Cambridge, MA, pp. 1-23.

Koslov, L. (2016), "The case for retreat", *Public Culture*, Vol. 28 No. 2, pp. 359-387.

Leckner, M., McDermott, M. Mitchell, J. and O'Neill, K. (2016), "Local responses to hurricane Sandy: heterogeneous experiences and mismatches with federal policy", in O'Neill, K. and Van Abs, D.

(Eds), *Taking Chances: The Coast after Hurricane Sandy*, Rutgers University Press, New Brunswick, pp. 208-221.

Lewis, D.A. (2012), "The relocation of development from coastal hazards through publicly funded acquisition programs: examples and lessons from the gulf coast", *Sea Grant Law and Policy Journal*, Vol. 5 No. 1, pp. 98-139.

de Vries, D.H. and Fraser, J.C. (2012), "Citizenship rights and voluntary decision making in post-disaster U.S. floodplain buyout mitigation programs", *International Journal of Mass Emergencies and Disasters*, Vol. 30 No. 1, pp. 1-33.

Di Liberto, T. (2017), "Reviewing Hurricane Harvey's catastrophic rain and flooding", available at: https://www.climate.gov/news-features/event-tracker/reviewing-hurricane-harveys-catastrophic-rain-and-flooding (accessed 15 November 2018).

Lowrie, K. and Kutner, D. (2016), *Mystic Island Voluntary Buyout Health Impact Assessment: Assessing Health Outcomes of Post-Sandy Decision-Making*, Bloustein School of Planning and Public Policy, Rutgers University, New Brunswick.

McGhee, D.J., Binder, S.B. and Albright, E.A. (2019), "First, do no harm: evaluating the vulnerability reduction of post-disaster home buyout programs", *Natural Hazards Review*, Vol. 21 No. 1, 05019002, doi: 10.1061/(ASCE)NH.1527-6996.0000337.

Montz, B., Tobin, G. and Hagelman, R. III (2017), *Natural Hazards Explanation and Integration* 2nd ed., Guilford Press, New York, NY.

Morris, M. (2017), "Houston to fund buyouts in three neighborhoods", available at: https://www.houstonchronicle.com/news/politics/houston/article/Houston-to-fund-buyouts-in-three-neighborhoods-12306545.php (accessed 16 November 2018).

Neal, D.M. (1997), "Reconsidering the phases of disaster", *International Journal of Mass Emergencies and Disasters*, Vol. 15 No. 2, pp. 239-264.

Newton, J., Paci, C.D.J. and Ogden, A. (2006), "Climate change and natural hazards in northern Canada", in Haque, C.E. (Ed.), *Mitigation of Natural Hazards and Disasters: International Perspectives*, Springer, Dordrecht.

Phillips, B., Neal, D. and Webb, G. (2017), *An Introduction to Emergency Management* 2nd ed., CRC Press, Boca Raton, FL.

Pilkey, O., Pilkey-Jarvis, L. and Pilkey, K. (2016), *Retreat from a Rising Sea: Hard Choices in an Age of Climate Change*, Columbia University Press, New York, NY.

Qian, Z. (2010), "Without zoning: urban development and land use controls in Houston", *Cities*, Vol. 27, pp. 31-41.

Quarantelli, E.L. (1998), "Disaster recovery: research based observations on what it means, success and failure, those assisted and those assisting", available at: http://udspace.udel.edu/bitstream/handle/19716/282/PP+263.pdf.txt;jsessionid=1073F5EFB98EBD52B5D98D61C6A8B360?sequence=3 (accessed 18 November 2018).

Quarantelli, E.L. (1999), "The disaster recovery process: what we know and do not know from research", working paper 286, Disaster Research Center, University of Delaware, 20 March.

Rubin, H.J. and Rubin, I.S. (2012), *Qualitative Interviewing: The Art of Hearing Data* 3rd ed., Sage Publications, Thousand Oaks, CA.

Saldaña, J. (2012), *The Coding Manual for Qualitative Researchers*, 2nd ed., Sage Publications, Thousand Oaks, CA.

Satija, N. and Collier, K. (2017), "Houston's "flood czar" says Harvey has brought the city to a decision point on flood control", available at: https://www.texastribune.org/2017/09/13/follow-conversation-houstons-flood-czar/ (accessed 18 November 2018).

Schwab, A.K., Sandler, D. and Brower, D.J. (2017), *Hazard Mitigation and Preparedness. An Introductory Text for Emergency Management and Planning Professionals,* CRC Press, Boca Raton, FL.

Smith, K. (2013), *Environmental Hazards Assessing Risk and Reducing Disaster* 6th ed., Routledge, London.

Stafford Act (1988), "Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended, and Related Authorities as of June 2019", available at: https://www.fema.gov/media-library/assets/documents/15271 (accessed 28 February 2020).

U.S. Department of Homeland Security (2019), "National mitigation investment strategy", available at: https://www.fema.gov/media-library-data/1565706308412-19739d7deeca639415cc76c681cee531/NationalMitigationInvestmentStrategy.pdf (accessed 5 November 2018).

Zavar, E. (2016), "The role of magnetic agents in land use decision-making and neighborhood initiatives", *Land Use Policy*, Vol. 56, pp. 38-46.

Zavar, E. and Hagelman, R.R.I. (2016), "Land use change on U.S. floodplain buyout sites, 1990–2000", *Disaster Prevention and Management*, Vol. 25 No. 3, pp. 360-374.

Zaveri, M. (2017), "County OKs first Harvey-related buyouts", available at: https://www.houstonchronicle.com/news/politics/houston/article/County-OKs-first-Harvey-related-buyouts-12301988.php (accessed 5 November 2018).

Zhang, W., Villarini, G. and Smith, J. (2018), "Urbanization exacerbated the rainfall and flooding caused by hurricane harvey in Houston", *Nature*, Vol. 563, pp. 384-388.

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