



Efforts to end a stalemate in landslide insurance availability through inclusive policymaking: A case study in Sitka, Alaska

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ARTICLE INFO

Keywords:

Stalemate
Participatory action research
Landslides
Disaster risk financing

ABSTRACT

Stalemates frequently obstruct disaster risk management related initiatives, including related to risk financing. They can arise from misaligned stakeholder objectives and a cognitive effort to avoid decision-making under uncertainty. Participatory action research techniques can be useful for overcoming stalemates but have not been examined in the context of disaster risk management. To fill this gap, we explored how participatory techniques could overcome one disaster risk financing related stalemate: the case of landslide insurance in a highly landslide-prone location, Sitka, Alaska. Landslide insurance in Sitka is a classic stalemate, as diverse stakeholders see the value of offering a landslide insurance policy, but their respective concerns and information gaps stymie their ability to feel confident in decision-making making landslide insurance generally unavailable. Utilizing a series of inclusive interviews and workshops as our participatory techniques, respondents describe how the workshop engendered confidence in the prospect of landslide insurance, specifically by brokering new relationships and serving as a catalyst for new public-private partnerships while effectively reframing the landslide risk financing conundrum. However, they also note that a new market for landslide insurance requires sufficient state or Federal funding support, improved probabilistic landslide models, and sustained consumer demand. This suggests that participatory techniques can play an enabling role in overcoming stalemates, but only if certain conditions are in place. These findings may have relevance to policymakers facing stalemate-related obstacles in disaster risk management.

1. Introduction

Disaster management professionals, media, and the public often speculate why disasters and their consequences frequently repeat themselves. Despite best intentions to disrupt the *status quo* and advance public policy to learn from mistakes, momentum is lost, there is insufficient coordination, or efforts to improve disaster preparedness may not be sufficiently incentivized (and there are no consequences associated with upholding the *status quo*) [1]. As a result, a stalemate occurs which brings divided stakeholders to “conflict, delay, and indecision” and often leads to “deadlock, inadequate and ineffective policies, or no policies at all” [1,2]. Despite the available literature on information gaps and uncertainties that are often associated with stalemates [1,3], public policy gridlocks continue to persist in municipalities throughout the United States.

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A prominent stalemate in the United States is the lack of landslide insurance to financially transfer the risk of landslides for homeowners. Across US insurance markets, “earth movement”, inclusive of landslides, has typically been excluded from multi-hazard or “all peril” homeowner insurance policies. There are generally two common rationalizations as to why landslides have been excluded in US insurance markets: 1) there is insufficient information on landslide risk for insurers to understand probability of loss, and 2) the combination of adverse selection, moral hazard, and correlated risk makes landslides potentially uninsurable [4].

Participatory action research could potentially be an effective tool to overcome stalemates. Participatory action research often refers to the attitudinal approach to research taken on by the researchers, and generally includes an assumption and awareness that research participants are more than just a data point but rather a primary stakeholder [5]. Depending on participants’ preferences, roles of participants in participatory research could include supporting or leading steps to determining relevant questions, improving local understandings, and actualizing and translating research into action [6]. Given the significant challenges with information asymmetries across various stakeholder groups, participatory tools represent a potentially useful tool for overcoming disaster risk management-related policy gridlocks. As various stakeholders have different motivations, incentives, risks, and rewards for engaging with landslide risk financing, participatory methods could potentially shed light on framing stalemates from different perspectives, identifying alternative policy options, and improving stakeholders’ understandings of others’ concerns and setbacks [7–9]. Within the realm of participatory action research, several of these formal exercises to broker discussions across a diverse range of stakeholders have been effective for improving civic engagement and knowledge co-production [10,11].

However, there is limited research on how participatory action research might improve access to any form of disaster insurance, let alone landslide insurance, including “first step” of prioritizing and removing the barriers to landslide insurance provision. There are several closely analogous examples of multi-stakeholder and sub-national discussions of ex-post disaster risk financing during a recovery effort [12–15], however the objectives are notably different and not inherently ‘participatory’ [16]. Most research focuses on participatory tools as a form of knowledge co-production [17–19], with a less direct intention to engage with participatory approaches as a means for brokering policy action. There have also been no formal participatory exercises to broker discussions across a diverse range of stakeholders at a sub-national level to discuss opportunities and challenges to securing landslide insurance coverage. As a result, there is a gap in understanding how to proceed with this “step zero” of multi-stakeholder knowledge co-production or unlocking a political and multi-dimensional stalemate with an overall goal of securing landslide insurance while still satisfying other local public policy objectives.

1.1. Research objectives

The objective of this study is to explore how participatory action research methods might be used to facilitate multi-stakeholder knowledge co-production and overcome stalemates. To do so we employ participatory action research methods in the small town of Sitka, Alaska, consisting of presenting various insurance operations during a workshop and eliciting stakeholders’ motivations and framing of the landslide insurance availability challenge, and the tools and resources each stakeholder would need to ensure some form of landslide financial risk transfer to feel most confident about an uncertain future. Our aims were:

1. Explore the appropriateness of a multi-stakeholder, inclusive workshop, interviews, and discussions in helping to overcome stalemates;
2. Identify stakeholders’ perceived concerns about their financial risks associated with landslide-related losses;

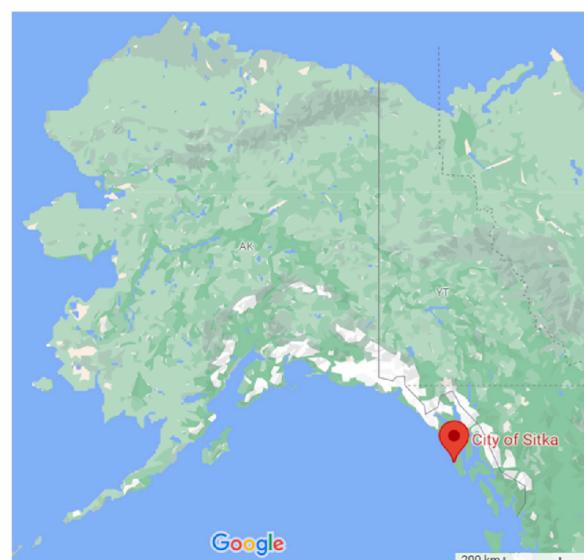


Fig. 1. Location of Sitka, Alaska [27].

3. Shed light on the diverse policy options that could potentially ameliorate the current challenges with securing landslide insurance; and
4. Broker relationships among diverse stakeholders to share current challenges, limitations, and desire to transfer landslide-related financial risks.

The remainder of this paper is organized as follows: First, we describe the landslide risk financing stalemate before continuing with our literature review. We then provide an overview of our participatory action research methods before presenting results. We conclude with a discussion of the implications of this study, including policy recommendations and areas of future research.

1.2. Landslide risk management in Sitka, Alaska

In 2015, a devastating and fatal landslide occurred in Sitka, Alaska (Fig. 1) that killed three people, obliterated newly constructed homes, and disrupted an entire community [20]. Immediately following the devastation, individuals within Sitka and all around the world questioned how this could have occurred [21]. To many geologists, this was perhaps inevitable; Sitka and Baranof Island (where Sitka is situated) has a significant history with landslides (USFS, 2021), and one geologist suggested that a simple geomorphic mapping exercise could have elucidated details around the subdivision's landslide susceptibility [22]. However, answers to questions about landslide risk are not solely rooted in physical geology, but socio-political factors that shape people's vulnerability and exposure [23]. Sitka, Alaska is a small city in Southeastern Alaska with approximately 8500 residents and nestled up against the Tongass National Forest [70]. With only fourteen miles of road for all the residents, homes are sandwiched either alongside the coast or alongside the hills, limiting options for real estate development (Fig. 2).

Due to a constrained housing market and limited land for development, throughout the past half century, a few plausible locations for housing development in Sitka were upwards along the hillside, the most prominent being the 'benchlands'. Since 1985, the City of Sitka has begun developing 193 acres zoned for residential use for parcels ranging from approximately 2 to 8 acres [24].

In the absence of landslide risk information for these benchlands and throughout Sitka more broadly, homeowners often were required to leverage their own "rules of thumb" to determine risk. In a letter written from a real estate developer to the City's attorneys in 2016, allegedly "neither the city to our knowledge nor [the developer] anticipated the landslide" [25]. The Federal Emergency Management Agency (FEMA)'s Ready program also suggests that homeowners should "become familiar with the land around [them]", and similarly suggests that homeowners obtain a geotechnical assessment of their home [26]. These recommendations are not so simple: landslide risk is incredibly complex, and site-specific surveys can insufficiently capture broader topographical assessments that model where a landslide could start and end [27]. Given these information gaps, particularly achieving probabilistic risk measurements with sufficient granularity for a homeowner, landslide risk management remains a challenge not only for Sitka but for communities around the world [28].

There appears to be a paradox that inhibits homeowners in Sitka to be financially prepared against landslides: without sufficient landslide risk information, insurers are generally unwilling to write residential landslide insurance policies; without any expectation to transfer the financial risk of landslides or given the disincentives to learn about the landslide risks, the appetite to better understand landslide risks is mixed [29]. Consequently, private citizens of Sitka, policymakers, banks, real estate professionals, and insurance professionals are left at a stalemate: Sitka continues to develop housing units in the benchlands and other areas potentially susceptible to landslides while current homeowners and residents remain financially exposed to the threat of landslides on their property [30]. In the meantime, the process of evaluating landslide risk is largely left up to the individual with limited public information: private geotechnical surveys, individual heuristics, insurance underwriters operating under uncertainty, oral histories, and site-specific property appraisals [31].

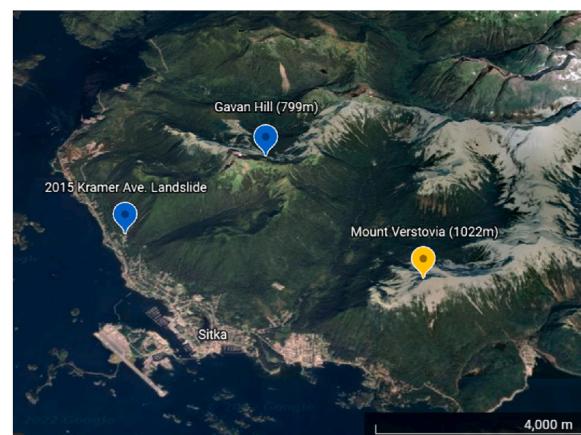


Fig. 2. Satellite image of Sitka, Alaska [26].

2. Literature review

Disaster risk management is frequently framed as a multistakeholder governance challenge, requiring the sustained engagement of all sectors of society – government, private sector, nonprofit, and communities themselves. Collectively many actors shape hazard, vulnerability, and exposure and have the capacity to both create and reduce risk. Like other policy problems, disaster risk management is therefore not decided on the authority of a centralized stakeholder like a state, but rather a whole of society endeavor is everyone's collective responsibility.

Community-based approaches to disaster management are often used to improve disaster management as part of these multi-stakeholder efforts. Community based disaster management describes a broad series of approaches that involve community members in the design and execution of disaster management activities [32]. All recognize that community members have specific needs, knowledge, vulnerability, and capacity, and that without them disaster management processes will fail. They have become de rigor for disaster management, a ubiquitous part of many interventions [33], seen in the intervention strategies of state government agencies such as the US federal agency responsible for disaster management, the Federal Emergency Management Agency, and its 'whole community' approach [34] and international agencies like the UN agency focused on disaster management (the United Nations Office of Disaster Risk Reduction) with its statement that disaster risk reduction is "everyone's business" [35].

Yet despite the widespread acceptance, there are challenges inhibiting community-based disaster management. One is what can sometimes be a discrepancy between values, goals, and objectives of members of a community and other stakeholders, often resulting in a public policy stalemate. Public policy stalemates are considered an outcome of "policy drift", whereby a policy or institution is not updated to reflect changing external circumstances [36]. "Inaction" is the most commonly identified stakeholder behavior which results in a stalemate: this inaction is often described as a result of a deliberative, inadvertent, or rational decision to adhere to the *status quo* [1,2]. Despite that the counterfactual (i.e., "doing something") may actually achieve both individual stakeholders' and societal welfare goals, the resistance to reform is often due to uncertain future gains [37] particularly if the future seems susceptible to consequential negative externalities such as natural hazards [38]. These stalemates have severe implications for disaster management and public welfare, and in several instances, can exacerbate or create other risks [39].

Various strategies that aim to avoid a stalemate require having the right people at the discussion table, with an aim to "negotiate behind closed doors" or to "hold feet to the fire" [40]; these strategies, however, are particularly challenging for local communities to employ. Identifying whose voice to include and prioritize is no easy task, since community members might have knowledge and understanding at certain scales and within certain systems that others lack and *vice versa*. Others also point out that 'community' can be a misleading category: there are major variations within communities to the extent that what one group prioritizes might increase vulnerability or risk for another community member [41]. Last there is also a danger of ascribing too much agency at community level as this is often a level where risks are realized, not created [42]. By privileging community as the site of intervention these approaches risk drawing attention away from these underlying and systemic factors shaping risk. It is for this reason that some caution community based interventions, with some going so far as to question their efficacy entirely [41,43].

As a result disaster management rarely achieves these whole of community objectives [44], and stalemates persist. Research on community disaster management emphasizes the importance of facilitating community involvement via community-centric forms of engagement, discussing how risk assessment, meetings and workshops, and other forms of engagement can help galvanize communities to action and facilitate change [9,45,46]. Critical voices can be missing from the disaster management process or otherwise marginalized. Interventions can focus on the needs of some at the expense of others, and underlying factors shaping risk might be ignored [47,48].

Participatory action research can be an effective approach for better identifying critical voices and to mitigate several information asymmetries that could be contributing to stalemates. Participatory action research centralizes research approaches based on local contexts, perspectives, and experiences [49,50]. Participatory action research has been effective in the co-production of knowledge for disaster risk management, particularly with examples in risk assessment [51,52] and even in the development of a landslide early warning system [53]. Although these efforts are multi-stakeholder initiatives, often involving academia and "formal" researchers, local community members, and in some instances local government, they typically lack private sector engagement. Participatory action research approaches are well-suited for overcoming stalemates since they can 1) leverage the historical underpinnings of disaster risk management as well as the national policy trends that have led to the private sector exclusion of landslide risk provision, and 2) involve community members as part of a structured public policy analytical exercise to better understand and potentially identify obstacles contributing to the political gridlock [5].

3. Methods

As opposed to alternative participatory action research methods such as arts-based approaches [54], storytelling groups [55], concept mapping [56], or community action planning [57], we chose key informant interviews and a workshop. We chose this due to stakeholders' comfortability and familiarity with these methods, convenience, and exploratory nature of the research. The interviews, workshops, and respective protocols were developed with significant support from a local community-based organization, the Sitka Sound Science Center (<https://sitkascience.org/>). Sitka Sound Science Center staff helped to gauge the viability of various approaches, ensure that a venue would be perceived as neutral and secure, and coordinate the logistics and invitations for the workshop. Further, building upon previous research exercises that were rooted in ethnography [58], the research team made concerted efforts to not solely include general "community members" but rather deliberate selection of local stakeholders who may be perceived to be at personal financial risk of landslide-related loss.

The participatory process invoked multiple methods over a nine-month period between April 2021 and November 2021. These

methods were sequenced during these periods, beginning with 1) twenty-four key informant interviews and 2) a facilitated half-day workshop in Sitka complemented by a post-workshop survey.

3.1. Key informant interviews

Between April 2021 and February 2022, we conducted twenty-four key informant interviews with stakeholder groups including insurance professionals, homeowners, real estate professionals, banking professionals, and other subject matter experts. [Table 1](#) below summarizes the participant sample by the three core respondent groups: homeowners, real estate professionals (inclusive of appraisers, real estate agents, and lending officers), and insurance professionals (inclusive of brokers, policy managers, and regulators).

Preliminary ethnographic research [58] and a literature scan identified these stakeholder groups as unique perspectives that may have been ideologically in conflict and thereby contributing to a stalemate. Based on the preliminary ethnographic research, we adopted a referenced-based sampling approach to ensure most appropriate respondents were considered for analysis. These interviews were conducted both telephonically and in-person in Sitka, Alaska. Particularly given the tight-knit community of Sitka, Alaska [58], references were often triangulated throughout the community, often with very few individuals representing a particular function within a community (e.g., a limited number of appraisers and real estate agents).

We developed a unique question guide to loosely structure the discussions for each stakeholder group. Each interview was then recorded, and all interview notes were transcribed for analysis. We then uploaded all transcripts into Dedoose, an online platform that allows qualitative data to be thematically coded and analyze. We developed each code through inductive reasoning; as new themes emerged throughout the data, these were added to the coding frame. The results were developed based on the inductive coding frame and leveraging thematic analysis, often supported by patterns and metrics through Dedoose (e.g., code co-occurrence).

3.2. Facilitated workshop

On Saturday, October 4th, 2021, we organized a workshop to discuss landslide insurance options at the Centennial Hall in Sitka, Alaska. We invited all Alaska-based respondents from the key informant interviews to the workshop, with an option to join remotely; a total of 18 participants fully attended the workshop.

Following the workshop, on November 11, 2021, we launched a short web-based post-workshop survey for all workshop participants. The survey was open for seven days and had a 50% response rate (or $n = 9$, half of the workshop participants). We then performed descriptive analyses of the survey findings in SPSS.

4. Findings

The workshop was borne out of a demand by most stakeholders who wanted to clarify some doubts and local information regarding landslide insurability and local housing finance. Consequently, as a facilitator, it was essential to be able to ensure that the workshop meets their expectations. The findings are organized around our learnings around 1) participants' motivations, 2) their identified concerns, 3) the suggested public policy challenge, and 4) overall effectiveness of the workshop exercise.

4.1. Motivations for participation

In interviews prior to the workshop, it was evident that each stakeholder group had distinct motivations that influenced their interest in landslide insurance availability, and resultantly their willingness to participate in an inclusive, multi-stakeholder workshop. The table below summarizes these diverse motivations by stakeholder group. By better understanding these stakeholder groups, we organized the workshop constructively to address their motivations, expectations, and contextualize some of their arguments and decision-making.

Stakeholders described their motivations underpinning the perceived areas of concern, and in some instances, detailed their assumptions and information constraints in forming a more optimistic opinion on the future of landslide insurance availability. The major distinction in motivations was between the "demand-side" participants, or homeowners, and "supply-side" participants such as insurance professionals and policymakers or regulators. Homeowners were largely concerned around their overall property value; given the uncertainties around landslide risk, homeowners wanted assurance that their property values would not be adversely affected by landslide risk awareness, particularly if they had intentions to subdivide their parcel, refinance, or sell their property. Insurance professionals were somewhat less myopic and wanted the assurance that they would have adequate demand for landslide insurance, sufficiently estimate landslide risk probabilistically, and build enough capital without landslide loss for the first several years of writing a potential landslide policy to remain solvent.

Despite the differences, there was some convergence in areas of concern, particularly among real estate professionals including realtors, appraisers, and lenders. These real estate professionals shared motivations with both homeowners and insurance professionals: while they emphatically wanted to support local homeowners' investments, many of them were still concerned about the

Table 1
Stakeholder sample characteristics.

Stakeholder Group	Count of Participants
Homeowners	6
Real estate professionals	16
Insurance professionals	10
<i>Total</i>	32

impact of landslide risk information (if it were to become available, such as vis-à-vis determining a landslide insurance premium), on 1) the appraisal value and 2) the homeowners' financial capability to collateralize their home if there were an increased likelihood of loss during the loan period. **Table 2** below summarizes these divergent and convergent motivations, by stakeholder group.

In Sitka, these stakeholder groups are not mutually exclusive. As one respondent aptly put it, "we all work and play here"; local insurance professionals may represent potential consumers of landslide insurance, policymakers may have strong social ties to insurance professionals, homeowners in landslide-affected areas may also be real estate professionals, etc. Consequently, many of these motivations overlap and could broadly be interpreted primarily 1) for self-interest or self-preservation, and secondly 2) for public welfare and the promotion of local economic development. Although each unique stakeholder may have their own personal positionality when it comes to how they intent e.g., develop a methodology for adjusting an appraisal to include landslide risk knowledge, the general principle of self-preservation, as an individual and for their primary stakeholder group, largely applies.

4.2. Shared and divergent concerns

After elucidating the motivations, we mapped out perceived landslide insurance-related policy areas of concern to each stakeholder group. We summarized these priorities, by stakeholder group, in **Fig. 3** below. The figure illustrates the relative landslide insurance-related areas of concern that the various stakeholder groups raised throughout the interviews. Concerns range from consequences of public landslide risk information (e.g., impact on property values) to concerns about the feasibility of a potential insurance program. The darker shades indicate a particular area of concern that a stakeholder group disproportionately cited relative to other concerns. This is used as a proxy for salience; when given sufficient time to discuss all valid concerns, naturally some stakeholders gravitated towards and expressed greater concerns in some dimensions relative to other stakeholders. Although all stakeholder groups were concerned about how people perceive the risk of landslides and the impact on property values, their motivations for their concern were drastically different. Notably, only insurance professionals expressed concerns about ensuring adequate demand for an insurance program; other stakeholder groups suggested that if a landslide insurance policy were affordable and at-risk homeowners were willing to pay, then they believed demand for at-risk homeowners would not be a concern.

Once we identified shared and divergent concerns, we engaged in discussions to frame the *status quo* for each concern, as defined by each stakeholder group. These areas of concern and priority helped to understand how to allocate time and efforts in the workshop and ensure that all stakeholders were operating from a similar level of understanding and if there were any information gaps that could have contributed to increased concerns and consequently a stalemate, then these would have been made explicit during the next step of articulating the *status quo*.

4.3. Defining the status quo

As noted earlier, one of the objectives of the workshop was to assess the appropriateness of an inclusive workshop in unlocking the initial steps to overcoming a stalemate. We began with a conversation that required a definition of the *status quo*, as well as everyone's

Table 2
Motivations for participating in a multi-stakeholder landslide insurance workshop.

Motivation	Stakeholder Group				Quotes
	Homeowner	Real Estate/ Housing Finance Professional	Insurance Professional	Policyholder	
Impact on property value	X	X			<i>"I am frustrated with people making landslide decisions with no skin in the game." (Homeowner)</i>
Impact on appraisal value	X	X			<i>"We use careful language [in an appraisal] about landslide exposure or whatever the language is – We just do not want to give the perception of a sense of negligence." (Real estate professional)</i>
Understanding policies and standards for landslide risk information in lending decisions	X	X			<i>"Firms have independent models for earthquake risk and we want that [for landslides]...we just want to stay in our lane and not get involved". (Real estate professional)</i>
Improving prospective homeowners' access to landslide risk financing		X			<i>"If you can't get there because the road [will be] closed due to a landslide, can't lend." (Real estate professional)</i>
Profitability		X	X		<i>"If landslide affects a homeowner, the debt will still be there." (Housing finance professional)</i>
Limiting liability and public welfare				X	<i>"I heard that [researchers] are looking at the peril in different ways...potentially could be more appealing for insurers to participate than before." (Insurance professional)</i>
					<i>"Banks are telling [a homeowner] that they are requiring landslide insurance because the Sitka ordinance has defined landslide as a risk. I want to remove that excuse and find another excuse for landslide insurance coverage besides 'the city is making them do it'." (Policyholder)</i>

Stakeholder Group	Concerns									
	Overall insurance demand	Market size	Risk spreading	Risk perceptions	Willingness to pay	Local politics	Geo-morphology	Geo-technical surveys	Landslide maps	Property value impact
Homeowner										
Insurance Professional										
Real Estate Professional										

Darker shaded boxes indicate the proportionate amount that each stakeholder group cited a respective concern, relative to the other stakeholder groups.

Fig. 3. Relative landslide-insurance concerns, by stakeholder group.

unique interpretation of the *status quo*. Based on our findings of the key areas of concern to most stakeholders, the *status quo* definition was generally organized around three topics: 1) landslide insurance (un)availability, 2) lending requirements for landslide financial risk transfer, and 3) effect on property values. Other topics of concern, such as risk perceptions and local politics, were considered endogenous and essential considerations that underpinned all three topic areas.

4.3.1. Landslide insurance (un)availability

Prior to the workshop, there was near consensus that any form of landslide insurance that was previously available – namely a difference-in-conditions (DIC) policy through the surplus line market – was no longer available. As one homeowner lamented:

“[Immediately after the 2015 Kramer Ave. landslide], I emailed Lloyds of London and they offered me a policy for about \$1,200 a month. I decided to just [risk] it because I figured since there was already a slide, there wouldn’t be another one...[recently] I talked to [insurance brokers] and they said they would be able to get me a policy but came back with nothing....Lloyd’s is no longer willing.”

However, at the workshop, one insurance broker shared that they recently discovered a website for a lesser-known carrier that seemingly writes residential DIC policies that would cover landslides. There was overall zero awareness of the policy carrier.

4.3.2. Lending requirements for landslide financial risk transfer

One common belief held among various stakeholders prior to the workshop is that certain mortgage lenders were requiring landslide insurance for homes that were in a landslide-susceptible zone. One homeowner highlighted their experience with this *de facto* policy:

“I went to [the bank] to refinance and they said ‘all good’ – right before signing paperwork, they said they required either landslide insurance or enough assets to cover the replacement value of the home....all due to tiered landslide risk designation from the State”

This claim, however, did not go undisputed; lending officers contested this and noted that although landslide coverage may pose some challenges when trying to finance with traditional lenders like Freddie Mac, that many lenders would have the risk appetite and the homeowner should not have had any landslide-related challenges with refinancing. One lending officer further suggested that for prospective or current homeowners, the ability to finance a house is less influenced by any landslide risk designation but rather, more about the appraisal report, the borrower’s loan-to-value ratio, and the borrower’s credit profile.

Although there was still sufficient discussion at the workshop about challenges many homeowners faced when trying to refinance their homes and capitalize on low-interest rates in 2020, all homeowners agreed that regardless of their ability to secure landslide insurance, they were all able to identify a mortgage lender (either from a local bank or from a lender in the contiguous United States).

4.3.3. Effect on property values

In the invitations for the workshops, we articulated that the workshop would be a part of an ongoing intention effort to explore potential options for landslide risk financing. As noted in the stakeholder motivations, a desire to ensure that the threat of landslides would not negatively affect their property value was the principal reason that homeowners participated in the research and attended the workshop. Since the 2015 Kramer Avenue landslide, there has been a general concern throughout the community that any research into better understanding landslide risks throughout Sitka would devalue residential property in areas believed to be susceptible to landslides. However, regardless of landslide insurance availability, respondents held mixed beliefs on whether landslide risk disclosure would ultimately influence property values.

Currently in Southeastern Alaska, each appraiser has their own unique approach to incorporating suspected landslide risk into an appraisal. While one appraiser asserts that they have never made any local adjustments to the appraised value because of historical landslide-related losses, another appraiser has. However, in some way, nearly all appraisers acknowledge the potential threat of a

landslide within the appraisal notes. In a small and connected community such as Sitka, homeowners are aware of the different methodological approaches for incorporating landslide risk into an appraisal; as a result, homeowners in landslide-susceptible areas prefer some appraisers more than others. For example, one appraiser gave an example that “[In Juneau], people know that if an avalanche affected the home, they won’t use X appraiser because he’ll think that the sky is falling”. These sentiments were echoed by homeowners and appraisers alike in Sitka regarding landslide risk.

Due to the constrained housing market in Sitka, real estate agents and appraisers remain somewhat optimistic that 1) property values will stay higher than the appraised value, 2) there will be consistent demand for homes everywhere in Sitka, and 3) the market generally forgets about landslides. One real estate agent noted:

“At the end of the day, if you have a house in a flood zone or a landslide zone, there will be people who will not buy that house, so to ask him if he thinks it will devalue some houses, it absolutely will to some people. Other people who say ‘eh, every hundred years’, pray that they’re right.”

4.4. Effectiveness of the workshop and participatory methods

We observed notable signals of progress towards improving public awareness of the challenges associated with landslide cost recovery and the value of landslide insurance throughout the duration of the research. In August 2021, four months after the completion of key informant interviews and two months before the workshop, the Sitka City Council updated the city code to remove language that designated landslide risk to several households (including areas in the Benchlands, which the city had ordained for development decades ago). One motivation for rescinding the landslide-related language from the city code was to promote the viability of landslide insurance. The City administrator noted that “these homes [were] boxed out from insurance, when really nothing has changed for them over the years” [59]. Although this decision may likely be coincidental and not necessarily a product of these burgeoning discussions that have been catalyzed by the research, the rationale for the decision was consistent with many of the research findings. As landslides continue to occur throughout Alaska, other municipalities have similarly speculated the implications of landslide risk designations on cost recovery, as well as the potential value of a landslide insurance market [60,61].

At the end of the workshop, some of the major concerns that were shared among all the homeowners at the beginning of the workshop were unresolved and remained a major source of uncertainty. The two (related) concerns that lingered at the end of the workshop were related to 1) risk disclosure and information asymmetry between homeowners and private insurers (in the absence of a landslide risk model), and 2) the impact on property values. As various participants from different stakeholder groups expressed their concerns around the same topics, other stakeholder groups felt more comfortable similarly sharing their grievances. At the end of the workshop, despite learning more about the potential policy options for improving landslide insurance availability, participants became more aware of the long road ahead. One participant noted at the workshop that they were pleased that it seemed like the community was making progress and openly talking about various landslide finance concerns. However, the participant also expressed concern that the conversation has shifted from one stalemate to the other (lack of probabilistic landslide risk models) and consequently speculated how to engage multiple actors to develop better landslide risk models. Given these challenges, less than half of all workshop participants noted that the workshop has increased their optimism that landslide insurance will become available in the future.

The most significant outstanding concern among all respondents is surrounding localized and probabilistic landslide risk information: one the one hand, homeowners still believe in the proverb that ignorance is bliss, and that in the absence of landslide risk disclosure, their wealth would likely grow due to increasing property values and improved access to home financing opportunities. On the other hand, without sufficient risk information, homeowners may either exhibit optimism bias or rely on their own mental models to arrive at the conclusion that their property risk is so low or non-existent that it would not warrant demand for landslide insurance [62] or any financial planning in the event of landslide-related catastrophic losses. Similarly for insurers lacking property-specific landslide risk information, it is incredibly challenging, if not impossible, for underwriters to adequately assess risk and ultimately engender confidence in the feasibility of any landslide insurance policy. Without an adequate probabilistic model to better forecast property-specific risk, the economic concerns outlined by French [4]; namely adverse selection, would prevail.

Despite the concern about the ability to make progress without fulfilling the information gaps, results from the post-workshop survey suggested that the workshop was insightful to the diverse range of participants. Nearly all the post-workshop survey respondents (8 of 9) noted that they plan on discussing some findings from the workshop more widely with others. Homeowners have noted that they are eager to share with others “how insurance works and the ways that insurance companies can provide coverage and the limitations they have”. Another homeowner provided crucial feedback that because of the steep learning curve, they would have preferred to have a full-day session that were purely educational for more insurance-related background. These findings further stress the importance of inclusive methods for policy dialogue, and how transparency and knowledge sharing are essential steps a shared understanding of the determinants of a stalemate.

5. Discussion

Evaluating the extent to which a stalemate has been unlocked is relatively straightforward: once a political stalemate has already been established, legislative action is a clear marker that ultimately a decision has been reached [1]. As the *status quo* of no landslide insurance was insufficient to many individuals across stakeholder groups, and given the siloed policy dialogues, participatory action research methods such as information exchange vis-à-vis a workshop could have been an initial step for all stakeholders to imagine a future state with alternatives to the *status quo*. However, resolving a gridlock often does not happen overnight and can involve arduous exercises such as this one, designed to clarify the institutional sources of stalemate (such as various stakeholders’ motivations and

constraints), patterns of the particular gridlock, and its potential consequences on public confidence and economic or social development.

Results of our study suggest that efforts to end the public policy stalemate for landslide insurance availability may require a protracted process: the resolution would likely benefit from inclusive, public-private partnerships across multiple levels of government. In the United States, at all levels of government, the lack of a precedent for public-sponsored landslide insurance may prove this to be even more difficult. The ultimate impacts of the multi-stakeholder workshop may take years to be realized, however since the inception of this research, there have been significant short-term markers that the public policy dialogue to address landslide insurance availability has been reinvigorated or even shifted.

Evidence from the post-workshop survey, local word-of-mouth, and newspaper features suggest that many of the research exercises, and particularly the workshop, have catalyzed stakeholders' engagement and knowledge exchange [31,63]. For an issue that many homeowners and insurance professionals considered to be stagnant since Sitka's devastating 2015 Kramer Avenue landslide, participatory research methods have created a policy dialogue momentum, and for many, reframed the landslide insurance discussion in a way that looked beyond the nostalgic pre-2015 options but deliberately challenged *status quo* and provided a future with options.

Given that our study is exploratory, it is important to be cautious on interpreting the results: the increased salience may only be among core stakeholders and not Sitka's broader population, and may further, be fleeting. Without ongoing attention and an advanced dialogue, the efforts to end the stalemate could be at-risk of being stalled and short-lived. Across the United States, commitment to improving disaster preparedness is often most acute immediately after a disaster occurs, and due to competing priorities and acquiescence to the *status quo*, a stalemate perseveres [64].

Our results may also indicate that leveraging participatory methods to reimagine public policy for disaster preparedness beyond the *status quo* appears could be a valuable exercise to help unlock stalemates for disaster risk management policy objectives beyond solely landslide insurance. Specific to stalemates, participatory methods also have the potential to strengthen commitment and reinvigorate a disaster risk management objective as we have seen in Sitka. In addition to knowledge co-production, which has been extensively discussed in the literature [17–19], inclusive participatory methods that invite a diverse range of stakeholders into the policymaking process can support transparency in public policy dialogues and broker new relationships to solve problems that have traditionally been siloed. As a result of this siloization, stakeholders are often restricted from critical information on risks. This renewed attention to disaster risk management can also have the potential to galvanize multi-level government and private stakeholder support and engagement beyond a locality. The effects of renewed attention have been noticeably significant; increased salience in disaster risk management initiatives has historically led to improved outcomes of public policy goals [65–67].

In spite of these outstanding concerns contributing to a stalemate, the potential value of landslide insurance will likely remain an issue in Sitka. Considering the increased incidence in atmospheric movement resulting from climate change which may lead to more frequent and more intense rainfall [68], coupled with speculations for continued housing development throughout Sitka as the healthcare industry and job opportunities burgeon [69], public discussions of the role of landslide risk in local economic development may potentially garner further attention. Consequently, questions surrounding landslide risk financing, and predominantly the hope for a landslide insurance market, may become even more salient for Sitkans and Alaskans more broadly in the future. Future research on landslide insurance modelling and risk spreading, particularly considering these complex risk dynamics, would reduce several of the uncertainties that still contribute to a landslide insurance stalemate. With fewer uncertainties, more research, and continued inclusive policy making, current and prospective Sitkans may have reason to be more confident in their decision-making for real estate investment, future economic growth, and disaster preparedness.

6. Conclusion

Our study suggests there appears to be significant potential for participatory action research involving multiple stakeholders to overcome stalemates, at least in the initial phases of identifying opportunities for policy action. Such multi-level and diverse stakeholder engagement can generate new ideas, momentum, excitement, and reconcile information and assumptions around the underlying challenges that are causing the stalemate. In the context of Sitka, Alaska, the simple act of convening stakeholders appears to have increased the salience of landslide insurance availability concerns and likely has contributed to subsequent discussions and policy motions at multiple levels of government. By sustaining momentum and interest in identifying opportunities for landslide insurance provision, there is less danger that people will forget the importance of landslide insurance in disaster preparedness as well as the various impacts that 2015 landslides have had on Sitka.

Given how intractable stalemates can often be, the path to securing landslide insurance and improving disaster preparedness and policy action is likely not a short path. For Sitka, significant obstacles remain towards overcoming the barriers to achieve a policy that may support homeowners to becoming better financially prepared against catastrophic loss resulting from landslides. Additional research on probabilistic landslide hazard models, with sufficient granularity to estimate property-specific landslide recurrence intervals, may help engender greater confidence in insurers' ability to appropriately price any prospective landslide insurance policy and continue to move toward overcoming stalemates.

Funding

This work was generously supported by the National Science Foundation (Award number 1831770). Max Izenberg was additionally supported by the John M Cazier Dissertation Award and Aaron Clark-Ginsberg was funded by the National Science Foundation/National Oceanic and Atmospheric Administration, under the project entitled "Belmont Forum Collaborative Research: Community Collective Action to Respond to Climate Change Influencing the Environment-health Nexus" (Award number 2028065).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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