The missing politics of urban vulnerability: The state and the co-production of climate risk

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Abstract

Studies of urban disaster and climate change risk have increasingly invoked governmentality as a theoretical frame for understanding how urban risk governance functions. This article argues that the use of governmentality in this context can advance political readings of urban vulnerability to climate risk. However, using the idiom of co-production from Science and Technology Studies, I question current treatments of the politics of expertise in the urban risk governance literature, highlighting the need to understand the political commitments and practices that shape the implementation of purportedly technical risk knowledge and their particular manifestation in the context of informal, urban settlements. A case study from Bogota, Colombia, links the science and practice of state risk management to vulnerability outcomes in informal urban settlements. It shows how a new suite of qualitative methodological approaches are revealing of the power-knowledge dynamics in governance that influence vulnerability, and their differential social effects.

Introduction

Over the past decade, the imperative to adapt to the impacts of climate change has provoked new forms of intervention in cities which have variously overlain or bypassed older programmes for tackling disaster risks (Bulkeley and Tuts, 2013). The convergence and tensions between the adaptation and disaster risk policy domains is widely discussed, with the orientation of adaptation work focussed on a sub-set of climate-related risks diagnosed utilising global climate models in addition to historical climate data and probabilistic forecasts (Birkmann and Von Teichman, 2010). Despite different but overlapping foci, long-standing literature in both sub-fields has stressed the common need for policy to address not only the onset of biophysical hazards and their impacts but also the

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underlying social vulnerabilities that give rise to risk, where risk then reflects the likelihood not only of a biophysical event but also of a human disaster causing losses in life, mortality or livelihood (Blaikie et al., 1994; Bulkeley and Tuts, 2013). This view of vulnerability as the 'pre-event, inherent characteristics or qualities of social systems that create the potential for harm' (Cutter et al., 2008: 299) derives from the political ecology schools of hazards and disaster risk research, which challenged earlier frameworks in their neglect of the political economy factors that made people vulnerable (Blaikie et al., 1994; Hewitt, 1983). In contrast to vulnerability frameworks focussing on the contemporary biophysical and social conditions of a given area (Cutter et al., 2008), structural theorists seek to elucidate the causal social, political, economic and institutional structures of entitlement that mediate peoples' access to resources (Adger, 2006; Blaikie et al., 1994).

A large proportion of socially vulnerable urban groups live in informal urban settlements, or those constructed outside formal regulation, where the lack of rights and recognition precludes access to the formal infrastructure, services and markets which protect against climate-related risks (World Bank, 2011). Here, the nature of urban politics and governance is germane to the nature and dynamics of vulnerability (Moser et al., 2010; Satterthwaite, 2011). Our conceptual understanding of urban vulnerability in this context is challenged to account for both the structural entitlements under negotiation (as discussed in Pelling, 2003, although without explicit theorisation of informality) but also the role of informal institutional processes alongside the formal, and of power and meaning alongside material resources, emphasised through post-structural entitlements frameworks (Leach et al., 1997). Indeed, as increased efforts are made to tackle the impacts of climate change in urban areas, related critical social and political theory – and particularly work indebted to governmentality frameworks – is finding growing application to investigate their framing, implementation and consequences (Stripple and Bulkeley, 2014).

This article critically examines engagements with governmentality as a framework for understanding urban climate risk governance and its impacts on social vulnerability in conditions of informal settlement. As the following section argues, additional perspectives from Science and Technology Studies (STS) challenge existing scholarship to account for the political commitments embedded in 'expert-led' risk assessments and the institutional practices through which technical risk knowledge is enacted, which in turn requires a better understanding of how the institutional dynamics of informal, urban settlements shape risk governance.

The following sections then introduce the case study and methods, discussing how the use of oral history methods alongside surveying techniques can shed new light on the urban politics of risk and its differential effects on vulnerable populations. Empirical findings from Bogota, Colombia, demonstrate how risk knowledge is co-produced with state practice to influence vulnerabilities. Finally, the conclusion discusses the implications for theory and practice.

Understanding the politics of vulnerability in informal, urban settlements

Knowledge and power in urban risk governance

Studies of urban disaster and climate change risk have increasingly highlighted that knowledge-power relationships shape urban risk governance (Mustafa, 2005). Invoking James Scott's implicitly Foucauldian notion of 'seeing like a state', authors highlight how technocratic framings of risk simplify the social and political dynamics of everyday life, and

are contested by lay understandings (Mustafa, 2005; Rebotier, 2012). Other work draws more explicitly on Foucault's governmentality approach to show how risk is constituted as a new problematic for urban governance, creating new territories and subjects (Boyd et al., 2014; Zeiderman, 2012). In line with work on the politics of knowledge in disaster risk reduction more generally, both seams of literature highlight how contests in risk governance reflect the broader nature of social relations and struggles over the prevailing social order (Bankoff and Hilhorst, 2009). Harnessed to the analysis of social vulnerability, and its causal structures, the development of such conceptualisations of governance ensures power and politics remain at the forefront of analysis – phenomena which have too often been marginal to agent-based livelihoods approaches to urban vulnerability (Hendriks, 2011) – and emphasises the role played by particular techniques and practices of government (Bulkeley, 2015).

The politics of science and the co-production of urban risk governance

While analysis of the 'reasons' of government is central to the project of governmentality analysis (Stripple and Bulkeley, 2014), other work in the STS sub-field of science-policy studies – drawn together under the idiom of 'co-production' – critically interrogates the political and social commitments that underpin the role and use of science in government (Jasanoff, 2004). In the urban climate risk literature, discussion of the social and political influences on the 'making of knowledge' remain largely confined to discussion of the political uses of technical risk knowledge (Boyd et al., 2014; Mustafa, 2005; Zeiderman, 2012). However, questions arise about the politics lying *within* what is purportedly technical and not just in what is 'cast out' (a politics that Jasanoff argues has 'tended to be leached away in most high-modern theorising about expertise') (Jasanoff, 2004: 279). While risk assessments, a cornerstone of many programmes of government improvement through risk reduction, may indeed be 'rendered technical' (Ferguson, 1994; Li, 2007), a long-standing literature in STS has stressed how such risk assessments nevertheless embody social assumptions about agency, causality and responsibility (Jasanoff and Wynne, 1998). The need to fix what may actually be uncertain or more indeterminate elements of risk – such as institutional behaviours – leads to highly contingent assumptions being 'written in' to technical exercises (Lane et al., 2011; Wynne, 1996). Studies of risk-based policy-making indebted to the idea of co-production further show how the form and use of risk classification and assessment tools serve the pre-existing, and possibly competing, political logics and interests of multiple stakeholders (Epstein, 2009; Rothstein and Downer, 2012).

Co-production therefore provides a promising frame through which to understand the political rationalities of knowledge embedded in urban risk governance interventions, and their interplay with the practices of government (Jasanoff, 2004). The application of this frame to the specific context of urban informality – where the nature of state practice in response to disaster and climate change risks has received little focussed attention (Boyd et al., 2014) – requires critical examination of how states govern in such areas.

Re-thinking risk governance and its effects in informal, urban settlements

The disaster risk and climate change adaptation planning literature in urban areas has thus far concentrated on the challenges to integrating necessary plans in the formal structures of local government, and the limits to existing policies (Birkmann et al., 2010; Wamsler and Brink, 2013). It has only just begun to explore how such planning practices 'play out', particularly in informal, urban settlements. Where the urban 'risk governmentality'

literature touches on informality it highlights how risk management creates subjects beyond the realm of formal regulation (Boyd et al., 2014). However, urban planning theorists have noted that, far from always existing 'beyond the state', informal, urban areas have also been sites of formalisation and inclusion, and states are present in informal areas in heterogeneous ways (Jenkins and Anderson, 2011; Varley, 2013). The state's involvement in processes of defining and producing informal and formal settlement, and related categories of legal and illegal, relies on highly flexible practices of 'exceptions, contradictions, ambiguity and arbitrary decision-making', which underlie formal planning processes (Duminy, 2011: 2). Further – contrary to the assumption that the modern state governs and plans only through technologies of visibility, counting, mapping and enumerating, as the 'seeing like a state' literature suggests – it is held that it is the process of deregulation and 'un-mapping' that allows the state to control land and its use in informal areas (Roy, 2009). A further analytic step – in line with the aim of co-production to unpack both the 'scientific' and the 'social' together (Jasanoff, 2004) – is to acknowledge that both the urban disaster and climate change risk governance and urban planning studies literatures maintain a conception of the state as a unified agent. State theorists have nevertheless noted that state elites, agencies and levels of government may themselves be at odds around a given agenda (Corbridge et al., 2005; Gupta, 2012). Further, this conceptualisation of a 'disunited' state is central to understanding the processes through which state power produces mass poverty, even in sites of stated inclusion: the effectiveness of social welfare programmes, for example, is undermined by tensions between different levels of government (Gupta, 2012). This work emphasises the need to problematise the state and its purposive projects of risk management as well as understand the interaction between the 'state' and multiple formal and informal local actors (Boyd et al., 2014).

Case study and methods

The conceptual discussion above raises central questions about how social vulnerabilities to climate-related risks are governed in informal, urban areas through institutional processes of defining, appropriating and using particular concepts and technicalities of risk that reflect the political logics and aspirations of relevant actors.

To investigate these questions, the research used an in-depth case study of an urban landslide risk management programme – the *ladera* or hillslopes programme – with a long history of implementation in the informal settlements of Bogota, Colombia. In Bogota, a globally renowned system of risk management has penetrated these areas since the 1990 s, when the mayoral administrations of Mockus (1995–1997 and then 2001–2004) and Peñalosa (1997–end 2000) developed such programmes as an integral part of urban improvement efforts, under Peñalosa catalysing physical investments in neighbourhood legalisation, improvement and integrated urban spatial planning (Robles Joya, 2008; Zeiderman, 2012). Since then, dedicated cadres of engineers have produced some of the most detailed records of risk and vulnerability in the world (such as the landslide risk map shown in Figure 1), on the basis of which the city government has defined risk zones and implemented resettlement programmes, structural mitigation works and education campaigns (Dickson et al., 2010). Although the *ladera* programme was originally conceived as a disaster risk programme, from 2012 to 2015 under the mayoral leadership of Gustavo Petro, such programmes were harnessed to the development of climate change adaptation policies in the city, giving further impetus to resettlement efforts (Lopez, pers. comm. 19 May 2016).

Field research to investigate the relationship between hazard occurrence, the vulnerability of households and the practices and knowledge basis of government interventions over time took place in 2009–2010 in three government-designated landslide risk zones in Ciudad
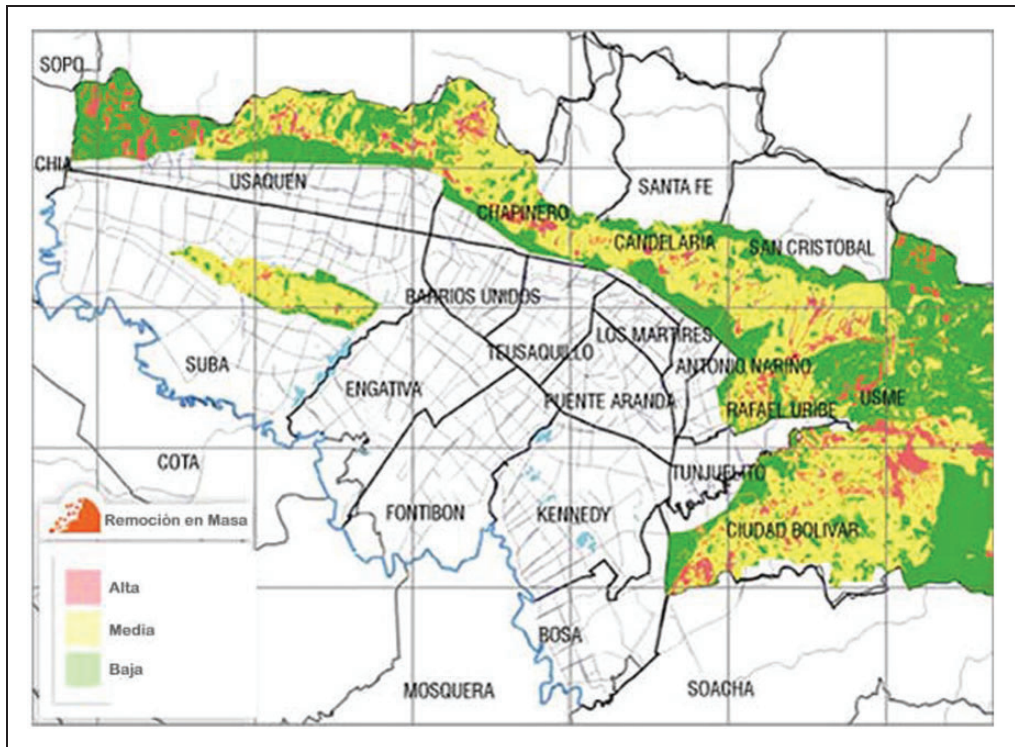
Figure 1. Landslide risk map of Bogota showing the location of the Ciudad Bolivar neighbourhood. Different shadings depict high, medium and low risk.
Source: DPAE, Bogota.

Bolivar, on the South Western periphery of the city: Altos de Estancia, Caracoli and Brisas de Volador. All the zones shared a history of informal settlement and were subject to the same formal strictures of the *ladera* programme. However, the three zones had distinct histories of state engagement and community responses, which allowed for a broader range of state and social practices to be observed and comparisons to be drawn which illuminated key drivers of vulnerability.

Examining vulnerability as 'a function of the exposure (who or what is at risk) and sensitivity of system (the degree to which people and places can be harmed)' (Cutter, 1996: 559), research methods were selected with the aim of, first, probing the role of state knowledge, power, practice and meaning in shaping the nature and distribution of vulnerability in affected communities and, second, contextualising such findings with reference to the socio-economic and political statuses of households living in the risk zones to understand the differential effects of state practice. The central methods were a semi-structured household survey coupled with a more open and flexible mode of oral history. This focussed less on full life chronologies, and instead on an adapted 'livelihood trajectories' approach which sought to understand the pathways of different social groups over the course of the programme (De Haan and Zoomers, 2005). As for oral histories in general, these proved an invaluable method for exploring the interactions between structure and agency and uncovering narratives that challenged dominant policy discourse (Lewis, 2008). The 'livelihood trajectories' approach went beyond just mapping the contours of

Figure 2. Surveying the Brisas de Volador risk zone. One thousand people were estimated to live in the zone. Twenty nine interviews were undertaken in the high risk (upper) and medium risk (lower) sections, including original settlers (whose brick houses appear in the middle of the photo), newer settlers who had inhabited cleared plots (to the right of centre), displaced families in the upper section of the cleared area and a group of home owners to the upper right quadrant of the photo who were under threat of eviction. Interviews included 1 renter and 2 squatters.
Source: Author (2010).

behaviour, however, in its exploration of attitudes and beliefs, an explicit focus on power relations and a situating of individual behaviours in relation to broader social-cultural repertoires (De Haan and Zoomers, 2005). The two methods of survey and oral history overlapped: more open histories initially 'grounded' the investigation, whilst in the later stages the systematic collection of household data through the semi-structured interviews (household origin, ownership, social structure, housing material, economic activities, levels of education and health status, access to services, social involvement) allowed new types of household to be identified for more in-depth interviews. For the analysis, salient social and economic groupings were compared and, to contextualise the rich, narrative information, case studies or household vignettes were used to report the findings, alongside the identification of common themes through the coding of interview texts.

A random sampling technique for surveying in the zones proved difficult due to the on-going resettlement of communities, the mobility of households and communities themselves and security considerations which limited access to certain groups (such as households unavailable during daylight hours). I nevertheless conducted 96 interviews, using community informants to 'snowball' out to different types of inhabitants according to their geographic spread in the risk zone, classified level of risk (high or medium), housing construction type, livelihoods status (newly displaced communities, for instance, as well as older community groups), and political status (eligible or ineligible for resettlement, for example). An example of the patterns of inhabitation and types of groups interviewed in the Brisas de Volador risk zone is shown in Figure 2. To offset bias towards groups

remaining in risk zones after resettlement, I interviewed in two resettlement sites as well as within the risk zones.

The salient historical junctures and practices of the *ladera* programme identified in household interviews were further explored in in-depth interviews with community leaders and key informants, in field visits with government officials and in 33 semi-structured interviews with current and former local government officials involved with the programme. This was complemented by analysis of official documents and media reports produced over the period of programme and of documents (such as legal transcripts and petition letters) made available by households and community leaders. This suite of methods moves beyond conventional social vulnerability assessments in historicising and politicising the investigation of the drivers of vulnerability. However, it retains a structured understanding of the longitudinal evolution and spatial distribution of vulnerability in the sites, which might have been lost without the survey method.

Findings and discussion

The analysis that follows uses the framing idea of co-production to examine the relationship between science and government practice in risk management and its influence on patterns of household exposure and sensitivity to landside risk across three informally-settled sites over time. The first section examines the political assumptions embedded in the practice of risk assessments and their effects. The second and third sections explore the political logics at work in the process of categorising who is at risk in high-risk zones. The fourth section moves from a focus on the practices of risk management agencies to show how the objectives and practices of wider sets of state institutions converge and diverge in the process of governing risk in informal sites.

Political assumptions in the assessment of landslide risk boundaries

Bogota's landslide risk management programme has exemplified a physically-based paradigm for assessing risk overlooking the structural and social causes, agency and coping strategies and local perceptions and meanings of risk, in ways already discussed by vulnerability analysts (Blaikie et al., 1994; Forsyth, 2003). Landslide risk assessments are based on the likelihood of physical threat and the condition of the physical infrastructure (housing). These forms of expertise have buttressed state power to define risk in the face of conflicting local interpretations and behaviours, as post-structuralist theorists concerned with the knowledge apparatus of modern states highlight (Mustafa, 2005; Rebotier, 2012). While communicating risk according to risk assessments has been a major strategy of the programme, the aim has been to project the results of risk assessments, with no active involvement by those affected in the assessment process or the design of the programmes that follow.[1]

However, beyond the exercise of power based on purportedly neutral 'technical' expertise, a more complex politics of knowledge also underpinned the way in which risk zones are defined that reflected assumptions about institutional behaviour and responsibility in the context of the formalisation of informal settlements, as science-policy studies highlights (Lane et al., 2011; Wynne, 1996). Across the three landslide risk zones, this took two forms. The first was the assumption made in grading areas 'medium' rather than 'high' risk that infrastructure upgrading would occur (given that risk assessment processes went hand in hand with the legalisation, formalisation and, ultimately, the 'securitisation', of Bogota's informal areas) which would restore the physical condition of the area. Any lack of upgrading, however, influenced the occurrence of landslide disasters in medium risk zones

as deterioration due to the on-going lack of a legal water and drainage system, and subsequent water filtration, changed the conditions of the soil (Department for Emergency Prevention and Response (DPAE) official – July 2010). New landslide emergencies prompted boundary revisions and the expansion of medium risk zones into high risk zones (where inhabitants might then be included in resettlement programmes).[2] In the risk zone of Caracoli, for example, both the first technical assessment of landslide risk in 1999–2000 and a subsequent evaluation in 2008 assumed infrastructure upgrading in areas then classified as 'medium' risk. However, in the first instance, the state and community remained in conflict about the legal right of people to remain in what was a state-designated forest conservation zone (DPAE, 2006; Lopez, 2007). By the time of the second technical assessment the settlement had been legally recognised and institutional upgrading was underway, but it was slow.

The second assumption related to the designation of 'mitigable' and 'non-mitigable' levels of high risk, which affected whether inhabitants were to be resettled. Decisions in this respect reflected a pre-assigned political assumption that upgrading housing infrastructure (as opposed to providing large infrastructure works such as contention walls) was an action on private property where the responsibility rested with homeowners themselves. In the case of the Caracoli, for example, the Technical Assessment Report of 2006 made clear that 'these actions [mitigation works] must be undertaken by owners of the lots, given that the DPAE [the disasters agency] does not have house improvement programmes and that it cannot intervene on private property' (DPAE, 2006: 54). However, fieldwork in all three high risk zones found that such actions (such as stabilising cuttings in the hill slopes for construction) were widely beyond the financial reach of most households. The absence of such actions exacerbated risk levels for people who were technically excluded from resettlement because the risks had been deemed as 'mitigable'.

The categorisation of 'at risk' households and processes of exclusion

While the risk assessment process described above for defining risk zones was also used to distinguish priority households for resettlement, such technical expressions of risk were not the only rationality at work in defining household eligibility. While 'rendered technical' (Li, 2007) through the institutions, procedures and discourses of risk management institutions, in fact a political and bureaucratic 'matrix' was at work that in its structural origins went beyond the influence of the 'everyday' state-citizen encounters that Ziederman describes as important to the definition of risk 'on the ground' (Zeiderman, 2012). The political and bureaucratic logics at work in processes of risk definition stemmed from the historical origins of the programme, and reflected competing imperatives to both include and formalise informal populations as well as contain and structure the programme (Rothstein and Downer, 2012).

The form that this took for households in high-risk landslide zones was a set of eligibility criteria first laid down in a municipal decree in 2003 (Decreto 094) and then in the procedures of implementing agencies. The decree limited entitlements to a new housing subsidy for resettled populations by establishing the 'technical' mode of prioritising families through risk assessment but also through requirements to have a deed of sale or improvement; invoices from public service companies and judicial declarations by the Junta de Accion Communal (or locally elected committee); to have lived on the plot at the time of its declaration as a high risk zone; to not own another title and to have no other member of the family group in the resettlement programme (Decreto 94, 2003). Further qualifying details were developed by implementing agencies: those in ownership or possession, for example, should have been so for at least five years and they should have cleared all debt

with public service companies (State housing agency (Caja de Vivienda Popular) official – June 2010). Further, the guiding logic of the programme focussed on protecting the right to life – translating into the practical stipulation that the programme should apply only to persons physically 'at risk' at the time of a given emergency (DPAE official – January 2010).

This rationality emerged out of a specific historical juncture in the *ladera* programme as well as the political context in Bogota at the time. Its enactment and use in the context of risk management finds parallels in the analysis of co-production in the field of medical risk, where Epstein shows how scientific and state policies and categories were essentially 'hybridised' to produce a form of health classification in the US which simultaneously served logics present in biomedicine, in lobbyists' framing of their concerns and in the state administration itself (Epstein, 2009). In Bogota's *ladera* programme a form of 'structured containment' by the state (Biehl, 2005) emerged which fused risk knowledge, political categorisation and a particular – and limited – conception of rights. This was driven by the tension for state agencies between regulating risk, the high financial costs of risk-related resettlement, and the thorny dilemma of wanting to dis-incentivise new and repeated settlement in risk zones (Local management team DPAE – January 2010; Former *ladera* programme coordinator – June 2010; Caja de Vivienda Popular official – January 2010; Former district planning official – January 2010). As outlined by officials working in risk management institutions at this time, by the second Mockus administration of 2001–2004, during which the Decreto was passed, the municipal government was financially over-burdened, while damage from ongoing landslides in Altos de Estancia accelerated from the start of 2002, along with the number of evacuations and projected resettlement needs (Former director social management team, DPAE – June 2010; Former DPAE official and director of resettlement – June 2010).

Epstein shows how the co-production of US government health classification obscured questions about the nature and causes of health problems, by privileging biological difference over a view of health risk as related to structural categories (such as social class) and practices (such as certain types of social behaviour) (Epstein, 2009). In the three landslide risk zones of Bogota, the effect of eligibility criteria was to engender a dynamic of social inclusion and exclusion that de-privileged the risks faced by certain groups due to their social status or practices.

Table 1 shows the influence of categorisation on the reasons cited by households in high risk zones for their failure to access the resettlement programme.

Household interviews as well as secondary documentation showed up the salience of the length of settlement and ownership status to eligibility. Renters and squatters did not qualify because they were deemed able to take up residence in other areas of the city; newer settlers (such as the household illustrated in Figure 3) were ineligible because they were not present in the zones at the time of prior landslides, when censuses for resettlement were conducted, or because they were politically displaced and eligible for other housing subsidies (Caja de Vivienda Popular official – June 2010).

The majority of people interviewed in all three zones, however, were home owners (holding a form of informal title albeit through illegal purchase) who were the original settlers of the neighbourhood, having arrived as part of the main wave of urbanisation of the zones from the 1990 s and then undertaking a gradual process of self-building (shown in Figure 4). For home owners, despite the state's acknowledgement of informal title, state assumptions about social practices in eligibility criteria were the most common factors preventing or delaying access to resettlement programmes. In particular, this included the practice of obtaining credit from public services companies for the purchase of domestic goods and patterns of ownership and habitation, such as living on a plot owned by an

Table 1. Reasons cited for exclusion or delay in accessing government resettlement programme from high risk zones.

Exclusion	Delay
Away from address at the time of declaration of risk or census or address does not appear on formal records	Negotiating for used housing rather than state-built housing; lack of state approval of used housing chosen
House only partially built	Fighting for perceived correct valuation for existing house
Squatting	Problems with title (due to family sub-letting or ownership of another property)
Classified as displaced and therefore receive another form of state subsidy	Time and money to complete on paperwork or debts owed to public service companies
Renters	Slow state process – infrequency of state housing projects
Risk classification (either medium or low priority)	

Source: Author's elaboration from fieldwork.

Figure 3. New settler household in the Altos de Estancia high risk zone, classified as illegal and formally excluded from risk management programmes.
Source: Author (2010).

estranged or deceased family member (so that families had to go through a process of transferring ownership documents before they could be resettled), moving between urban and rural areas and the incremental practice of house building. The process governed the mitigation of risk exposure for those left living in risk zones but also affected household

Figure 4. Original settlers' houses in the Altos de Estancia high risk zone. The owners, settled in the zone since the 1990s, needed to regularise the family's land titles before admittance to the resettlement programme, and were negotiating for two new houses through the resettlement programme to accommodate all family members.

Source: Author (2010).

sensitivity to landslide risk: those who remained in high-risk zones were not entitled to state-provided service upgrading or to undertake building modifications, such as upgrading one's house through the process of building a brick house to replace the original zinc sheet and wood constructions, which would also have protected against disaster damage and loss.

To give one example, in the Altos de Estancia risk zone I interviewed an association of nearly 50 plot owners who were absent in person at the time of the census during a landslide emergency, or whose houses were at that time incomplete, and would therefore have been marked on the census as uninhabited. The families, however, remained or returned after the zone was cleared so as to, as one inhabitant expressed it, '*not lose possession of our plots*'. They were living in some squalor in predominantly poor quality shacks of zinc and wood (as they only planned on temporary shelter while their situation was appraised) with few services, tapping electricity illegally and without any water or drainage service (Interviews March and June 2010).

State visions of citizenship in risk management and their effects

Alongside the categorisation process, state visions about the passage to urban citizenship through resettlement also influenced patterns of inclusion and exclusion in high risk zones. These values and discourses were rooted in the historical embeddedness of the programme in broader projects of urban improvement, with Mockus' programmes focussed in particular on protecting life and security through the construction of new social behaviours and norms around citizenship while Penalosa focussed on physical infrastructure. Politically,

risk-related resettlement became an opportunity for the state to reorder illegal zones, with the 2000 territorial plan declaring as a strategy 'the conversion of the resettlement of the population into an opportunity to push urban ordering and improve conditions of life in the sector' (p. 55) (Decreto 619 2000). This movement from illegality to legality involved encouraging eligible families to take up new (state-build) housing rather than existing housing stock, and, if necessary, temporary rental accommodation. This was accompanied by the active promotion of 'citizenship' – those going into new social housing received training in 'rights and duties' – and a discourse of 'co-responsibility' for citizenship. As one housing agency official related, '*Often people can't pay for their papers [such as ownership documents], and you have to explain that they have to take some responsibility*' (Caja de Vivienda Popular official – June 2010).

However, home owners, even when eligible for resettlement, expressed deep ambivalence about the offer: while it reflected their desire for better housing and services it was also felt as a form of 'identity risk' (Wynne, 1996) as existing values and ways of life were curtailed. In state-build houses, families could no longer keep animals and there was no longer space to accommodate large and extended families – they were commonly referred to by interviewees in the Altos de Estancia and Caracoli risk zones as '*jaulas*' [cages]. Rental accommodation carried a stigma for the majority of home owners who had bought their lots in order to be able to move out of costly and insecure rental. In Brisas de Volador a family of sisters had returned to live on their parent's plot after problems with rental payments explained, '*It's that if here they resettle you, then you go to your own house and live well, then you can work at least to have good food, education for the children, but you can't if you are paying rent*' (Interview January 2010).

Household asset status also influenced responses to resettlement offers, and to a certain extent the profile of excluded households (although this was overlain with the exclusion of social groups of newer settlers, renters and squatters who were more asset poor, and the evacuation of areas of neighbourhoods following a landslide which cut across all groups).[3] For longer-term medium to high-asset ranking households their ambivalence to resettlement also reflected the loss of the financial and emotional investment made in house-building, with compensation amounts cited as too low (although 'high asset' households (who more likely to have two storey brick houses, permanent employment, take loans and have strong political connections) were uncommon across the risk zones as they could pursue independent options to leave). As one high-asset home-owner commented: '*those houses are no good for me, not even as a gift, they are good for displaced people (referring to poorer, newer settlers), for guerrillas (referring to those displaced from political conflict)*' (Interview January 2010). Such responses to resettlement fed the refusal of some households to leave high risk zones, or prolonged their stay while they negotiated with risk management agencies (as reflected in Table 1).

State responses to competing agendas: Flexibility and the contradictions of the 'state' in risk governance

This final section shows how the 'on-the-ground' making of risk knowledge (Jasanoff, 2004) reflected the pragmatic responses of risk management agencies to the inherent political tensions in the *ladera* programme but also the unwitting contradictions between the mandates of different state institutions operating in risk zones (Duminy, 2011; Gupta, 2012).

Household interviews and the review of programmatic documentation revealed ongoing, ad-hoc and sporadic attempts by risk management agencies to accelerate the clearance of some households from risk zones, in a manner seemingly unconnected to their political or

socioeconomic status. The group of home owners who re-occupied plots in the Altos de Estancia zone, pictured above, reported receiving offers of a 'special subsidy' to move on (Interviews March and June 2010). In 2007, the DPAE had issued a new Technical Concept in Altos de Estancia that upped the technical priority for resettlement, including for 92 families who had built their houses after the census of 2003 and were therefore not formally eligible. The stated aim was of 'saving life...and making the plots available for mitigation works...' (DPAE, 2007). In the Brisas de Volador risk zone, households in one area of the zone reported re-prioritisation in the resettlement process because state agencies wanted to undertake a re-forestation project (Interview August 2010).

Again, the norms, principles and imperatives of the prevailing political context re-shaped the application of risk assessment and re-defined the lived experience of risk for inhabitants. Continued habitation of risk zones was problematic for risk management agencies due to the politically-driven mandate of the programme to resettle people to protect them from risk and then 'green' cleared zones for recreation as part of wider urban improvement efforts. However, the desire to dis-incentivise ongoing settlements in high risk zones led to the withdrawal of state support from certain groups alongside attempts to harden control of (and criminalise) new settlements in high risk zones. Programme documents and municipal decrees related to the programme following the Decreto of 2003 embody this tension, with continuous changes to subsidy rates and eligibility criteria to prevent delay in entering resettlement programmes (Robles Joya, 2008; Caja de Vivienda Popular official – June 2010; Former director social management team, DPAE – June 2010) alongside decrees re-affirming that housing subsidies would not be available for those who settled on land after the declaration of the high risk zone (Decreto 40, 2011). In this context, flexible techniques of accommodation with households and groups made it possible to move people on whilst avoiding enshrining and normalising new principles for inclusion. Whilst state mapping of risk boundaries and zones embodied a normative vision of how such landscapes should be governed, the physical basis of such maps allowed social relations and dynamics to remain visually unrepresented – and high risk zones 'empty' in the formal discourses of disaster management officials, despite the reported presence of around 30 groups in the Altos de Estancia high risk zone (Head, Altos de Estancia Social Management team, July 2010) – a dynamic of 'un-mapping' that allowed for such flexible play (Roy, 2009).

The ongoing exposure of certain households and groups (with implications for their sensitivity to landslide risk) was influenced not only by the singular project of risk management agencies, however, but by the actions of multiple state institutions working in risk zones. New occupancies occurred in all three zones where areas had been cleared through resettlement programme, facilitated both by the ongoing sale of land by local mafias and the enmeshment of local mayors in this politics (despite them being political appointees of the city mayor) which often prevented them from exercising their formally mandated role to evict people.[4] The delivery of services to high risk zones was governed by other state agencies and private companies. In the Caracoli risk zone, inhabitants of the high-risk area reported that the mode of water and drainage provision exacerbated erosion.[5] While a provisional water service (or communal tubes from a water tank left in place for households to connect to) was ensured by the (public run) water company on the basis that it had a duty to uphold people's right to water, this did not extend to drainage. In conjunction, the state water agency had no mandate to repair community-constructed drainage (DPAE official – July 2010).

Finally, the rights of settlers to remain in risk zones, or leave through resettlement programmes, were framed differently by different state agencies. Whereas risk management agencies were concerned to uphold the right to life, human rights and civil

protection agencies supported broader constitutional rights to livelihoods and quality of life and, in one case of exclusion, the right to *habeus data*, or the constitutional right to be included in the relevant census (DPAE, 2009). Not all legal cases supported by these agencies were upheld in the courts, and not all households had the resources to seek their support (in the Caracoli neighbourhood, out of twenty two households surveyed, only three households reported directly contacting state agencies). However, individual cases did force inclusion into resettlement or the stay of evictions: for example, in one case in the Altos de Estancia risk zone, human rights agencies asked that newly displaced settlers arriving from rural conflict zones be allowed to remain on humanitarian grounds rather than being evicted (DPAE, 2009).

The idiom of co-production provides a framework through which to interrogate and link the making of knowledge (through landslide risk assessments) and the making of government (through state practice in risk zones) (Jasanoff, 2004), beyond existing governmentality approaches to risk governance. Defining what risk is, who is at risk and how risks should be addressed has been an integral part of processes of formalisation and upgrading in Bogota's informal settlements. Processes of risk definition have embodied its conflicts in informal zones over individual and institutional responsibility, its politics of social and political categorisation and its norms and visions of who an urban citizen should be and how they should behave. The resulting form of risk knowledge has functioned in practice through modes of governance influenced by the context of informality, its complexity, indeterminacy and form of institutional multiplicity. The resulting forms of social inclusion and exclusion have influenced patterns of exposure and sensitivity in landslide risk zones – revealing a missing politics of vulnerability.

The theoretical contribution of the work is illustrated by placing it in the context of other analytic readings of disaster risk and vulnerability from Bogota itself. From a social vulnerability perspective, authors emphasise how the risk management paradigm in Bogota has focussed on protection against 'natural' phenomena through physical mitigation measures, exposure reduction and risk communication but has little engaged with understanding or tackling the social vulnerability of affected communities, the social forces that propel the habitation of risk zones and the capacities of inhabitants to prepare for or recover from landslide impacts (Hewitt, 1983; Lampis and Rubiano, 2012). However, when this perspective is applied to social and historical analysis of the *ladera* programme, important questions remain about the political drivers of ongoing vulnerability in risk zones (Blaikie et al., 1994; Pelling, 2003). Some of these dimensions of risk are captured by work from a governmentality perspective which historicises the phenomena of the 'high risk zone', and shows how its boundaries are set not only in the hard science of probabilistic calculation but in highly contingent, personal encounters (Zeiderman, 2012). The sense of the political contingency of risk is echoed in the analysis developed here. However, unexplained in this post-structural account is the matrix of institutional rationalities at play, reflecting not only the technical endeavour of risk management but also the political commitments – and their tensions – embodied in risk definitions; not only the rationality of high-modernist planning but also the on the ground imbrication of state institutions in the construction of informality itself (Gupta, 2012; Jasanoff, 2004; Roy, 2009).

Conclusion

The importance of adapting to climate change and protecting against disaster risks in urban areas has been increasingly recognised by international and urban actors, but a major

challenge remains to move forward from hazards-centric, technocratic approaches that dominate current responses (Birkmann et al., 2010; Wamsler and Brink, 2013; World Bank, 2011). The call to address the social and structural drivers of urban risk comes from many perspectives; this article buttresses the appeal to address the political and institutional dimensions of such processes (Blaikie et al., 1994; Mustafa, 2005; Pelling, 2003; Rebotier, 2012). It also suggests, however, that we need to better understand how risks are defined in urban risk governance in politically contingent ways (Forsyth, 2003; Jasanoff, 2004) as well as how the context of informality influences how urban risk governance operates 'on the ground' (Roy, 2009; Stripple and Bulkeley, 2014). These considerations apply as much to moves to promote better multi-stakeholder governance in urban risk management (Birkmann et al., 2010) as they do to particular policy measures being advocated for urban adaptation planning, including resettlement, land use zoning and building control (World Bank, 2011). While improved deliberation, the natural corollary of an analysis of knowledge politics (Forsyth, 2003; Jasanoff, 2004), may be one part of the route forward, this may be an insufficient mechanism for change if the broader structural and developmental factors (and power relations) that shape people's ability to deliberate remain unaddressed (Blaikie et al., 1994). Further combining insights from critical social and political and planning theory and STS in the context of urban vulnerability, however, may help to illuminate a more progressive agenda.

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Notes

1. Community meetings I attended became a forum for officials to explain district policy and procedure, and where participation has been formally encouraged it has mostly involved engaging communities remaining around the high risk zones to participate in schemes to monitor new settlement in the zones.
2. In the course of fieldwork in 2010 such emergencies were declared in Caracoli and in the north of the Altos de Estancia risk zone. In 2011, a landslide was reported in Brisas de Volador which affected houses in the medium as well as high risk part of the zone. In all cases, this expansion of the high risk zone led to new incorporations into the state resettlement scheme.
3. To be eligible for resettlement, the household had to be in socio-economic bracket 1 or 2 (the lowest strata). This reflected quite wide internal variation, however, as indicated by differences in housing

structure – from two storey brick constructions to zinc and wood makeshift shelters put up by new settlers and partially developed by poorer long-term settlers.

4. As one informant explained: '*If they pull down houses, they may get death threats*' (Disaster Risk Consultant, Ministry of Environment – January 2010).

5. Technical risk assessments for the zone undertaken in 2006 also noted that 'non-technical' excavations – undertaken in the direction of the slope – aggravated erosion (DPAE, 2006).

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