Why climate cooperation? Subnational government participation in climate policy networks

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Abstract:

Climate change is a global issue with highly localized impacts. In the face of national inaction and outright antagonism against climate policy efforts, subnational government have continue to lead. While subnational governments are the implementation agents on the ground for most policy, they are limited in the impact they can have on issues beyond their immediate jurisdiction, as is the case of most climate issue. Understanding how and why cooperation occurs across jurisdictional boundaries is the social dilemma underlying how to design more effective climate policy. Using a national dataset on subnational government's climate cooperation we examine three theoretical approaches to climate cooperation; as a response to risk, based on political factors and urbanity, and one that understand it as a localized organizational response. Five factor emerge as important in predicting subnational cooperation on climate; the degree to which climate change is understood as a threat to human health, population in which an subnational government operates, the degree climate change is recognized as a threat to the fundamental mission of the organization, the perceived distance of those impacts, and whether a subnational government is already engaged in climate adaptation activities. The paper concludes with a discussion of the relevance for understanding inter-jurisdictional cooperation, the design of effective climate policy, and collective action dilemmas.

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Introduction

Inaction at the federal level has resulted in subnational governments taking the lead in climate change policy in the United States. National level policies that have fluctuated between sporadic and outright antagonistic, combined with the highly decentralized nature of American federalism, has spurred action from lower levels to both reduce the negative impacts as well as respond to citizen preferences for mitigation. The first action at any level of government in the US toward addressing climate change occurred with the 1993 City of Portland's Climate Action Plan. Since then, local governments have continued to lead in the area of climate policy through developing networks and alliances, such as the U.S. Conference of Mayors Climate Protection Agreement, the International Council for Local Environment Initiatives, and even quasi-public entities such as the Water Utility Climate Alliance.

Theoretical research on federalism and polycentricity suggests a number of ways more localized action offers benefits over national and even state level policy. The list of factors include better information on the fit of policy action to the problem, more direct feedback between the preferences of citizens to decision makers, matching the costs of action to the localized benefit provided, increased legitimacy of local public agencies, among others (Bodansky 2014, Engle and Orbach 2008, McGinnis 1999, Ostrom 2014). Climate change represents a global challenge with highly localized consequences. The anticipated impacts of climate change are diffuse and influence nearly every sector of the economy, from agriculture and infrastructure to human health and economic development (IPCC 2014). The diversity and localization of climate impacts suggest a critical role for local government organizations and state agencies, however, climate change policy and activities varies significantly across subnational governments.

There has been wider recognition of subnational government as critical for climate policy at moth the international and domestic levels. Following the entry into force of the Paris Climate Agreement and the COP22 meeting in Morocco, the Marrakech Roadmap for Action was signed by representative of 114 local and regional leaders calling for a more explicit emphasis on local financing for climate policies and promoting "the role of local and regional governments as primary partners of the central States" (Marrakech

Roadmap for Action, 2016). In 2018 the CitiesIPCC and Climate Change Science Conference was organized explicitly around establishing the next frontier of science as focused on cities and climate change (CitiesIPCC, 2019).

At the domestic policy level, cities and local governments were identified early at a way for the Obama administration to by-pass congressional inaction and align federal agencies with state and local risk-mitigation and other adaptation efforts. Executive Order 13653 updated the 2014 Federal Emergency Management Agency (FEMA) guidelines for state, tribal and local hazard plans. It obligated them to at least "consider climate variability as part of their requirement to address the probability of future events in state planning efforts" (Executive Order 13653, 2013).[1] Subnational activities by the States, in the form of climate vulnerability assessments, climate adaptation plans, and mitigation efforts are well documented (Rabe 2004, Wheeler 2008).

Literature Review

Subnational governments have a critical role in producing many of the public goods and services impacted by climate change (Rabe 2006, Victor et al. 2005) and act as the action arenas where state and national policy gets implemented (Oakerson 1999, Ostrom, 2010). However, much of the research on subnational climate policy has focused primarily on the activities of urban centers and membership in international urban policy networks such as the Local Governments for Sustainability (ICLEI) and 100 Resilient Cities. While this work has been important in highlighting early climate policy activities and understanding the dynamic of local climate policy, it has tended to ignore activities in less prestigious arenas of cooperation such as state-level activities and regional climate meetings.

There are a number of theoretical reasons why lower levels of government may be more responsive to issues that impact local constituents (Elazar 1995, Kauneckis and Andersson 2009, Ostrom

[1] One of the stated intentions for EO 13653 was to allow for "for more resilient and sustainable recovery" with actions to include "elevating or relocating homes and businesses to reduce flood risks associated with sea-level rise and more intense storms or rebuilding to higher standards" (Executive Order 13653, 2013). The order was rescinded March 28, 2017 by President Trump.

1994). The impacts of drought, wildfires, sea level rises, and infrastructure damage increase the risk dramatically for some regions while may have little direct impact in other locations. This creates incentives to act locally to reduce this risk, regardless of actions at higher levels of governance. Similarly, jurisdictions are likely to perceive that risk, and their capacity to respond to it differently. More risk adverse locations may be willing to expend resources toward risk reduction efforts, while others may choose to bear that risk. The link between citizen preferences and localized risk may partially explain differential responses across jurisdictions. Recognizing heterogeneity in the preferences of local constituents also policy implications for both mitigation and adaptation policy. Reducing greenhouse gas emissions is a collective action problem around a global atmospheric commons and local jurisdictions that limit emissions face immediate economic costs with little impact to the underlying problem. However, local preferences can serve to incentive policy action. Local mitigation can occur in spite of costs if the citizens of a jurisdiction have political preferences that support climate policies (Cavicchi 2016). Additionally, polycentric governance systems, with multiple centers of decision making and overlapping authority (Christensen and Laegreid 2007; McGinnis 1999, Ostrom 1994), increases the number of decision points and can allow for greater experimentation. As lower level governments work to solve local issues and cater to citizen preferences, they have the potential to become hubs of innovation where other jurisdictions can learn from local successes and failures (Mintrom 1997).

Early action by cities led scholars to investigate why subnational governments were engaging the emerging global policy issue of climate change in spite of limited national policy. The groundbreaking work of Bulkeley (2000) looked at Australian cities developing climate action plans. Betsill (2001) followed with an examination of greenhouse gas mitigation policies among cities who were members of the US Mayor's Climate Protection network. Subsequent work by Romsdahl and Wood (Romsdahl, et al. 2013; Wood, et al. 2014) has looked at natural resource and land use planning activities by local officials across twelve states in the Great Plains communities. A survey of cities globally examined members of the Local Governments for Sustainability (ICLEI) network to understand the motive of urban leaders to engage in

local climate policy (Aylett 2014). Similar work has been conducted among local governments in Britain (Porter et al. 2015) and India (Jogesh and Dubash 2015).

Climate policy scholarship has shifted attention from a distinct division between national, state and local action to focus on multi-scaled governance (Bodansky et al. 2014, Gupta 2007, Jordan and Huitema 2014, Ostrom 2012). Jogesh and Dubash (2015), in their study of interactions across local and national government adaptation planning, suggest that state-led efforts restrict local innovations as they seek to follow a central mandate. In an examination of local government motives for engaging international policy forums, Happaerts (2015) suggests that local governments cannot act as innovators due to the political ramifications driving cross-scale cooperation on climate toward the status quo. Alternatively, Hughes (2015) suggests that higher-level institutional support structures are critical to support local city action. It is likely that while some efforts are driven internally, an external support framework is needed to navigate the complex vertical and horizontal relationships around policy action.

The literature on multi-scale climate governance has important implications for understanding local policy dynamics and offers challenges to current research (Termeer et al. 2011). One of the principal critiques of much of the current literature is directed toward the methodology of case selection. Scholars have focused predominantly on cities, and while urban areas are centers of economic and human capital, there are no inherent reasons why suburban or rural jurisdictions should be excluded. The urban focus, with their abundance of resources and political constituencies that favor climate change action, have likely biased our understanding of the subnational processes of climate policy formation. Focusing on urban areas also over-represents those climate activities intended to reduce risk to urban environments. Furthermore, qualitative studies that sample by membership in formal climate membership-based organizations essentially end up selecting cases on the dependent variable of those already active in climate discussions. This makes it difficult to answer the question of what conditions are necessary to foster subnational climate activity since cases where action is constrained or fails are not systematically examined.

An additional methodological issue is confounding different types of climate change activities, such as combining mitigation with adaption actions and using formal membership rather than active

participation (Dupuis & Biesbroek, 2013). This over-counts real climate change induced activities, overstates the actual commitment of jurisdictions to implement real policy, and missing the types of informal interactions that while less politically symbolic, lead to real action. Two largest urban climate networks, the Mayor's Climate Protection Agreement and ICLEI only require voluntary commitments to a list of guidelines. There are no associated sanctions for unfulfilled commitments, no monitoring of compliance, and membership is neither lost nor denied. Similarly, climate policies are often been treated as a specific set of activities; however, given the diffuse impact of climate across a wide variety of sectors, and the fundamental policy differences between adaptation and mitigation actions, a finer resolution of analysis on specific sectors is needed as many climate policies are likely associated with specific sector co-benefits.

Our analysis attempts to begin to address some of the shortcomings. First, we surveyed all subnational government organizations nationally that had any possible climate change activity. As such, there are no population, urban/rural division, or specific type of activity constraints (monitoring, adaption, mitigation, resilience) in our sample. Second, there was no membership criteria for the sample selection, avoiding the aforementioned problem of selection bias on the dependent variable. Cooperation in climate networks was open to information seeking activities, partnership building, mitigation, adaptation or any other potential climate activity. Specific actions and sectors were coded to differentiate types and sectors. Lastly, in order to examine both local and regional political effects, secondary data was utilized in order to understand how structure factors may impede or support subnational cooperation.

Methods

The study uses the Local Climate Policy Project (LCPP) data, a survey of subnational government agencies. The survey instrument focuses on the types of public sector activities the organization was responsible for delivering, whether there are climate planning and policy activities, the importance of climate change to the organizational mission, level of innovation and engagement in climate policy networks, among others. The survey instrument was sent to organizations selected from the 2013

Leadership State-Muni Premium online database. From among the 53,000 state officials, legislators, local officials and public agencies listed, 11,751 organizations associated with public services potentially be impacted by climate change were selected. Since the study was the first national-scale survey of activities, invitation to participate were intentionally sent to an extremely broad array of organizations, most of which were unlikely to have climate change related activities. As an exploratory effort, this broad sampling strategy allow us to capture small activities, a wider range of actions, as well as jurisdiction and organization not often associated with climate change. Invitations to respond to the survey were sent via email in three waves, with a fourth via paper mail to ensure responses from those with less internet connectivity. The total number of respondents included 1,233 replies to the online survey, and 103 responses to the mail survey, for an overall response rate of 11.4%.[2] Responses were received from all 50 states, the District of Columbia, and the overseas territories of American Samoa, Guam and Puerto Rico).[3]

Subnational climate action were understood as any activity undertaken by organizations within the directory of county, state and local government officials. Because of the nature of policy responsibilities in the US, with shared and often overlapping responsibilities across different public organizations, public/private partnerships, and the exploratory nature of this research, the types of organizations included among those engaged in local policy systems was intentionally kept broad. Four types of subnational governments are included in this analysis: local government agency (61.02% of respondents), state government agency (31.24%), special purpose (5.22%), and regional agency (2.51%).

[2]The population selected for the survey was intentionally extremely diverse in order to gather information from as wide of a variety of local government organizations as possible. Organizations were selected to include any that potentially had activities related to climate change. While the diversity of organizations included resulted in a lower response rate than studies focused specifically on those sectors directly impacted by climate (water for example), it allows for a fuller picture of climate related activities.

[3] The maximum response rate as a proportion of those organizations invited to participate was from Nevada (30%) and minimum was from Vermont (3%). The large response rate for the State of Nevada was likely due to the University of Nevada being on the return address. No apparent reason was available for the small response rate from Vermont. In terms of potential biasing of the data due to a higher proportional response rate from Nevada, it accounts for only 2.4% of all responses examined here. Overall, each state's contribution to the data averaged approximately 1.8%, with a median score of 1.3%. The largest contribution from any state was that of California (13.5%) followed by Florida (6.2%) and Texas (5.8%) reflecting the relative size of each states population and government.

All responses were geo-located based on address and associated with county jurisdictions. Respondents were asked to provide information about their management responsibilities, whether they were engaged in climate policy activities, and details about climate change activities in which their organization was involved, and other organization and group with whom they meet and collaborated with around climate issues.[4] The measure of cooperation used in this analysis was participation in any type of climate change meeting activity. Meeting participation is the most generalized form of cooperation, even though it is a relatively low cost one, consisting of principally time. It represent a willingness to engage on climate issues, active information seeking, and openness to establishing partnerships with other subnational government, science-producing organizations such as universities and federal agency climate hubs, and regional local-to-local peer organizational networks such as the Compact and the Bay Area Regional Collaborative (BARC) and the Southeast Florida Regional Climate Change. Survey respondents reported a wide diversity of meeting activities around climate change and partnerships with other subnational organization, state and national organizations, and international and even foreign subnational governments. Figure 1 illustrates the connectivity across subnational governments and with their meeting partners and illustrates the diversity of subnational government networks.

Independent variables were examined through three different specifications following broad theoretical approaches. Descriptive statistics for all variables are reported in Table 1. The first set of variables concentrates on whether subnational governments are cooperating primarily in response to climate change vulnerabilities and risk. Assessing both the contemporary and potential impacts of climate change is a field of study on its own, involving dynamic modeling of climate and influence on natural, ecological, infrastructure and other human systems. Four metrics were used to assess the influence of climate risk. Three were reported directly by respondents, while the fourth, inundation due to sea level rise was measured

[4] The investigators are aware of the numerous sources of selection bias within the data. These include potential bias in the initial survey with a higher response from organizations active in climate policy, lower response rates from individuals with partisan biases against climate, and reframing general environmental programs as climate related for the purpose of the survey. These potential sources of bias are common in survey data and justify discretion in interpreting the results. However, alternative sources of local climate policy do not exist and this work provides the most comprehensive data source to date.

using NOAA data. Thirteen different issue areas likely to be impacted by climate change were asked about. These included wildland fires, storms and extreme weather events, flooding, availability of surface water, groundwater, snowpack, human health, natural vegetation, agriculture, wildlife management, general biodiversity management, infrastructure, and the economy. Because many of the issues were geographically specific and the survey was conducted at a national scale, the top three most commonly reported issues were used here: storm events, floods, and human health. Each was reported according to a four point scale indicating the level of concern around the potential climate impact.

The impact of sea level rise is the most direct and obvious effects of climate change and can cause flooding not only in areas adjacent to coasts, but also far inland via waterways such as deltas, impact groundwater supplies, change the range of coastal vegetation such as mangroves, and have infrastructure impacts along a distant supply chain. Data on projections of flooding from future sea level rise models were obtained from NOAA (2016) and originally developed to produce a nationally consistent data sets from a variety of sea level rise models. We utilized sea level rise data to generated inundation measures of the percept of land area inundated at the county level in one to six foot increments. Alternative measures of sea level rise were also used in various specifications of the model not reported here including six separate continuous measures of the percent of a respondent's county inundated by increments of 1 to 6 feet of sea level rise, and a separate specification using the greatest overall percent of flooding in a county across all possible 1-6 foot sea level rise scenarios. Since no substantive impacts to any of the models occurred from the inclusion of any measure of sea level rise, a simple binary variable is used in this analysis to represent whether a county faces any inundation from sea level rise.

The second model specification examines the influence of local politics on climate cooperation. Climate change has become an increasingly a partisan issue similar to abortion and gun control. While many of the vulnerabilities associated with climate impacts fall disproportionally on conservative rural counties, liberal and urban jurisdictions have taken up leadership on the issue even if as merely a symbolic political statements. In order to understand the differential impact of politics verses vulnerability three

variables are used. The measure of local partisanship was the percent democratic votes in the 2012 Presidential election at the county level.

Densely populated urban centers have lead climate policy innovation and there are numerous reason to expect greater levels of cooperation around emerging climate issues due to concentrations of wealth, human capital, organization capacity, and greater overall connectivity with other subnational governments (Hawkins, et. al. 2015). The logged county level population of the location of a respondent was used as a continuous measure of urbanity. Population was logged in order to compare small rural jurisdictions with large urban centers. This was meant to capture both the influence of urban centers, as well as impacts of potential threats to heavily populated centers and associated infrastructure.

There was also effort to account for the importance of climate change as a symbolic political issue. While this has been expressed through a number of symbolic activities, we drew on the most recent effort, the "We Are Still In" movement. We Are Still In is a group of 3,500 representatives consisting of mayors, businesses and investors, county leaders, college and university leadership, cultural and health sector organizations, state governors and tribal governments expressing a commitment to follow climate commitments made in the Paris Climate Agreement following the Trump Administration's 2017 announcement of the US intention to withdraw. Data was coded to indicate whether a respondent was in a county that was among the two hundred counties or if it was located in a county that contained a city that was a member. The variable was intended to represent a measure of the intensity of political interest on climate change as a policy issue.

The final model specification looked the subnational government organization's perception of climate risks. Three variables were used. The first was being the degree that climate change represents a threat to the mission of the organization. In order to measure this, respondents were asked to rank on a 1-4 point scale "how important climate change is to the mission of your organization". The second variable examined the immediacy of potential impacts. Respondent we similarly asked "how distant are the potential impact of climate change in regard to the work of your organization" along a scale of "distant, greater than 80 years away" to "contemporary, dealing with climate change impacts now".

The third variable was a measure of whether the respondent reported their subnational unit having engaged in any climate adaption activities. This was considered a measure of real concern and engagement with climate impacts that can differentiate from politically symbolic actions that serve as political messaging, as opposed to an actual response to a perceived threat. Even small rural local subnational agencies in political conservative regions that see the direct impacts of climate change on immediate concerns such as increased precipitation and flooding can implement storm water infrastructure upgrades that account for a wetter future based on climate scenario outputs while avoiding the politically charged discussion around climate change. The survey was designed to capture these small-scale adaptation activities that might be direct responses to climate impact that are often missed by high profile debates at the national and international levels. Open-ended text responses asking about any climate change activities were coded and cross-checked by two separate coders to indicate when and activity represented adaptation. Examples of activities ranged from developing local climate vulnerability assessments, to changing land use regulations or storm drain requirements to account for heavier precipitation patterns and flooding.

Results

The three separate model specifications were run to account for the differential influence of each set of variables. Results are presented for each specification in Table 2. The first model represents cooperation as a response to the risks a location faces from potential climate impacts. The model was intended to test the emphasis placed by some in the climate research community on vulnerability and the threats posed to local populations, infrastructure, and regional ecosystems as sufficient to spur cooperation. A mix of measures of the perceived local importance of climate change and projected risks posed by sea level rise modeling outputs were used.

Of the three issue areas around which climate risk was most commonly identified, storm events, flooding and health, only storm events was not a statistically significant indicator of subnational cooperation. Human health was significant at the 0.001 level and flooding at the 0.01. Whether a

respondent was located in a county vulnerability to sea level rise was both significant at the 0.001 and had the largest coefficient value (coeff. = 0.60).

The second model specification tests the narrative that urban leadership dominates cooperation on climate issues. Cities do remain a critical element of climate policy with progressive urban centers often leading on funding initiative as well as political action, however given that the risk is pervasive and often difficult to ignore, there is no reason other jurisdictions may not also be cooperating on climate issues, only in a less politicized manner and focusing on pragmatic problem-solving. Three variables were used to test whether climate cooperation was occurring primarily among more democratic, urban, and those jurisdictions politically engaged on climate. Of the three metrics used; percent democratic vote in the 2012 presidential election, logged population at the county level, and membership of a local city or county in "We Are Still In", only population was found to be significant (coeff. 0.20, $p=0.05$) . It should however be noted, that if the model is run solely on the above three political variables, without any consideration of the local climate risk, then percent of the democratic vote is the only significant variable (coeff. = 2.33, $p<0.000$). Both the perceived impact of climate on flooding and human health remain significant in the second model (refer to Figure 2).

The third model specification understands climate cooperation as a response to risk, within structural constrains that make it easier or more difficult to act based on subnational political factors, and that allows agency of subnational organizations to respond to climate impact as they understanding them to be important. Rather than a fundamentally new activity, cooperation on climate change are understood as an additive challenge to the existing tasks and implementation actions subnational actors on the ground are already actively engaged. Climate impacts are framed within localized response systems that involve pragmatic decision making about impacts, and how likely these are to impact the functional outputs of local organizations.

Three additional variables were added to the final model specification to determine the importance of this localized response. Statistical significance was found across all three variables:

importance of climate to the mission of the organization (coeff. 0.31, $p<0.05$), perceived distance of the impacts (coeff. = 0.40, $p<0.001$) and whether a respondent reported a climate adaptation action (coeff. = 0.78, $p<0.001$). The significance level of two of the three variable are the greatest among all examined, and the largest coefficient in the combined model was that of whether a respondent reported an adaptation activity (coeff. = 0.78). In the localized response model (Model 3, Figure 2) the variable measuring the priory of flood events is no longer significant, while human health impact remain significant across all three model specifications (coeff. = 0.38; $p<0.01$). Similarly the logged population of the jurisdiction in which a respondent works also remains significant (coeff. = 0.27; $p<0.01$)

Conclusions

While high profile statements on climate change from democratic urban centers such as New York's Mayor de Blasio and San Francisco's Mayor Breed dominate the news, it presents an incomplete understanding of the drivers of subnational climate change cooperation. Local subnational organizations in less populated and non-democratic jurisdictions are also actively engaging and cooperating on climate issues. By focusing on the subnational level and those most responsible for implementation, this study hopes to shift the discussion away from high profile urban centers and toward the fundamental factors that may drive local action. Our results suggest the conditions in which climate impact become salient to local implementation agencies are the primary factors that explain cooperation.

The dominant narrative of much of the climate modeling and natural sciences has been on understanding the risk climate poses to communities. Our research further suggests that the objective physical risk of climate change (Table 2, Model 1) is far less important than either the political environment in which decision are made, or the impact to an organization's current activities, in terms of actively engaging with others on climate. Indeed, as variables measuring political structure (Table 2, Model 2) and subnational organizational priorities (Table 2, Model 3) are added to the overall specification, those measuring risks decrease in importance. Surprisingly, the most directly observable

outcome linked to climate change and arguably the most devastating potential impact, that of sea level rise, only provides an accurate predictor of climate cooperation when only risk is examined. Concerns over human health impacts is the only measure of climate risk that remains significant across all three model specifications.

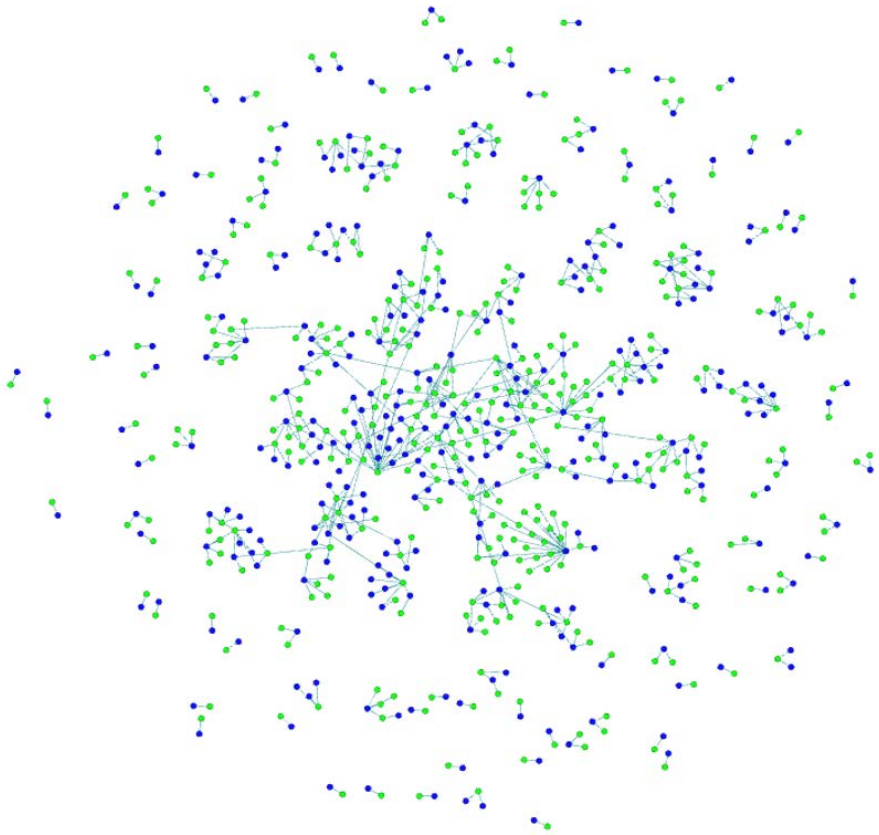
A second popular narrative is that climate change cooperation is principally the domain of liberal cities. Figure 2, Model 2 tests that assumption directly. While we do not suggest that partisan politics is not an important factor, it was not significant in any of the two model specification in which it was examined. There is much greater diversity in the geographic distribution of climate cooperation than a cursory examination would suggest, and much of this is happening at the level of local and state professional bureaucrats outside the view of partisan politics. Anecdotally, interviews have suggested there are intentional strategies among subnational bureaucrats to use climate projections in land use and infrastructure investment decisions while avoiding the mention of 'climate change' and framing activities as more mundane upgraded flood models, improving response to sever heat events, and addressing air quality and asthma, rather than climate adaption. While this approach of stealth climate policy has limits, it does suggest focusing solely on larger international organizations such as ICLEI misses the most important dynamic of expanding cooperation and local policy change.

The finding that even minimal climate adaption activity is the greatest driver of cooperation among subnational organizations, followed by an organization's salience of climate threats to their overall mission, and the importance of the linkage to human health impacts, has important implications for both designing effective climate change policy and general theories of cooperation. Effective engagement on how climate modeling effort might be more directly connected with the agendas and implementation activities at the subnational government level would appear to be a more effective strategy than either highlighting emerging risks and politically symbolic action. Lower levels of engagement that take into account how climate change can be used to better inform the array of current issues subnational organizations are actively working on such as health impacts, flood risk mitigation projects, and other co-benefits will like be more effective. Since action is occurring among subnational networks already, there

are possibility to redesign both the engagement of science-to-practice, and policies that can support existing efforts rather than bold, but politically risky, new initiatives.

In terms of theories of cooperation, the analysis reveals that exposure to risk in its own does not drive cooperation. It is far outweighed by engagement in the action arenas in which subnational governments already operate and along the policy issues and challenges they current face. Internal motivation to act on the issue and incremental action, as evidenced by the impact of adaptation activities already occurring, are far greater drivers than either risk or the political environment in which organizations operation. This suggests multiple and novel pathways to inducing great climate cooperation among subnational organizations, who are most likely to be responsible in the end for implementation.

Figure 1: Patterns of Interactions among Subnational Governments with other Climate Partners



Survey respondent are in blue, their partners in green.

Table 1: Description of Variables

Variable	Type	Mean/Median	Min	Max	Std. Dev.	Description
Dependent variables use across different model specifications						
Participates	Binary	0.1/0	0	1	0.48	Participates in climate change related meetings (35% have attended at least one).
Exposure to climate risk						
Storms	Ordinal	0.55	1	4	0.92	4-Point scale ranking level of concern over extreme weather events, 1=Not at all, 2= Little, 3 = Somewhat, 4= Very concerned.
Floods	Ordinal	3.16	1	4	0.92	4-Point scale ranking level of concern over flood events.
Health	Ordinal	2.81	1	4	1.00	4-Point scale ranking level of concern over impact on human health.
Sea Level Rise	Binary	0.36	0	1	0.48	Whether a respondent's county is threatened by sea level rise based on 1-6 foot projections.
Political economy						
Dem Vote	Continuous	0.55	0.15	0.91	0.13	Percent democratic vote in 2012 Presidential Election.
Population	Continuous	13.03	8.77	16.10	1.09	Logged population at county level, unlogged population ranged from minimum of 6,429 to maximum of 9,818,605.
Still-In	Binary	0.58	0	1	0.49	Indicates whether the county of the respondent is itself a member, or has a city that is a member of 'We Are Still In' (58% of respondents).
Organizational perceptions of climate risk						
Organizational Mission	Ordinal	2.85	1	5	1.09	Response to question, "How important is climate change to the mission of your organization", 1=Not a priority, 5=Top priority.
Distance of Impacts	Ordinal	2.66	1	5	1.15	Response to question, "How distant are the potential impacts of climate change in regard to the work of your organization", 0=Not likely to ever have impact, 1=Distant, greater than 80 years away, 2=Part of long-term planning activities, 3=Part of short-term planning activities, 4=Contemporary, dealing with climate change impacts now.
Climate Adaptation Action	Binary	0.34	0	1	0.47	Reported at least one climate adaptation activity.

Table 2: Results across all Model Specifications

Dependent Variable **Participation**	Model 1: **Risk Response**		Model 2: **Urban Leaders**		Model 3: **Localized Response**	
Independent Variables	Coeff.	Z-score	Coeff.	Z-score	Coeff.	Z-score
Storms	0.13	1.01	0.14	1.06	-0.25	0.20
Floods	0.35**	2.72	0.36**	2.76	0.23	1.25
Health	0.36***	3.68	0.31**	3.04	0.38**	2.75
Sea Level Rise	0.60***	3.41	0.26	1.30	0.36	1.36
Dem Vote			1.34	1.59	1.92	1.71
Population (logged)			0.20*	1.98	0.27*	1.99
We Are Still In			0.41	1.92	-0.01	-0.04
Org Mission					0.31*	2.37
Distance of Impacts					0.40***	3.36
Adaptation Action					0.78***	3.18
Constant	-2.10***	-6.21	-5.51***	-4.02	-7.15***	-4.01
	N = 702 chi_2 (4*df*) = 83.66 Loglikelihood =0.000 Pseudo R_2 = 0.09 AIC = 1.20 McKelvey & Zavoina's R_2 = 0.15		N = 688 chi_2 (7*df*) =105.8 Loglikelihood=0.000 Pseudo R_2 =0.12 AIC =1.17 McKelvey & Zavoina's R_2 = 0.19		N = 506 chi_2 (10*df*) =132.44 Log likelihood =0.000 Pseudo R_2 =0.22 AIC =1.00 McKelvey & Zavoina's R_2 = 0.34	
* p < 0.05 ** p <0.01 *** p<0.001						

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