

**Cities in the Global Climate Marketplace:
Transnational Actors and the Governance of Urban Climate Adaptation in India**

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Abstract: In cities that are pursuing climate change adaptation actions, transnational actors are critical catalysts for financing programs, generating public awareness, and legitimizing the agenda. However, scholars of urban climate adaptation have yet to understand whether such external interventions have long-lasting effects on the sustainability and equity of urban governance processes, particularly when placed in context with competing development priorities across the global South. In this paper, I draw on experiences from three cities in India – Surat, Indore, and Bhubaneswar – to analyze the multilevel dynamics that link local adaptation actions with their supporting transnational networks and funders. Drawing on a comparative multi-scale case study methodology, I find that current capacity deficits in Indian cities indeed allow external actors to catalyze adaptation, but this relationship becomes more dialectical farther into the planning and implementation stages. The governance of climate adaptation in fact involves embedding adaptation into bureaucratic practices, financial processes, spatial plans, and institutional cultures. The interaction between these four pathways results in the coproduction of knowledge, co-creation of options, and inter-institutionalization of standards, practices, and behaviors. A particular actor’s ability to exert authority over how interventions are framed, financed, bureaucratized, and built across the urban landscape then yields different patterns of adaptation. This finding therefore reasserts the role of urban political actors operating within the global climate governance regime and the marketplace for climate finance.

Keywords: Cities; climate change governance; climate change adaptation; urban development; multilevel governance; India

1. Introduction

Emerging climate change adaptation plans in many cities across the global South have been driven strongly by external resources, capacities, and institutional interventions (Ayers 2009). International organizations such as the Rockefeller Foundation, ICLEI – Local Governments for Sustainability, the United Nations Development Programme, and the US Agency for International Development are often critical actors for providing policy guidelines, seed money, and general capacity and staffing support (Kernaghan and da Silva 2014). At the same time, external interventions are important catalysts for initiating action, generating awareness and public buy-in, and legitimizing the adaptation agenda in the eyes of the political establishment (Carmin, Dodman, and Chu 2013; Roberts 2008). Despite a recent proliferation of research on emerging urban adaptation challenges and opportunities, this literature has so far yet to critically evaluate whether these external interventions – such as in the form of financial, capacity, or decision support processes – have long-lasting effects on the sustainability and effectiveness of local adaptation actions in the context of wide-ranging (and often competing) urban governance and development directives.

In this paper, I draw on theories at the nexus multilevel governance, scalar politics, and urban development planning to evaluate the different political, institutional, and financial pathways for supporting climate adaptation actions across three cities in India. Through unpacking experiences from Bhubaneswar, Indore, and Surat, I show how different urban actors frame, implement, and institutionalize adaptation measures under a backdrop of external aid, urban governance deficits, and increasing local awareness of climate impacts. I argue that current local governance capacity deficits in India indeed allow external networks and institutions to catalyze urban adaptation actions, but this relationship becomes more dialectical farther into the planning and implementation stages. Process of *governing adaptation from below* involves public, private, and civil society actors, and is characterized by the coproduction of knowledge, co-creation of options, and inter-institutionalization of standards, practices, and behaviors. In the end, climate adaptation actions are locally sustained through four pathways of institutional change: bureaucratization, financialization, spatialization, and acculturation. A particular actor's ability to exert power and authority over these processes yields different patterns of adaptation action on the ground, thus reasserting the role of urban political actors operating within the global climate regime and the 'marketplace' for climate finance.

2. Situating Urban Adaptation in the Global Climate Marketplace

Cities are critical nodes of climate change action and decision-making. Municipalities across the global North and South have recently assumed more responsibilities over planning, designing, and implementing climate change mitigation, adaptation, and overall resilient development actions

(Bulkeley 2010). Often operating under extreme pressure – i.e., budget austerity in European cities after the 2009 sovereign debt crisis or catastrophic disaster events like Hurricane Sandy in New York City in 2012 – cities face a variety of structural constraints to their capacity to plan for the risks of climate change, or to translate climate science that is communicated to them from external agents. Scholars of urban climate change governance have noted that the urban arena is increasingly important (Moser 2006; Betsill and Bulkeley 2006; Rosenzweig et al. 2010), and that the emerging role of urban actors has facilitated new decision-making pathways, new participatory forums, and new roles for science-policy intermediaries (Anguelovski and Carmin 2011; Chu 2016b; Chu, Anguelovski, and Carmin 2016).

The rise of climate change as a global policy issue over the past several decades corresponded to a resurgence of cities as a unit of analysis in the fields of public policy, governance, and international development. In the global South, trends in democratization meant that many cities were increasingly beneficiaries of devolved budgetary, legislative, and infrastructural powers (Bardhan 2002), but they were hamstrung by capacity and governance deficits that were symptomatic of the post-colonial condition (A. Roy 2011; Watson 2009; Robinson 2011). To further theorize these new scalar political dynamics, scholars of multilevel governance have argued that the ‘stretching’ of planning and policy-making authority happens horizontally – i.e., across jurisdictional boundaries in space – *and* vertically between local, regional, national, and global scales (Hooghe and Marks 2003; Sellers 2002). In this context, cities are increasingly objects in the global political economic order (Savitch and Kantor 2002), with issues of environmental sustainability and climate change having become a prime policy arena (Toly 2008; Bulkeley and Betsill 2005; J. Gupta 2014).

The growing global policy emphasis on climate change adaptation has necessitated new networks of transnational cooperation (Fünfgeld 2015; Rohrschneider and Dalton 2002), nongovernmental organizations (Gough and Shackley 2001; Rohrschneider and Dalton 2002), peer-to-peer knowledge sharing mechanisms (Betsill and Bulkeley 2004; Andonova, Betsill, and Bulkeley 2009), and public-private partnerships (Harman, Taylor, and Lane 2015). Many of these networks are supported by private and non-state institutions that fill existing gaps in human resources, project implementation, and other financial needs (Ayers 2009; World Bank 2010). For example, at the local government level, programs such as the World Bank’s Cities and Climate Change Initiative, different networks associated with ICLEI-Local Governments for Sustainability, and the Rockefeller Foundation’s Asian Cities Climate Change Resilience Network (ACCCRN) and 100 Resilient Cities program all seek to integrate climate adaptation priorities into existing urban development planning (Brown, Dayal, and Rumbaitis Del Rio 2012; Sharma and Tomar 2010). Furthermore, the emergence of global climate finance is providing further incentives for integrating climate priorities into development policies (Agrawala 2004; Donner, Kandlikar, and Zerriffi 2011; Rübhelke 2011; Kok et

al. 2008; Metz and Kok 2008). To increase the local uptake of external financial resources around adaptation, many cities have combined these resources with existing intergovernmental grants, local tax sources, and private investments to help fund larger-scale adaptation interventions (Chu 2016c).

Despite these advancements, adaptation discourses in the global South continue to face concentrated power amongst small numbers of urban economic elites, structural biases towards decentralized network governance approaches, and a persistent unraveling of public sector planning and decision-making authorities (Himley 2008; Swyngedouw 2004; Brenner and Theodore 2002). On the one hand, such governance constraints have prompted local governments to search for innovative planning strategies, cross-sectoral tools, and experimental approaches to designing new participatory arrangements (Anguelovski, Chu, and Carmin 2014; Bulkeley, Castán Broto, and Edwards 2015; Chu 2016b). On the other hand, however, there are vast uncertainties on the implications of these new governance arenas in promoting more equitable outcomes or improving overall urban sustainability or resilience (Shi et al. 2016; Anguelovski et al. 2016; Sovacool, Linnér, and Goodsite 2015). Equity and inclusiveness are important parameters for assessing adaptation outcomes due to the uneven distribution of power in development processes (Paavola 2008; Schlosberg 2012; Chu, Anguelovski, and Carmin 2016), as well as the fact that low-income communities tend to be the most vulnerable to climate impacts (Ayers and Dodman 2010). In light of this, recent sources of adaptation assistance have increasingly prioritized the needs of the most vulnerable and advocated for more inclusive governance approaches (Ciplet, Roberts, and Khan 2015; Adger et al. 2006; Chu, Anguelovski, and Carmin 2016).

The challenge for many cities in the global South, therefore, emanate from an inability to integrate adaptation into different urban agendas, bridge deficits in finance, staffing capacity, information, local leadership, and supportive cultural values (Carmin, Dodman, and Chu 2013), and anticipate or cope with increasingly severe climate impacts (Carmin, Anguelovski, and Roberts 2012). For many, questions remain around how global financial and capacity resources can be supplied and distributed in ways that support governance change – in the context of climate change but also beyond – in a sustainable, resilient, and equitable manner. In this paper, I contribute to this knowledge gap by not only highlighting how urban actors in India have implemented adaptation against a backdrop of external aid and urban institutional change, I also respond to recent calls for applying a multilevel perspective to diagnosing urban governance constraints and to supply empirical evidence on *climate governance from below* (Amundsen, Berglund, and Westskog 2010; Corfee-Morlot et al. 2009; Christiansen and Jørgensen 2000; Bulkeley, Castán Broto, and Edwards 2015; Nalau, Preston, and Maloney 2015). A more nuanced understanding of how urban bureaucratic, financial, institutional, and spatial planning dynamics contribute to climate change governance at-large will likely pave the way for more effective, accountable, and equitable adaptation interventions.

3. Methodology

This paper compares the experiences of the cities of Bhubaneswar (Odisha), Indore (Madhya Pradesh), and Surat (Gujarat) in India to assess the role of external climate adaptation finance in catalyzing climate awareness, implementing projects, and facilitating institutional change. These three cities were selected because they have long histories of engagement with and have received support from key international programs, including the Rockefeller Foundation's Asian Cities Climate Change Resilience Network (ACCCRN) and the Climate Risk Management technical assistance project sponsored by the United Nations Development Program (UNDP). Furthermore, these three cities have successfully articulated and advocated for their own local development needs while working with multilateral aid networks. In this context, Bhubaneswar, Indore, and Surat are all considered 'early adapters' of climate adaptation plans, and have a long track record of implementing specific pilot projects and programs.

The empirical analysis is based on fieldwork conducted in Bhubaneswar, Indore, and Surat between January 2011 and June 2014. The data draws on semi-structured interviews with stakeholders involved in each of the city's adaptation planning process, observations of planning meetings, and an analysis of municipal plans, budgets, and reports. A total of 50 interviews were conducted, which relied on snowball sampling to identify adaptation experts in the different municipal corporations, urban development authorities, development agencies, funders, and external and civil society sectors. The interviews were recorded, transcribed, and coded thematically to understand how cities have promoted adaptation and facilitated development through employing external or multilateral resources. A series of emblematic quotes are presented throughout the case narratives.

The case study narratives are divided into two sections. First, the case studies of Bhubaneswar, Indore, and Surat are presented separately to highlight how different local actors have framed, implemented, and institutionalized different climate adaptation plans and programs on the ground. Second, I compare the experiences from the three case studies – a summary of which is provided in Table 1 – and then organize the discussion according to the four pathways of governance change attributed to the emergence of adaptation as an intrinsic urban planning agenda item, namely the embedding of adaptation within bureaucratic practices, financial processes, spatial plans, and institutional cultures. Finally, in the conclusion section, I revisit my initial research question and offer some observations on how the roles and responsibilities of cities should be re-envisioned within the global model of climate governance. I find that despite similarities in terms of how multilateral actors choose to engage with cities, subsequent adaptation actions differ drastically because specific interventions are locally sustained through different combinations of political actors, which then yield different patterns, iterations, and coalitions of local action.

Table 1 Summary of adaptation interventions and their implications for local governance

	Bhubaneswar	Indore	Surat
<u>External Funder</u>			
Source of Support	USAID, UNDP, ICLEI-Local Governments for Sustainability	Rockefeller Foundation Asian Cities Climate Change Resilience Network, UK Department for International Development	Rockefeller Foundation Asian Cities Climate Change Resilience Network
Duration of Support	2012 - 2015	2008 - 2014	2008-2014
<u>Implications for Urban Governance</u>			
Strategy	To integrate adaptation objectives into city and community disaster risk management plans; facilitate projects that build awareness.	To promote community level water management and conservation programs; identify complementarities with urban plans and policies.	To institutionalize adaptation projects into decision-making and funding bodies, such as the Surat Climate Change Trust.
Key Interventions	To promote water harvesting technologies, community awareness activities, cross-departmental coordination; to protect infrastructure against climate impacts; improve stormwater drainage; subsidize greenroofs; preserve urban ecosystems.	To develop comprehensive water management programs; strengthen early warning and forecasting; protect infrastructure against climate stressors; facilitate local level planning processes for climate resilience.	To form a climate watch group, install early warning systems; develop disaster management plans; improve public health and disease surveillance; build skills in disaster response; training citizen groups; building community awareness.
Institutional Arrangement	To create a flexible mechanism for integrating adaptation and disaster management into key state and municipal functions; make use of public finances earmarked for climate and disaster response, and combine that with local development funds and discretionary resources; target awareness and education programs, as well as existing urban poverty alleviation and community development priorities.	To create opportunities for community-based interventions that are synergistic to slum redevelopment and infrastructure upgrading projects; provide policy and financial incentives for local adaptation strategies; focus on community development, slum improvement, and infrastructure and public service access for vulnerable communities.	To create a structured public-private institution outside of government responsible for identifying and securing dedicated adaptation funds, pursuing pilot projects, and establishing a decision-making system for integrating adaptation priorities into municipal functions; develop projects focused on improving adaptive capacity within important sectors and economically important infrastructures and services.

Source: ACCCRN 2013; Chu 2016c; Chu 2016b; Sharma, Singh, and Singh 2014; Karanth and Archer 2014

4. Case Studies of Climate Adaptation in Indian Cities

4.1 Bhubaneswar

Bhubaneswar is situated on the Mahanadi Delta in the eastern coastal plains of Odisha and is managed by the Bhubaneswar Municipal Corporation. The city has a population of nearly one million and has 377 slums, which account for approximately 50% of the population. Bhubaneswar has experienced many major climatic events in the past, including heat waves, cyclones, and floods (Chittibabu et al. 2004). A particularly serious heat wave occurred in 1998, which led to more than 120 deaths. In 1999, Bhubaneswar experienced a super cyclone with winds of nearly 300 kilometers an hour (Thomalla and Schmuck 2004). During this event, many buildings were damaged and basic services like water supply, sewage drainage, solid waste management, food supply, and communication came to a halt (Interview 2013). The cyclone cause more than 10,000 deaths across Odisha, damaged more than 2 million hectares of agricultural land, and resulted in more than US\$5 billion in damages along the coastline (Chhotray and Few 2012; Mishra and Mishra 2010). This experience prompted the creation of the Odisha State Disaster Management Authority in 1999, the publishing of the *Environmental Management Plan of Bhubaneswar* in 2003, and eventually the *Odisha Climate Change Action Plan* in 2010.

Between 2005 and 2012, Bhubaneswar was part of the United Nations Development Programme's Urban Risk Reduction project, which worked to reduce disaster vulnerabilities across city institutions. In 2012, the city, in partnership with ICLEI-Local Governments for Sustainability, initiated their vulnerability and risk assessment and adaptation planning process. This process highlighted issues of precipitation, temperature change, and extreme events as key climate risks (Interview 2013). Since 2013, Bhubaneswar has been a pilot city for the Climate Risk Management project. Supported by United Nations Development Programme and the U.S. Agency for International Development, the project support urban adaptation through focusing on institutionalization, building community-level awareness, and policy-level changes.

Throughout Bhubaneswar's engagement with these different external actors, the focus has always been on disaster risk reduction and community engagement and awareness. One important project is the ward-level disaster management plans. In addition to facilitating cross-departmental coordination and identifying nodal champions, ward-level plans also included school safety programs, community disaster response workshops, and – most importantly – facilitated community-based hazard risk and vulnerability assessments (Interview 2014). As one official at the Odisha State Disaster Management Authority stressed,

‘For climate change, if people are not facing any problems, they will not recognize it as a problem for them. So you have to push them, to provide some support where they will get benefit for their projects. Only then will they take note that climate adaptation is something we have to do’ (Interview 2014).

These workshops not only created awareness around disaster risk and climate adaptation, they also helped to educate about search and rescue procedures, debris management, and other training programs.

In a second project, the city oversaw a civil defense corps trained in disaster management and response techniques. The civil defense corps is made up of volunteers and their basic duties include community protection, disaster response training programs, and assisting emergency services in the event of disasters (Interview 2013). As one corps member noted,

‘Communities are very sensitive to disasters, and they’re the people who will face the loss and will be affected. They are also the first responders. Disaster is not a regular phenomenon, but we can create some regular tasks that can be used in daily activities’ (Interview 2014).

These training programs include educating volunteers on simple search and rescue techniques that employ locally available resources, such as improvising rescue rafts using fallen trees and creating lifejackets using discarded plastic water bottles and fallen coconuts (Interview 2014).

These adaptation actions show that, for Bhubaneswar, the overall urban agenda has framed climate adaptation in terms of immediate capacities for responding to and managing the impacts of extreme events, rather than dedicating significant investments towards addressing slow-onset effects. For example, when Cyclone Phailin struck Odisha in October 2013, public authorities were able to evacuate more than 10,000 people from slums across the city within hours of notice. Moreover, due to extensive response training programs, there were no casualties in Bhubaneswar that were directly attributable to Phailin, compared to the thousands who perished during the 1999 super cyclone. From the 198 disaster response centers, the city was able to coordinate water supply through temporary tankers and restore electricity to critical services within three days (Interview 2014). For Bhubaneswar, external resource and capacity support provided by UNDP helped improve clarity of municipal directives for both preparing for and restoring public services immediately after impacts.

4.2 Indore

Indore in Madhya Pradesh has a population of approximately 2.2 million and, in the past several decades, has experienced nearly 50% decadal populations growth (Indore Municipal Corporation 2006). Many of the city's 540 slum settlements are located along rivers and are prone to flood, waterlogging, and vector-borne diseases (Indore City Resilience Strategy 2012). Water accessibility and distribution are Indore's most critical climate stressors (Dipak and Arti 2011). Currently, most of Indore's water comes from the Narmada River, which is located 70 kilometers away (UN-Habitat 2006). Under the Narmada Water Supply Scheme, water is only supplied to Indore for several hours every other day (Indore Municipal Corporation 2006). Furthermore, 90% of water connections are unmetered and are assessed only flat charges according to the number of connections rather than the quantity of water consumed. Various assessments indicate that the demand for water in the city is increasing at the rate of nearly 5% a year (H. K. Gupta et al. 2006).

With support from the Rockefeller Foundation's Asian Cities Climate Change Resilience Network (ACCCRN), climate adaptation planning in Indore began in 2009, which culminated in the release of the *Indore City Resilience Strategy* in 2012. It identified issues of water, public health, and human settlements as most vulnerable and catalyzed pilot projects to address them. Projects focused on new water harvesting and conservation technologies as well as decentralized wastewater management and treatment models (Chu 2016a). In this context, one municipal officer noted that,

'Most of city's expenses go to water management because Indore has the costliest water management system [in India]. Operations and maintenance of the system is very expensive... For all the projects, community involvement is very important. In Indore, all the projects are related to ground-level implementation, so communities are the main stakeholders in our projects' (Interview 2013).

Given these priorities, this section highlights the community-based water management and urban lakes rehabilitation experiments that are at the nexus of adaptation, water, and development.

Indore's community-based water management projects focused on water availability and quality needs in three slum settlements. In the first site, Rahul Gandhi Nagar, a reverse osmosis plant was built with direct financial support from ACCCRN and indirect institutional support – through permits and subsidies – from the Indore Municipal Corporation. The reverse osmosis plant was inaugurated in March 2013 and can treat 7,000 liters of water per day (Interview 2013). Profits from selling treated water would then be funneled back for cleaning and maintaining the plant (Chu 2016a). In a nearby second slum, because the primary source of potable water is located far away, officials built water storage tanks to provide additional household water storage capacity. Lastly, a community water-harvesting program was launched in Ganeshnagar. This program involved designing a

community-wide system of collecting and storing rainwater, filtering this water through drum filters consisting of coal, sand, and brick fragments, and, finally, collecting water through common-access outflow taps (Interview 2014).

The second key project in Indore is the urban lake rehabilitation program, which began in 2013. Since Indore relies on water sourced from the Narmada River, water scarcity and supply consistency problems attributed to aging infrastructure have been perennial issues (Interview 2013). In Indore, 25 urban lakes serve as complementary sources to the Narmada River, but sewage pollution and general public neglect have resulted in the severe degradation of them. This particular experiment identified four lakes for rehabilitation, which began with biodiversity and household socioeconomic surveys in the area. This then resulted in comprehensive water quality protection plans and suitability studies for constructing community sewage treatment plants in the future (Interview 2014).

Adaptation actions in Indore – that are supported by the Rockefeller Foundation – have facilitated a renewed focus on water conservation and protection as critical urban development priorities and have catalyzed institutional change in the municipality. In particular, the city recently banned new bore wells within the city limits. Similarly, the city is mandating water harvesting be integrated into new master plans, and is offering a 6% annual property tax rebate on new commercial and residential buildings that use such technologies.

4.3 Surat

Surat, in the western state of Gujarat, has an urban population of more than 4.5 million. Since the 1960s, Surat has experienced about 80% decadal population growth, which makes it one of the fastest growing cities in the world (ACCCRN 2011). Surat is vulnerable sea level rise, river flooding, and urban heat (Interview 2011). The historical turning point for Surat's environmental consciousness was in 1994, when the city experienced a plague epidemic, which led to one of India's first large-scale urban sanitation and public health programs. In 2006, unusually high rainfall produced high discharges from Ukai Dam, which is situated upstream from Surat on the Tapi River. During this episode, 75% of the urban area was flooded, leading to a disease epidemic within slum neighborhoods. As a result of these major disasters, Surat's climate adaptation initiative is heavily focused on public health, flooding, water supply, and economic and industrial development (ACCCRN 2011; Bhat et al. 2013; Karanth and Archer 2014; Anguelovski, Chu, and Carmin 2014).

Surat, like Indore, has been a part of ACCCRN since 2008. The city placed particular attention on stakeholder engagement and vulnerability assessment processes. These workshops relied on scenario planning exercises to identify indicators for potential adaptation interventions (Kernaghan

and da Silva 2014). Between 2010 and 2011, the city piloted an Urban Services Monitoring System that established a robust electronic platform upon which to improve the city's urban health monitoring system, particularly around incidences of malaria, dengue fever, and leptospirosis. The system included a mobile application for health data collection, a web-based mapping and data visualization tool, and a server application to store and manage data (Interview 2013). As a result, this project has facilitated the real-time collection, visualization, and analysis of data, and has further assisted different city departments with predicting disease outbreak and enabling swift response.

Surat's *City Resilience Strategy* was published in late 2010, and served as the final deliverable for ACCCRN's engagement in the city. To further develop climate adaptation and resilience actions, the Surat Climate Change Trust was formed in 2013 as a platform upon which different urban public, private, and civil society actors can contribute to prioritizing adaptation options, soliciting external financial support, and defining the city's overall adaptation agenda (Chu 2016c). One of the initial projects of the Surat Climate Change Trust is the Urban Health and Climate Resilience Center, which – like the Urban Services Monitoring System – targets the nexus of public health and climate adaptation. The Center builds on the knowledge and operating procedures Surat's existing public health facilities as well as provides auxiliary support to state and national urban health institutions interested in engaging adaptation issues (Interview 2014). Since its launch, the Center has also facilitated an improved vector-borne disease surveillance system, hired an inter-disciplinary research team to steer and advise the city's existing public health policies in light of climate change, and inaugurated a community-wide outreach program that promotes preventative health practices (Interview 2014).

These projects in Surat show that urban actors are recognizing the importance of adaptation as a key component of the city's overall socioeconomic wellbeing. As one member of the Surat Climate Change Trust noted,

'Our objective is to understand the economic impacts of climate risks. We need to make a business case for motivating greater public and private investment in adaptation... Building urban competitiveness and urban resilience involves mitigating climate risks and integrating adaptation concerns within the city's development priorities' (Interview 2013).

In this vein, in early 2013, the city government adopted the issue of climate change as one of the line items included in their annual municipal budget. The line item earmarked 20 million rupees (approximately US\$300,000) per year to complement and build upon existing urban infrastructure upgrading and service enhancement efforts (Chu 2016c). These include programs for slum relocation

and rehabilitation, transportation and infrastructure improvement, flood and storm water control, drinking water distribution system improvement, and wastewater management.

5. Pathways of Climate Adaptation Governance From Below

The three case studies show that despite the presence of strong and well-resourced transnational networks providing financial and capacity support, cities themselves are actually quite selective in how they interact with these external actors. In this section, I compare the experiences from Bhubaneswar, Indore, and Surat to highlight how they employ particular governance tools to exert power and authority over planning, which then yield different patterns of local adaptation action. These approaches can be categorized into four types: bureaucratization, financialization, spatialization, and acculturation (see Table 2 for definitions). Through comparing these four pathways of governance change, I show that when faced with the complexity of the global marketplace climate finance, cities are not mere recipients of aid and capacity support or who have no say in the overall direction and objectives of these international programs. Rather, cities are active participants in the global climate marketplace through constantly interacting with multilevel decision-making actors, monitoring and evaluating the progress of aid and capacity support programs, and advocating for what cities themselves deem as locally appropriate adaptation needs and approaches to project implementation.

Table 2 The four pathways of governing climate adaptation at the local scale

Governance Pathways	Definition
Bureaucratization	The administrative and managerial aspects of urban governance. This includes the role of urban institutions, rules, policies, laws, and plans.
Financialization	The funding and fiscal aspects of urban governance. This includes the role of grants, transfers, taxes, and service charges.
Spatialization	The physical and spatial aspects of urban governance. This includes the role of design, geographic location, siting, and distribution of projects in space.
Acculturation	The behavioral aspects of urban governance. This includes the role of policy diffusion, communication, advocacy, compliance, and reproduction.

5.1 Pathways of Bureaucratization

One of the primary objectives of external interventions in Surat, Indore, and Bhubaneswar was to generate internal political motivations for adaptation planning. Adaptation priorities in the three cities were taken up by different sectors of society – such as private businesses and community-based organizations in addition to the local government – leading to broad-based awareness and

support for incorporating adaptation needs into existing development objectives. However, the pathways of generating awareness and commitment required sustained political leadership and rulemaking in order to institutionalize efforts catalyzed by external interventions (Anguelovski and Carmin 2011). As a result, processes of gaining commitment for adaptation were accompanied by simultaneous processes of ‘officializing’ adaptation projects and programs, which included drafting plans, generating budgets, coordinating department activities, and embedding adaptation in local government bureaucratic procedures. Approaches to bureaucratization then facilitated increased actor knowledge about the connections between issues and led to the development of issue specialization, technological development, demands for competence, participation, and competition (Degnbol-Martinussen and Engberg-Pedersen 2003).

In Indore and Surat, external interventions funded by ACCCRN since 2008 involved such intensive processes of engagement, collective visioning, and knowledge co-production. These processes were originally designed to build understanding of projected climate impacts, urban socioeconomic vulnerabilities, as well as help decision-makers envision their work in light of climate change (Chu 2016c). As one local government official noted,

‘Some of the city partners conducted training programs. For example, ICLEI and [ACCCRN] conducted training programs to help people understand what they were talking about. This was something very new for the cities and there were gaps in their understanding. So these initial workshops focused on telling the city administrator or officials about how these strategies for climate change would align with their development priorities’ (Interview 2013).

The search for policy alignment reached beyond identifying programmatic co-benefits, but also included identifying policy tools, procedures, and staffing capacities to bridge different urban agendas (Interview 2014). In the case of Surat, the establishment of the Surat Climate Change Trust further enabled civil society and private actor representation in structured adaptation planning processes (Chu, Anguelovski, and Carmin 2016). This implementation strategy coincided with the general culture of governance reform promoted by all levels of governments in India.

The bureaucratization of adaptation planning therefore entails the generation of urban adaptation priorities through an interactive dynamic between urban actors and institutions that produce co-beneficial outcomes, which is then further facilitated and directed by particular people who have specific scientific expertise and institutional knowledge. The process of embedding climate adaptation into the bureaucratic agenda of city governance through plans, policies, and strategies relies on the ability of select actors to communicate regularly and to put pressure on officials. This

constant communication allows for problem definition, issue translation, and the programmatic internalization of climate adaptation objectives within existing urban development programs. This produces a local epistemic community knowledgeable in climate adaptation that is formed and framed by personal histories, individual skills, and bureaucratic strategies (Mosse and Lewis 2005; Lewis and Mosse 2006; Mosse 2005; Thelen 2004). It is within these communities that external aid transactions, local technologies of monitoring and surveillance, and climate knowledge are negotiated between multilateral institutions and local governments.

5.2 Pathways of Financialization

The governments of Bhubaneswar, Indore, and Surat are key intermediaries between external agencies and local beneficiaries. However, cities in India are in fact constitutionally prohibited from directly accessing multilateral and bilateral funds. As one politician noted,

‘[T]here is one main constraint - cities cannot directly take money from external agents or funding agencies. [Funds] have to come to the central government, then to the state government, then to the cities. [T]here is a Department of Institutional Finance, which is responsible for getting all this external funding and then dispersing it to the Planning Commission or the Ministry. So that is the problem, [cities] cannot directly associate with funding agencies. So if [cities] get in touch with other organizations who want to fund, it is difficult for them to channel this into implementable and fully financed projects’ (Interview 2013).

Given these gaps, several philanthropic foundations, NGOs, and developmental agencies that can directly access city governments have stepped in to support urban adaptation interventions. In Surat, Bhubaneswar, and Indore, they include the Rockefeller Foundation’s Asian Cities Climate Change Resilience Network (ACCCRN), the United Nations Development Programme (UNDP), the German Society for International Co-operation (GIZ), and others.

Even though some cities are making use of these emerging opportunities, such external interventions are often limited to technical guidance or capacity development (Anguelovski and Carmin 2011; Bulkeley 2005; Chu 2016c). At the same time, many cities are also beginning to discover bureaucratic and legal barriers preventing them from accessing this external money (Carmin, Dodman, and Chu 2013). Since local governments often also lack capacities to fulfill complex monitoring, reporting, and evaluation requirements set forth by funders and grantees, many are identifying alternative climate adaptation options that can be financed in conjunction with their

locally-sourced revenue income or with domestic intergovernmental fiscal transfers. As one local government officer noted,

‘Since strategies will have to be developed into projects, [cities] will have to seek resources to implement those projects, which includes preparing detailed project reports. There are very few avenues for this right now. For example, there is the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and the Ministry of Urban Development’s Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) for city’s infrastructure and services. Currently cities are attaching a lot of adaptation projects to infrastructure and services programs because there are no other channels through which these adaptation projects can be implemented’ (Interview 2013).

In other words, the financing of infrastructure, public services, and economic development becomes an important entry point for climate adaptation. Given the high rates of urbanization in Bhubaneswar, Indore, and Surat in recent years, these cities have pursued adaptation objectives through building upon existing infrastructure finance, intergovernmental grants (such as JNNURM), and nationally-led development schemes to facilitate incremental gains on the ground.

In the context of chronic underfunding, Bhubaneswar, Indore, and Surat face a mismatch between growing expenditure responsibilities and limited control over revenue resources stemming from uneven implementation of fiscal decentralization. Embedding adaptation actions into municipal budgets – such as in the case of budget line items in Surat and Indore – is a practical requirement (Interview 2014). Here, we are starting to see city governments gradually take ownership over how climate adaptation options are financed and implemented across the urban landscape. Through conceiving projects that both further adaptation and address general urban development needs, adaptation has been reframed into a public good and, thus, has established a budgetary basis that makes use of emerging externally-sourced funding streams and effectively ties into existing local and intergovernmental funds that target service provision, infrastructure upgrading, and institutional reform. The experiences from Bhubaneswar, Indore, and Surat show how they are reasserting their interests against international and transnational actors operating within the global climate regime and the marketplace for climate finance.

5.3 Pathways of Spatialization

The growing awareness of climate adaptation priorities in Bhubaneswar, Indore, and Surat is resulting in a focus on implementing infrastructural or land use interventions that strive for co-

beneficial or mainstreamed benefits (Shi et al. 2016; Anguelovski et al. 2016). However, since many infrastructures are large, expensive, and permanent, they require data-intensive designs and engineering expertise (Sovacool 2011; Flyvbjerg, Bruzelius, and Rothengatter 2003; Giezen, Bertolini, and Salet 2015; Hodson and Marvin 2010). Despite growing uncertainty over how to navigate and synchronize financial support for infrastructure development with emerging climate adaptation needs, we are starting to see cities experiment with integrating climate concerns how particular development projects are sited, built, and managed.

Infrastructure projects implemented under ACCCRN in Surat and Indore targeted areas vulnerable to flood and disease risks (ACCCRN 2011), especially the slum communities under high exposure to flood and vector-borne diseases (Bhat et al. 2013). Surat, for example, initiated a design competition around planning for flood risk in low-income neighborhoods, designed a web-based vulnerable people's database, and created an urban services monitoring system to distribute real-time data and evaluate the performance of the city's water delivery and waste collection systems (Chu 2016c). Indore, on the other hand, initiated a series of lake rehabilitation programs to complement existing deficiencies in the Narmada water supply system. Many of these upgrading projects to the city's existing wastewater and sewage treatment infrastructure employed funds from JNNURM while also making use of local innovative strategies such as rainwater harvesting or reverse osmosis treatment technologies (Chu 2016a; ACCCRN 2013). From these examples, we see that the siting of particular adaptation interventions across the urban landscape depended on an ability to find complementarities and incremental policy gains between institutions, as well as between different infrastructure needs and local developmental contexts.

In the case of Bhubaneswar, despite the emphasis on physical infrastructure for hazard risk management purposes – such as in the form of cyclone shelters and early warning systems (Government of Odisha 2013; Government of Odisha 2010) – the local government continues to stress the importance of supporting 'softer' services, including community-based education, networking, and institution-building activities to further the effectiveness and long-term sustainability of adaptation programs. In particular, one official in the Odisha State Disaster Management Authority noted that,

'Nobody is looking after the softer activities... These softer activities can help urban communities prepare and face disasters, such as in the form of community-based disaster management or preparedness. Building institutions is very important, so UNDP is working to support existing social structures. Without social structures, people will not understand the use of the cyclone shelter, the equipment, or the role of

search and rescue teams. Building community resilience to climate change is just as important as physical structures' (Interview 2014).

As one can see, even though building and implementing physical or spatial planning projects often require more financial resources – which, in the case of Bhubaneswar, can cost upwards of ten million rupees for each cyclone shelter (Interview 2014) - cities must also recognize the importance of softer interventions that complement the many physical infrastructural projects.

From these examples, we are again seeing how local governments are gradually take ownership over how climate adaptation projects are distributed and implemented across the urban landscape. Due to the high degrees of uncertainty associated with investing and maintaining large-scale infrastructures, Bhubaneswar, Indore, and Surat have resorted to diverting multilateral finances to incrementally upgrade existing or pipeline development-oriented infrastructure projects. Many of these projects focus on protecting valuable assets – such as diamond factories and textile mills in Surat, water supply and distribution pipelines in Indore, or flood barriers in Bhubaneswar – against future risks. However, one emerging trend is the over-reliance of spatial adaptation strategies, which may be contributing to the displacement of already vulnerable communities (Anguelovski et al. 2016).

5.4 Pathways of Acculturation

Most officials in Surat, Indore, and Bhubaneswar attribute the ability to understand projected climate impacts on their respective urban policies and plans to constant engagement activities spearheaded by external agents such as the Rockefeller Foundation and UNDP. One local government official in Bhubaneswar noted that,

'The cities did not really have trouble with the basic methodology because there was handholding from the [international] partners. They were spending a lot of time with the city officials and they were doing a lot of things all by themselves. The strategy was prepared by the partners together with local officials to have local perspective, local knowledge, local challenges and constraints, and local responses that could help the city adapt – even though the [international] partner remained a very strong component in the whole exercise of technical assistance' (Interview 2013).

These 'hand-holding' engagement processes, continuously pursued across time, not only successfully increased the legitimacy and awareness of climate impacts across stakeholders, the iterative interactions also created spaces for communicative knowledge and information co-production, and thus gradually leading to a 'culture' of adaptation action from the bottom up. This process of

acculturation subsequently transformed adaptation from a form of *explicit knowledge* that involved technical assessment tools, risk projections, climate scenarios, and urban systemic analysis, into a form of *tacit knowledge*, with a deeper recognition of how these technical skills interacted with day-to-day bureaucratic procedures, work routines, implementation steps, and policy implications.

The permeation of tacit knowledge both within and beyond local government allowed for an increased creativity and flexibility around how adaptation objectives can be reframed and reconstituted to address additional – and often conflicting – urban development needs. This trend mirrors theories of ‘street-level bureaucrats’ who can flexibly and autonomously apply policies according to local contexts (Lipsky 1981). For example, in Indore, the iterative interaction around policy, funding, and project implementation allowed city officials to forge new interactions and creative framings around how to incorporate emerging climate objectives into ongoing urban development needs (Interview 2013). As one local government official noted,

‘The Indore Municipal Corporation has money, but there are procedures. All of these procedures take time. What Rockefeller has done is to give money to us for implementation, and for all of the projects that we are implementing, the Municipal Corporation’s role is very defined. The permission is given by the Municipal Corporation and the Indore Development Authority. If we require any financial support, either direct or indirect – like for the sewage treatment plant – the civil work is done by the Indore Municipal Corporation and the technical part is done by us’ (Interview 2014).

As one can see, strictly defined policy jurisdictions and the constraints of bureaucratic procedures limited the scope of how the sewage treatment plant and water conservation technologies were implemented in Indore. However, these limitations were slowly overcome due to increased awareness over the issues and an increased flexibility around how institutional constraints can be bypassed or overcome to incorporate emerging adaptation needs.

The successful implementation of climate adaptation actions in Bhubaneswar, Indore, and Surat depended on the fact that external actors have spent many years engaging with key sectoral stakeholders and decision-makers in the city (Interview 2014). This process of continuous communication, policy and plan translation, and ‘hand-holding’ inevitably brought increased awareness to these key actors, and thus resulted in them being accustomed to the ideas of climate adaptation, resilience, and infrastructure protection. The ability to engage and communicate around issues of climate change then permeated into a wide array of other urban planning and development work streams, while simultaneously supporting a ‘cultural’ change towards a better recognition of

climate change needs within different bureaucratic arms of the city. This process of acculturation not only succeeded in embedding climate change knowledge, practice, and policies within local government, this process also facilitated the bridging of policy coalitions, interest groups, and science-policy epistemic communities within the complex governance terrain of multilateral actors, urban policy-makers, and local community beneficiaries.

6. Rediscovering the Urban in Global Climate Governance

This paper assessed different climate adaptation actions in Bhubaneswar, Indore, and Surat that were initially promoted and financed by multilateral aid or philanthropic actors, but were subsequently locally sustained through embedding adaptation within bureaucratic practices, financial processes, spatial plans, and institutional cultures. At the beginning of the paper, I noted that there remains questions on how urban actors are implementing adaptation actions against a backdrop of external aid and urban institutional change, as well as how theories of multilevel governance can encapsulate emerging discourses and empirical evidence on *climate governance from below* (Amundsen, Berglund, and Westskog 2010; Corfee-Morlot et al. 2009; Christiansen and Jørgensen 2000; Bulkeley, Castán Broto, and Edwards 2015; Nalau, Preston, and Maloney 2015). I contribute to this gap in knowledge by highlighting how processes of bureaucratization, financialization, spatialization, and acculturation create pathways for coproducing knowledge, co-creating options, and articulating standards, practices, and behaviors. In the end, despite the presence of different directives or incentives from global actors, adaptation plans and actions end up being rearticulated and implemented based on contextually dependent local needs and capacities.

Even though urban public, private, and civil society actors are acting in response to projected climate impacts on account of increased external finance and capacity support, the extent to which adaptation interventions are effectively, sustainably, and equitably implemented depends on how development interests are negotiated and translated through the different pathways of governance change. The case studies from Bhubaneswar, Indore, and Surat highlight two broad tradeoffs associated with advancing urban climate adaptation priorities within a multilevel governance framework – both of which speak to the equity and inclusiveness of these emerging, externally financed adaptation actions in cities across the global South. First, a reliance on transnational and multilateral resources may represent a new form of global dependency. This point speaks to the repackaging of historic trends of aid dependency (Svensson 2000; Riddell 2007) and entrepreneurial urbanism (Harvey 1989; Sager 2011), both of which may result in entrenching existing neoliberal or capital-oriented modes of urban economic production (Shi et al. 2016). Secondly, since many of the mandates and incentives for urban adaptation are derived from outside of the city, these external economic and political interests may end up dominating or usurping the local development discourse.

The capturing of governance processes by powerful elite groups may well result in further marginalization of more vulnerable sections of society (Anguelovski et al. 2016).

In conclusion, despite different tradeoffs in equity and inclusiveness, the experiences from Bhubaneswar, Indore, and Surat do show that – to a large extent – urban actors are able to assert their own climate and development interests within an ever-expanding regime of global climate policymakers, funders, and other implementation actors. The ability of cities to exert power over how adaptation priorities are embedded into urban bureaucratic practices, budgets, and spatial plans means that cities are actually quite powerful actors in reframing and redirecting different policy agendas espoused by the different multilateral aid and philanthropic organizations. Although cities are playing an increasingly assertive role within the global climate governance regime and the ‘marketplace’ for climate finance – such as articulated in the Durban Adaptation Charter and in the recognition of the role of local governments in the Paris Agreement of the UNFCCC (2015) – I also argue that cities should play a more active role in mobilizing support to construct, revise, or sustain more climate resilient development pathways, as well as in advocating for more transformative visions of climate adaptation. In this sense, planner and policy-makers should employ the model of *governing adaptation from below* to harness local visions of more sustainable, equitable, and just societies.

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