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The local governance of climate change: new tools to respond to old limitations in Esmeraldas, Ecuador

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This article argues that climate change, seen as a socially constructed anticipation of natural disasters and a future-risk that plays out in present politics, is enabling the emergence of new modes of governance in cities of the global south. The article focuses on the process by which the city of Esmeraldas, Ecuador, developed a Climate Change Adaptation and Mitigation Strategy. Within the context of climate change adaptation, Esmeraldas mobilised new discourses, stakeholders, and planning mechanisms to address pre-existing urban planning and development limitations. This discursively enabled the municipality's ongoing governance project by leveraging resources, creating consensus, and informing practice. Climate change adaptation thus became an important mechanism for engaging with local priorities, particularly those of the most vulnerable populations, and for bridging the gap between the formal world of policymaking and the reality of life in the city, which is more often structured by informality.

Keywords: climate change adaptation; local governance; poverty; vulnerability; informality; institutional capacity; Esmeraldas

Introduction

It is well acknowledged that cities play a key role in responding to climate change, and climate change adaptation is now a well-recognised priority for cities in the global south (World Bank 2010). However, few efforts have been made to systematically identify the actions required to facilitate the adaptation of cities to the specific local impacts of climate change (Satterthwaite *et al*. 2007, Bicknell *et al*. 2009, Bulkeley *et al*. 2009, Bulkeley 2010) or to understand the broader political implications of these actions. From a practical perspective, these efforts are still in a pilot phase, with cities all over the world experimenting with technologies, social processes, and governance arrangements that arguably would lead to an increase in their adaptive capacity (Bulkeley 2010).

This article focuses on the city of Esmeraldas, Ecuador, and particularly on the process that culminated in the launch of its Climate Change Adaptation and Mitigation Strategy in 2011. Our analysis suggests that climate change, seen as a socially constructed anticipation of natural disasters and a future-risk that plays out in present politics (Beck and van Loon 2011), is enabling the emergence of new modes of governance in cities of the global south. Specifically, new discourses, stakeholders, and planning mechanisms are being mobilised in the context of local climate change adaptation to address urban planning and

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development challenges which pre-existed the climate change agenda. In Esmeraldas, the climate change adaptation agenda has become important in both connecting local government with local priorities and beginning to bridge the gap between the formal sphere of politics and policymaking and the reality of life in the city, much of which is structured by informality. Both of these are common dilemmas of medium size cities in the global south, and we argue that in this context climate change has thus become a powerful discursive enabler for a variety of mechanisms to better govern the city, including leveraging resources, creating consensus, and informing practice.

Formal, local-scale, climate change governance in Esmeraldas commenced in 2009, when the city was selected to participate in UN-Habitat's Cities and Climate Change Initiative (CCCI). CCCI aims to encourage the formulation of local climate change adaptation and mitigation strategies, by providing seed funding to cities and linking cities and local leaders to share experiences, knowledge, and practices. Its focus is on cities in developing countries, where it assists local authorities with capacity building, development of policy instruments, and technical support. Esmeraldas was the only CCCI pilot project in the Latin America and Caribbean region, and UN-Habitat found that the city's vulnerability to climate change was inherently linked to issues of poverty, informal housing, and limited service provision (UN-Habitat 2008). These vulnerabilities are exacerbated by the limited capacity of the municipal government, alongside challenges facing local governance in the context of decentralisation. While developing a mechanism to adapt to climate change, the city of Esmeraldas envisioned strategies to deal with these structural challenges.

This article begins by providing an overview of climate change vulnerability in cities in the global south, exploring the links between addressing structural deficiencies and increasing adaptive capacity. This section is followed by three sections focused on the case study of the city of Esmeraldas. These sections provide an overview of the specific nature of vulnerability to climate change in Esmeraldas, how these dynamics sit within Ecuador's climate change adaptation framework, and the process leading to the adoption of a local level Climate Change Mitigation and Adaptation Strategy. The article finishes with a discussion of how climate change provides new tools for dealing with pre-existing structural challenges, and the ways in which this constitutes an emerging form of local governance.

The article is situated firmly at the academic/practitioner interface, the result of a joint effort between climate change researchers based at a UK university and staff members of UN-Habitat working with the municipal government of Esmeraldas in developing and implementing climate change responses. UN-Habitat has been instrumental in supporting the development of the city's Climate Change Mitigation and Adaptation Strategy and in contributing to developing governance tools led by the city. In doing so, it has acquired a significant institutional "memory". The empirical material used draws on a variety of UN-Habitat primary sources and on the experience of staff members of the organisation, and includes internal workshop reports and records of other local activities. Co-learning with UN-Habitat was a key methodological tool employed, with the aim of casting light on governance interventions that are commonly invisible to the academic community by virtue of their results being found only in the "grey literature". By combining the insights and voices of stakeholders involved in the process as well as external researchers, the article highlights challenges specific to Esmeraldas as well as common challenges facing small- to mid-sized cities in Latin America. One theme in this regard is how action on climate change is being pursued at local scales even in the context of institutional constraints and pre-existing governance challenges.

In many ways, climate change in Esmeraldas operates as a discourse which facilitates traditionally difficult governance and urban development interventions. As Bulkeley and Castán Broto (2012) argue, "the ubiquity of climate change as a discourse ensures that it is attached to a range of different projects, from flood protection measures to tree planting schemes, which may have previously existed outside of the climate arena, adding to the fragmented landscape of urban responses." In other words, climate change provides a new unifying discourse which facilitates action on a variety of locally specific urban development and governance issues. Indeed, Bulkeley *et al.* (2012, p. 546) argue that the "growth in the scale and nature of municipal responses to climate change is one of the most significant features of the changing climate governance landscape over the past two decades." Bulkeley and Castán Broto (2012) argue that "such forms of experimentation are also intimately related to the ways in which urban authority is being restructured and to the strategic responses to climate change emerging through processes of urban political economies." In Esmeraldas, the emerging local governance of climate change has facilitated urban responses independent of existing regional and national frameworks for action. Climate change has empowered local action on urban development issues. In particular, it has played a legitimating role in encouraging Esmeraldas to connect to other cities (through networks such as CCCI) and benefit from the expertise contained in trans-national institutions such as UN-Habitat.

Climate change vulnerability in cities in the global south

Climate change is not a reality destined to operate in a catastrophic future. Rather, it is a powerful discourse that operates in the present through the anticipation of such a future. This anticipation "opens up completely unexpected and, more importantly, unforeseeable opportunities for radical transformations" (Beck and van Loon 2011, p. 113). Such anticipation and the risks attached to it have important social and political consequences in the present by allowing a variety of stakeholders to mobilise resources towards their particular aims. But in contrast to Beck and van Loon (2011), for whom the climate change threat is for the most part socially constructed under the abstract and intangible notion of "global risks", stakeholders in Esmeraldas deal with the possibility of tangible local disruptions and catastrophes that evolve out of the city's own vulnerabilities and those of its population.

Vulnerability is the potential to suffer harm or loss, related to the capacity to anticipate a hazard, cope with it, resist it, and recover from its impact (Benson *et al.* 2007). It has been defined as the "interface between exposure to the physical threats to human wellbeing and capacity of people and communities to cope with those threats" (UNEP 2002, p. 302). It implies that both social and bio-physical processes and the human ability to manage threats are of importance. Vulnerability combines factors affecting physical exposure (e.g. removal of mangroves providing protection from cyclones, rapid urbanisation leading to high density settlements on a flood plain) with the capacity of social and physical environments to cope.

Climate change is likely to significantly exacerbate the pre-existing vulnerabilities of cities. But the opposite is also true. Pre-existing vulnerabilities increase the potential impact of climate change and constrain the ability of a city to respond. Even before climate change is considered, mid-size cities in the global south face a significant number of challenges, including poor planning, weak institutional structures, and large deficits in basic infrastructure (such as sewers, drainage, water, and energy infrastructures) and services (such as health care, police, and emergency services) (ISO/CEI 2002). Urban poverty both increases the level of exposure to environmental risks and limits the ability

of the community to respond (Sanderson 2000). As a result, commentators have argued that climate change is likely to have the greatest impact on these most vulnerable communities, either because of their increased exposure (e.g. marginal land and informal settlements are often located in the floodplain, on inclined slopes vulnerable to landslides, in areas vulnerable to flash floods, or in vulnerable coastlines) or because of limitations in their ability to respond due to their low asset base (e.g. voicelessness, lack of durable housing, land related problems such as absence of secure tenure, limited education, and low access to employment) (Satterthwaite *et al.* 2007, Bicknell *et al.* 2009, Moser and Satterthwaite 2010).

The notion of adaptive capacity is seen as a mechanism to increase adaptation to climate change while acknowledging (a) the need to overcome pre-existing structural limitations and (b) the positive role of pre-existing capabilities. Adaptive capacity, also referred to in some contexts as climate change resilience, is defined as the inherent capacity of a population to cope with climate impacts (Reid and Huq 2007, Smith *et al.* 2010). It is a function of the available assets combined with the service provided by infrastructure and external institutions (Prasad *et al.* 2009). Adaptive capacity includes a series of resources such as funding abilities, technologies, and knowledge. It also considers issues of institutional capacity, resource distribution, and the ability to access and manage information (Yohe and Tol 2002). Increasing adaptive capacity is aimed at maintaining livelihoods despite the threats of climate change, and is achieved through ensuring a robust institutional framework as well as access to a variety of resources. From this perspective, responding to climate change implies both increasing adaptive capacity and responding to the pre-existing vulnerabilities present in a society. The appropriate response includes all environmental hazards and risks as well as a focus on the needs of those with the greatest vulnerability.

However, local governments in mid-size cities in the global south have limited capacity to respond due to various resource limitations, such as knowledge, funding, and access to information, coupled with the challenge of engaging with the urban poor through formal government structures (Satterthwaite *et al.* 2009, Satterthwaite 2011b). Latin America, particularly, is characterised by large numbers of people living and depending on informal conditions, despite the integration of the middle classes into global economic circuits (Hardoy and Romero Lankao 2011). Precisely because "inadequate infrastructure and governance structures constrain the ability of urban populations and authorities to adapt to existing and future climate change and to other environmental and societal stresses", climate change risk is more prevalent within low-income groups and those living in locations with no formal tenure and limited access to infrastructure and services (Hardoy and Romero Lankao 2011, p. 159).

The suggested solutions vary. Governments often respond with isolated physical infrastructure and structural improvements, disregarding the institutional and social contexts that enable these interventions to be effective. Alternative solutions range from greater community involvement in adaptation processes (Satterthwaite 2011a) to mixing the emerging climate change agenda with pre-existing goals, plans, and programmes (Carmin *et al.* 2012). Eriksen *et al.* (2011) have gone as far as to argue that there is a need to incorporate local knowledge while acknowledging the multiplicity of values and interests influencing the final adaptive result. In all cases, though, solutions need to recognise that climate change adaptation is a task that goes beyond traditional comprehensive planning, and that the models derived from climate change mitigation strategies do not always make for good templates for adaptive planning (Carmin *et al.* 2011). A tension between formal and informal governance modes and spaces becomes particularly evident when studying climate change adaptation initiatives, because climate change impacts are likely to be felt strongly in the spaces of informality (such as the urban settlements located in high risk areas).

Despite this, municipal solutions are likely to overlook this reality because of the unsanctioned nature of the informal settlements and spaces of the city (for example, as a result of existing legal barriers, lack of information for effective planning, and or difficult governance access preventing the municipality from operating in these areas). In spite of these barriers, research suggests that those solutions capable of bridging this formal–informal divide are likely to be more successful. Birkmann *et al.* (2010) contrasted the formality of city-level adaptation strategies in Ho Chi Minh City and Can Tho (Vietnam) with the informality of micro-scale adaptation strategies being pursued within the same cities. They argue that urban governance must go beyond established notions of urban planning, and that a shift must be made away from a focus on improving structures, towards improving planning tools and governance processes. To a large extent, this means expanding the urban geographies of the governing efforts by responding to the needs of those who are traditionally left behind. In the remainder of this article, we turn our attention to the specific response of the city of Esmeraldas, and the way in which the city started building adaptive capacity, because Esmeraldas highlights both the nature of the challenge and some possibilities for overcoming it.

Climate change vulnerability in Esmeraldas

Esmeraldas is a medium-sized coastal city located in the north-western corner of Ecuador, on the Pacific Ocean coastline and by the mouth of the Esmeraldas River. With a population of over 150,000, the city is home to the major seaport of north-western Ecuador. It is located in the Chocó bio-geographical region, a valuable and vulnerable ecosystem with one of the highest rates of biodiversity in the world. Esmeraldas is one of the poorest regions in Ecuador, traditionally inhabited by a population of African descent that has historically suffered from exclusion and discrimination. In recent years, the city's proximity to Colombia's coca growing regions, alongside an oil-based extractive economy, has had an impact on its social dynamics resulting in high levels of urban violence and crime. Located at an international border characterised by illegal drug trafficking and under the leadership of a left wing mayor (yet on the opposite political spectrum of Ecuador's leftist national government), Esmeraldas has often found itself isolated with respect to the national political agenda and priorities.

Hazards, risks, and vulnerabilities are not alien notions to Esmeraldas. Mudslides and river overflows during the rainy season are regular occurrences, bringing diseases such as typhoid as well as displacement, and the impact of such events is compounded by the fact that a significant proportion of the total population lives in informal settlements or inadequate housing. These informal settlements in Esmeraldas are characterised not only by a lack of property titles but also by irregular provision of basic services such as water and electricity. They are located in those areas of the city characterised by the greatest vulnerability, from the riverbanks of the Esmeraldas River (where there is a greater risk associated to flooding), to the uplands at the outskirts of the built area to the west of the city (where there is a greater risk associated to landslides). Although some 60% of dwellings do not have a building permit, many of them have evolved into well-established neighbourhoods characterised by relatively robust two- and three-storey structures. As in many parts of urban Latin America, living in an informal settlement does not necessarily imply living in conditions of acute poverty. Low and middle income families live in the same areas. Yet the lack of formal land title makes it particularly difficult for the municipal government to understand the magnitude of vulnerability and to take action to reduce it (Figure 1).
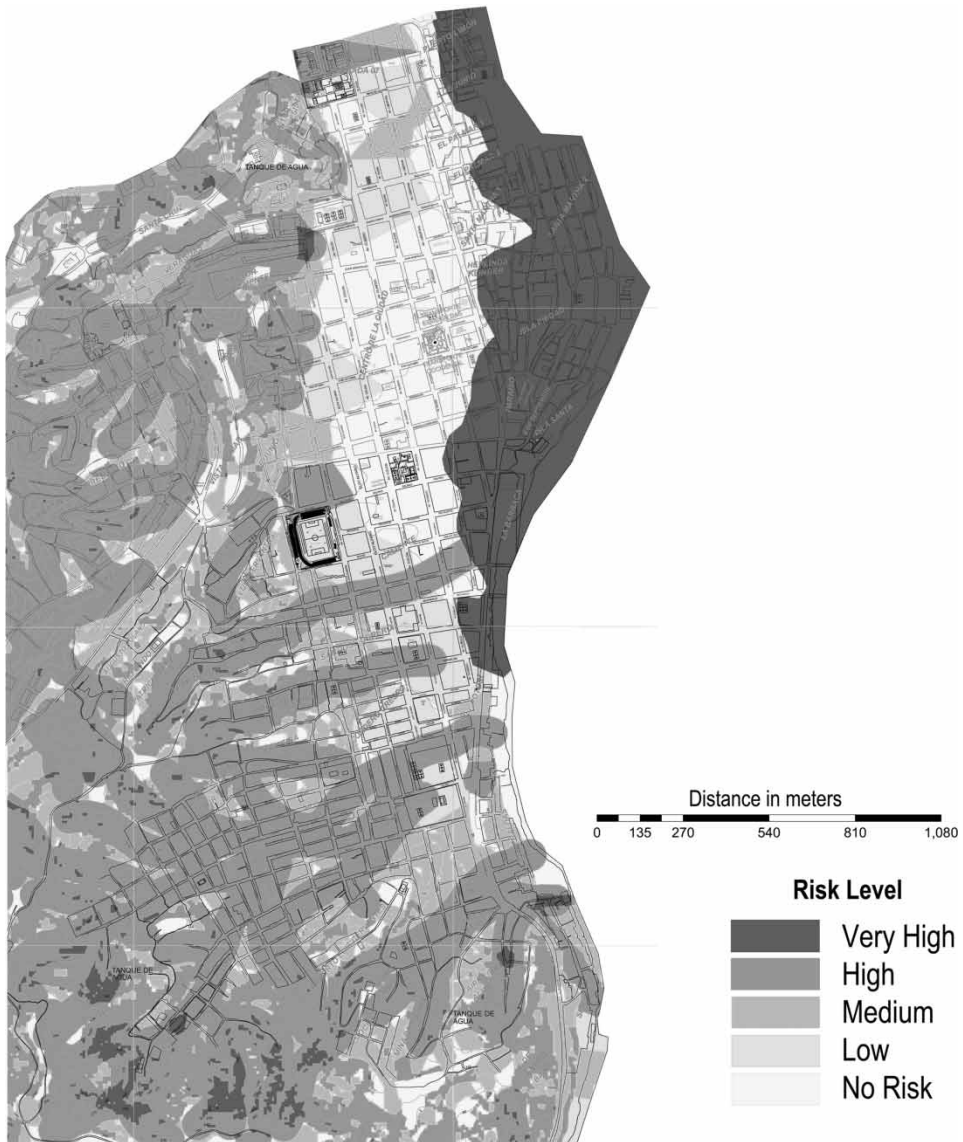
Figure 1.   Urban layout and risk level map of the central and southern sectors of Esmeraldas. The map depicts the floodplains of the Esmeraldas River along the eastern boundary of the city with very high risks, and the predominantly high risk areas in the sloped sectors along the western boundary. Both the floodplains and the sloped sectors of the city have a higher incidence of informal settlements. Map adapted from the *Mapa De Riesgos/Vulnerabilidades* prepared by UN-Habitat and the Municipality of Esmeraldas in 2011.

Ecuador's climate change adaptation framework and its impact at the local level

Ecuador has a national policy framework that provides a solid legal and institutional platform to incorporate climate change into local and national development efforts. As a result, a number of Ecuadorian cities, including Guayaquil, Quito, and Cuenca, have attempted to better consider the impact of climate change in city planning. Ecuador ratified the United

Nations Framework Convention on Climate Change (UNFCC) in 1994, and in 2008 constitutionalized government responsibility for action on climate change in Article 414 of the country's new Constitution:

> The National Government will adopt adequate and cross-sector measures to mitigate climate change by placing limits on greenhouse gas emissions, deforestation and atmospheric contamination. Measures will be taken to conserve forests and other vegetation and protect human populations at risk. (Republica del Ecuador 2008, article no. 414)

This commitment is also reflected in the National Plan for Well-Being (Government of Ecuador 2009), the main document guiding development efforts and investment priorities for the 2009–2013 government, which aims to promote adaptation and mitigation of climatic variability paying a particular attention to climate change.

In 2010, Ecuador's government established an Inter-Institutional Committee for Climate Change. The committee, with representation from a variety of government departments at the national level, has the objective of coordinating, designing, and facilitating the implementation of national climate change policies. Within the framework provided by the committee, the Ministry of Environment is leading the development of a National Climate Change Strategy. This will propose national policies to manage and mainstream climate change, including the design of Sectoral and Multi-Sectoral Climate Change Adaptation Plans. The draft National Climate Change Strategy seeks to develop an integrated social response to reduce the vulnerability and enhance the opportunities of the country by mainstreaming climate change into national policies for sustainable development. To do this, it proposes: 1) reinforcing the country's capacity to monitor climate change and assess vulnerabilities, 2) formulating greenhouse gas emission inventories, 3) designing and implementing climate mitigation measures, and 4) designing and implementing climate change adaptation measures.

But despite the presence of a comprehensive national framework guiding priorities and actions in response to climate change, the actual implementation of this framework does not always align with interests at the local level. Local authorities are burdened by a variety of immediate problems and constraints and have a limited institutional capacity for the type of long-term planning required to address climate change. Furthermore, the implications and risks associated to climate change are often poorly understood by municipal staff, local organisations, or the population at large, and the need to address issues of climate change rarely figures in local political agendas.

Until 2008 Esmeraldas was no exception to this. A port town where the oil industry is the largest employer, the main environmental concerns of residents in Esmeraldas are related to the substandard provision of basic services such as potable water and electricity and the health and environmental impacts of the oil industry. Climate change was not perceived as a threat and despite recurring natural disasters, primarily in the form of landslides and flooding, there was no conscience of future-risks associated with a changing climate. However, climate change achieved purchase in Esmeraldas when, in response to UN-Habitat suggestions, the local government saw it as an opportunity to expand its influence and build its capabilities. Although prompted by the city's co-operation with UN-Habitat, action on climate change adaptation in Esmeraldas was strongly local in its justification and aspirations. Climate change, in Esmeraldas, facilitated traditional urban development by discursively underpinning the need for investments in public infrastructure and improvements in institutional capacity. In the process, municipal staff as well as the local population developed an awareness of climate change. The following sections describe the efforts of

the city of Esmeraldas towards identifying its vulnerabilities and imagining ways to respond. The initiative has been the result of a strong local leadership coupled with a local-multilateral alliance (UN-Habitat 2008), where the UN-Habitat programme played a pivotal role.

The development of Esmeraldas' Climate Change Adaptation and Mitigation Strategy

Esmeraldas faces a number of challenges in developing adaptive capacity and addressing its vulnerability to climate change. Two key challenges are insufficient financial capacity and a lack of information and risk management tools, which manifest themselves in the absence of efficient cadastral tools and early warning systems, and in a resulting inability to enforce zoning regulations or implement location specific adaptation measures. Overall, the municipality has limited technical abilities to evaluate the needs and risks of households living in settlements located in flood prone areas (UN-Habitat 2008). Local decision makers acknowledge that the information available to inform urban planning decisions is insufficient, and that climate-change-related decisions can rarely be justified.

Budget limitations and a lack of resources to buy land further constrain the city's ability to implement mitigation or relocation plans. In 2008, 50% of the US$21 million annual budget of the municipality was spent on general functioning expenditures. Adaptation and mitigation measures, such as flood prevention systems, re-settlement programmes for vulnerable populations, and structural adaptation programmes, appear to be outside the reach of Esmeraldas.

The CCCI process sought to help the city overcome some of these challenges, whilst facilitating the development of a Climate Change Adaptation and Mitigation Strategy. It did so by providing funding and the analytical tools required for initial actions. It started with a vulnerability assessment evaluating challenges and opportunities to climate change. This assessment was aimed at the identification of key impacts and vulnerabilities, and intended to define how the current institutional and governance framework could effectively support proposed recommendations and adaptation measures. The assessment highlighted locally specific climate change impacts related to sea level rise and increased land surface temperatures, as well as more generic and uncertain impacts such as changes in cloud cover, precipitation patterns, and wind patterns. It also identified a set of tools designed to formulate a city-level climate change mitigation and adaptation roadmap. It was clear from the assessment that these primary climate change impacts were likely to result in secondary indirect impacts such as an increase in inbound migration from affected populations in the neighbouring rural areas, further exacerbating the direct impacts on the city (Sierra 2009).

Local views had already been incorporated in urban planning process through the implementation of UN-Habitat's Localising Agenda 21 Programme, and the climate change strategy sought to continue this active community engagement. Three workshops under the joint leadership of the municipality and local partners were carried out to share the objectives of the initiative with civil society. Carried out by the mayor's office, the workshops were advertised in the local media and promoted through the mayor's communication strategy. They provided a space to receive feedback on community expectations of the process itself, as well as a local understanding of the current challenges faced by Esmeraldas in the context of a changing climate. But with their high visibility, the workshops and other climate change activities also served as a platform to advertise government action in a context of active and contested local politics. The workshops were attended by

representatives of a variety of industries within the city, the local utilities, youth groups, women's groups, and other local stakeholders. The discussions ranged from how to link climate change to issues of local economic development, to the promotion of green buildings and environmental education. In practice, the discussion would often expand beyond the specific impacts of climate change and cover a variety of environmental problems in the city, with the polluting practices of the dominant petroleum-based economy and the city's oil refinery as one of the main local environmental concerns. It became clear through these discussions that the two major issues of concern were the inadequacy of the city's sanitation and water distribution system and the presence of illegal dwellings on landslide prone sites and in flood zones.

Through its partnership with UN-Habitat, the municipality was able to build local capacity, including developing participatory processes for environmental planning and management. The participatory process leading to the Climate Change Adaptation and Mitigation Strategy generated awareness in the population and enabled the incorporation of local concerns into the strategy, as discussed above.

Further engagement with the population was developed through third party consultation. The Luis Vargas Torres Technical University of Esmeraldas took the lead in organising a consultation with members of the public to discuss the impacts of climate change in the city. Along with the workshops, this public consultation highlighted key challenges and opportunities, such as the high levels of contamination of current water supplies, the need for better education and communication about climate change issues and green practices, as well as the need to integrate mitigation and adaptation perspectives in the context of the greenhouse gas emissions and sustainability impacts generated by local activities such as the local oil refinery. These events started a local dialogue on environmental issues and mobilised local stakeholders around the climate change strategy. They resulted in the collective definition of four objectives aimed at raising local awareness on climate change issues and guiding mitigation and adaptation measures in the local urban plan:

1. to collect data on climate change to support decision making process;
2. to implement mitigation and adaptation actions;
3. to increase awareness on local population and promote educational programmes targeting youth; and
4. to promote technology transfer for local industries.

These objectives represent the three main concerns raised by a variety of stakeholders during the process: firstly, the lack of planning tools and capacities leading to an organic urban growth strategy that does not recognise climate risk and vulnerability; secondly, the need to focus on raising awareness on environmental and climate change issues amongst the city's youth; and thirdly, the need to find more environmentally friendly development models for the city while reducing economic reliance on the oil industry.

Based on the initial vulnerability assessment and the different workshops and consultations with civil society, UN-Habitat and the municipality took initial steps to address Esmeraldas' structural limitations constraining its ability to respond to climate change. With access to data for decision making as one of the main priorities, the Municipality of Esmeraldas initiated the development of a geographical information system (GIS) platform and software tools to support risk management and the planning process. Its focus was on assisting policy makers in the identification of the most vulnerable settlements within risk areas, though it also helped identify major evacuation paths and gather together specific information on existing capabilities such as social infrastructure (hospital and schools). For

UN-Habitat, this mapping process was a first step in responding to climate change because it would support adaptive urban planning and facilitate the development of urban governance dynamics which would incorporate resilience to climate change. In addition to the information and risk management systems, the municipality initiated the development of a property registry for recently urbanised areas and other urban extensions located on risk areas, such as the informal settlements along the Esmeraldas River in the south of the city. The property registry intends to support a planned land development approach and is a first step in developing actions that bring formal support to some of the informal spaces of the city.

Historically, climate change concerns have not been a driver for the municipality in its risk reduction and adaptation measures to natural hazards. Local policies and strategies have been primarily guided by the need to address the challenge of poverty reduction. But with the combination of the poverty and climate agendas, by addressing the challenge of risk reduction and informality in urban settlements, the municipality is reducing climate change vulnerabilities while at the same time addressing some of the main structural problems facing the city. The resulting Esmeraldas Climate Change Adaptation and Mitigation Strategy is a tool that allows the municipality to integrate poverty alleviation, risk management, and climate change within a territorial urban planning approach. The strategy stands as the main outcome of a joint and participatory effort between civil society, local leaders, and key stakeholders, reflecting the geographical, economic, social, and cultural contexts as well as the main possible impacts and consequences of a changing climate for the city and its region. Along with the strategy, the pilot activities implemented in Esmeraldas helped different local government offices to include climate change criteria in their planning exercises.

The Municipality of Esmeraldas, with the financial support of the CCCI programme, also facilitated city-to-city cooperation with other cities in Ecuador, such as Cuenca and Loja, in issues related to sustainable urban planning. As part of this city-to-city collaborative effort, the Municipality of Esmeraldas worked in close partnership with the Municipality of Quito, another pioneering city in the development of a climate change adaptation agenda, in the implementation of pilot activities. Climate change became a catalyst for a city-to-city conversation that went beyond climate change and addressed a series of common limitations and challenges. City-to-city cooperation at the national level resulted in best practice knowledge on a variety of topics being transferred from Esmeraldas to other Ecuadorian cities.

In addition, the mayor of Esmeraldas participated in discussions at the 2009 UNFCCC COP-15 in Copenhagen and at the fifth World Urban Forum in Rio de Janeiro in 2010. These activities raised the profile of climate change amongst the local population and built climate change capacity amongst the municipality's staff. Furthermore, the international visibility gained by the municipality through these events gave it greater negotiating power when dealing with the national government, and its overall experience positioned it as a best practice case study for the formulation of climate change policy at the national level. In December 2009, within the context of the international negotiations at the UNFCCC COP-15 in Copenhagen, the Mayor of Esmeraldas released an open letter directed to the president of Ecuador urging him to highlight the role of local governments in addressing climate change issues. In this letter, the mayor reaffirmed the need to deal with climate change issues through "a state level policy for housing development that resettles those living in slope areas, along water courses or by the waterfronts, so that they are no longer affected each winter" (Estupiñan Quintero 2010). Climate change, as a discourse on future-risks, was here being mobilised by Esmeraldas' government in an attempt to

secure a commitment from the national government towards addressing present local problems.

Governing climate change from the local level: formal tools to work in informal realities?

One of the key challenges of urban governance in cities in the developing world is that the institutional structures in place do not cover the entire population. That is, municipalities are frequently responsible for governing (or attempting to govern) large numbers of people who are not structurally or socially enrolled in formal social, political, or institutional networks. As discussed earlier, essential services such as energy, water, and sanitation frequently only cover parts of the city, and large portions of the population are forced to rely on informal provision of these services. The effects of this have been researched extensively, and include poorer people paying higher prices for services compared with more wealthy residents (Swyngedouw 1997, 2004).

The experience of Esmeraldas provides insights on the challenges facing small- to mid-sized cities in the developing world as they attempt to respond to climate change. Many of Esmeraldas' challenges for effective climate change governance can be understood as particularly thorny manifestations of pre-existing challenges for urban governance. Esmeraldas' key challenges for climate change governance are structural in nature, as the city's vulnerability is deeply intertwined with issues of poverty, informal housing, and limited service provision. Esmeraldas also suffers from another problem that limits the possibilities of municipal governments to build adaptive capacity, which is both structural and common to mid-sized cities: limited operational capacity and lack of support from higher levels of government. Whilst the municipal government is providing leadership with respect to climate change, in the absence of support from higher levels of government it is encountering a variety of challenges which are not necessarily directly related to the problem of climate change, such as lack of financial resources, skills, and technical capacity.

Betsill and Bulkeley (2006, p. 146), evaluating transnational alliances of cities working on climate change issues, observed that "[local] governments have initiated policies and programmes for managing GHG emissions independent of their national governments". Esmeraldas is one of these cities. From this perspective, transnational and inter-city alliances for climate change are

> not only engaged in rescaling relations between existing and emerging scalar constructs and institutions, but [is] also creating a new 'sphere of authority' (Rosenau, 1997) within which the governance of climate change is taking shape. (Bulkeley 2005, p. 877)

The CCCI provided Esmeraldas with support to overcome these structural difficulties and advance towards the development of a municipal adaptation strategy. It is widely recognised that transnational city-based networks have become essential support structures for urban climate change adaptation in the last 15 years (Betsill and Bulkeley 2007). When Esmeraldas joined other cities all over the world working on similar processes, it gained international recognition and essential access to knowledge, information, and resources. But it also gained a national level visibility, supported by its local leaders, which led to a new type of relationship, support, and cooperation with other cities in Ecuador and with the national government. Esmeraldas participated in the climate change debate at national level and national institutions participated actively in the local workshops and dialogue with the local authority and the civil society of Esmeraldas. Whilst it is possible to argue that

limited multi-scalar institutional support for local authorities implementing climate change adaptation actions could have had positive outcomes (such as the promotion of innovation and the advancement of policies that are deeply grounded in the local realities), this positive outcome would also have had the effect of undermining the institutional context by challenging its legitimacy and stability (Anguelovski and Carmin 2011). The visibility gained by Esmeraldas allowed the city to strengthen its actions and supported legitimacy and stability.

The act of developing participatory governance strategies for climate change has a formalising influence on the institution of local government itself. "As local governments devise climate policies, they tend to formalize and institutionalize their work in order to facilitate implementation and strengthen the legitimacy, coordination, and support for such policies across sectors and departments" (Anguelovski and Carmin 2011, p. 170). In cities like Esmeraldas, and in the case of its development of climate change policies, this effect itself poses particular challenges as many of the adaptation actions required are tightly bound up with the spaces of "informality" within the city, such as the ability of the city to intervene in the landslide-prone informal settlements on hillslopes. But if the way forward for climate change adaptation requires bridging the gap between formality and informality, the design of robust participatory processes is paramount.

Conclusions

Overall, through the CCCI, the city of Esmeraldas has taken significant measures to reduce its vulnerability to climate hazards and increase its adaptive capacity. This was achieved through a combination of tools and participatory strategies, such as workshops and consultation events to define priorities and information systems to support decision-making processes. The resulting local governance of climate change became a tool to address pre-existing local priorities and structural deficiencies. The variety of alliances developed along the way provided consensus, knowledge, and funding. They also strengthened local capacity, brought new technical support, and resulted in refreshed policy instruments to deal with old problems.

An important landmark in the process of responding to climate change was the launch of Esmeraldas' Climate Change Adaptation and Mitigation Strategy. The strategy, one of the first to be formulated in Ecuador, provides guidelines for action and a roadmap for Esmeraldas to address its main challenges towards achieving a more sustainable urban development. The process of Esmeraldas stands out as a pioneering experience, setting the basis for developing a methodological manual for the design of climate change strategies for other small- and medium-sized cities in Ecuador. The development of the strategy, along with the partnerships that influenced it and the international alliances that supported it, brought about a new visibility to the governing activity of the municipality, and with it, greater support from national level governance scales and actors. In this way, climate change became a tool to re-establish the legitimacy of local government.

The experience of Esmeraldas teaches that, as part of developing a response to climate change, the physical and conceptual boundaries between the formal and the informal spaces of the city needed to be rethought and redefined. The municipality needed to devise a new set of practical tools to address the needs of the most vulnerable and ensure that rapid urbanisation would not continue increasing vulnerability. Esmeraldas' vulnerability mapping exercise and the property registry have been specifically designed to go beyond traditional formal–informal divides within the city, and most importantly, within its governing efforts. As such, echoing the words of Bulkeley (2005), they strengthen institutional state action and create a new "sphere of authority".

In the experience of Esmeraldas, climate change represents not only a future-risk but also a present entry point for strengthening institutional capacity and implementing participatory environmental planning. In line with Beck and van Loon's sociology of climate change, climate change does not belong to the realm of the future; its impacts are already being felt in Esmeraldas by transforming the city's political land-scapes. Through the intervention of the CCCI, and on account of a transnational–local alliance on urban environmental governance, climate change moved from the unimportant "subpolitics" of local development to a "superpolitics" where climate change dis-courses play a key role in local governance and political practice (Beck and van Loon 2011), and in doing so climate change governance is playing a fundamental role in developing the new modes of urban governance we have here called the local govern-ance of climate change.

But if this emerging mode of local governance supports Beck's thesis of climate change as a future-risk that is read in terms of the present, it also stands in opposition to Beck's view that climate change is an elitist discourse that does not consider the views of the citizens. In the experience of Esmeraldas, climate change politics are not being enacted as a political and economic discourse that presupposes the greening of societies (Beck 2010), but rather as a discourse that calls for listening and addressing the needs of the citizens via action over the structural challenges that were present before and despite climate change itself. This climate change is not about the greening of societies, but about finding access points capable of enabling a new local politics to function.

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