Urban partnerships in low-carbon development: Opportunities and challenges of an emerging trend in global climate politics

Parcerias urbanas no desenvolvimento de baixo carbono: Oportunidades e desafios de uma tendência emergente na Política Climática Global

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Abstract

This study explores the linkages between two recent trends in global climate governance. The first trend is the growing focus on cities in the multi-level governance of climate change. Whereas international climate change negotiations often end in deadlock, many urban centers across the world are taking the lead. Industrialized cities from the Global North and increasingly cities from the emerging Southern economies are experimenting with innovative and ambitious programs to reduce their local carbon footprints. A second trend is the expanding urban North-South cooperation in the area of low-carbon development. This cooperation takes various forms, such as city twinning, transnational municipal networks and trans-local development cooperation. A key target of these initiatives is to develop joint projects and exchange knowledge to foster low-carbon development pathways. This study analyzes the conditions of success and failure in selected Indo-German urban low-carbon partnerships with a particular focus on institutional arrangements. The paper presents evidence from three initiatives and argues that successful trans-local cooperation depends largely on the interplay between institutional forms and the development of social capital. Building on these findings, the paper discusses what lessons may be drawn from the emergence of urban North-South cooperation for the future development of global climate governance.

Keywords: Local climate governance. Knowledge transfer. North-South cooperation. Low-carbon development. Social capital.

Resumo

Este estudo explora as relações entre duas tendências recentes em governança climática global. A primeira delas se refere à crescente atenção concedida às cidades na governança multinível das mudanças climáticas. Enquanto as negociações internacionais de mudanças climáticas geralmente terminam em impasses, muitos centros urbanos ao redor do mundo estão se destacando. Cidades industrializadas do hemisfério norte bem como um número crescente de cidades de economias emergentes do hemisfério sul estão experimentando reduções de sua pegada local de carbono por meio de programas inovadores e ambiciosos. Uma segunda tendência é a crescente cooperação norte-sul na área de desenvolvimento de baixo carbono. Essas cooperações

se estruturam sob diversas formas, tal como cidades irmãs, redes transnacionais de municípios e cooperação para o desenvolvimento translocal. São objetivos centrais dessas iniciativas o desenvolvimento conjunto de projetos e trocas de conhecimento com vistas a fomentar alternativas de desenvolvimento de baixo carbono. Este estudo analisa as condições de sucesso e fracasso em determinadas parcerias de baixo carbono entre Alemanha e Índia, focando particularmente nos arranjos institucionais. Com base em evidências de três iniciativas, advoga-se que uma cooperação translocal bem-sucedida depende em grande parte da relação entre os formatos institucionais e o desenvolvimento de capital social. A partir desses resultados, o artigo discute quais lições podem ser aprendidas da emergente cooperação norte-sul para o futuro desenvolvimento da governança climática global.

***Palavras-chave**: Governança climática global. Transferência de conhecimento. Cooperação norte-sul. Desenvolvimento de baixo carbono. Capital social.*

The emergence of cities and trans-local partnerships in global climate governance

The study explores the linkages between two recent trends in global climate governance: the growing focus on cities in the multi-level governance of climate change and the expanding urban North-South cooperation in the area of low-carbon development.

Whereas international climate change negotiations often end in deadlock, the local level and, in particular, cities have received increasing attention in the research community and among decision makers so that "[...] the city now looms large on the international climate change agenda." (BULKELEY; BETSILL, 2013, p. 136). Cities are indeed crucial sites for global climate protection efforts. Already today, approximately half of the world's population lives in cities and, according to urbanization projections, by 2050, up to 70% of mankind will live in urban centers. It is hotly debated whether cities generate higher per capita greenhouse gas emissions (GHG) than rural areas and should therefore be blamed for causing climate change (SATTERTHWAITE, 2008; DODMAN, 2009; DHAKAL, 2009). However, the urban-rural divide is becoming increasingly blurred with cities and their surrounding rural areas being considered as metropolitan entities. It is thus insightful to explore the joint impact of local governments, which, according to UNDP (UNITED NATIONS DEVELOPMENT PROGRAMME, 2009), are able to influence 50-80% of global GHG.

Cities have core functions for implementing national climate change strategies and for experimenting with locally tailored responses to climate change mitigation and adaptation. As hubs for technological and social transformation, urban centers have immense potential to shape low-carbon development pathways (KAMAL-CHAOUI; ROBERT, 2009). Cities often even serve as "first responders" to climate change in their countries (ROSENZWEIG et al., 2010). In Germany, frontrunner cities have engaged in climate protection for more than 25 years, and many municipalities have adopted local emission reduction targets that meet or exceed their national government's commitments (DEUTSCHES INSTITUT FÜR URBANISTIK, 2011). The development of urban climate policies in the Global South is a more recent phenomenon. However, in emerging economies such as India, China, South Africa and Latin America, the number of cities engaged in local climate action has steadily risen over the last decade (REVI, 2008; DHAKAL, 2009; AYLETT, 2010; CASTÁN BROTO; BULKELEY, 2013).

Research into urban climate governance began in the mid-1990s (BETSILL; BULKELEY, 2007), and scholarly debate has centered on the following key areas: modes of urban climate governance (BULKELEY; KERN, 2006; ALBER; KERN, 2008; SCHROEDER; BULKELEY, 2009), cities as laboratories for climate governance experimentation (EVANS, 2011; CASTÁN BROTO; BULKELEY, 2013), the role of eco- and low-carbon model cities (HODSON; MARVIN, 2010; SCHREURS, 2010), the importance of local leadership and policy entrepreneurs (SCHREURS,

2008; CAMPBELL, 2012; ACUTO, 2013) and the institutional arrangement and interplay of urban climate action in multi-level governance frameworks (BULKELEY, 2005; BETSILL; BULKELEY, 2006; SCHREURS, 2008; CORFEE-MORLOT et al., 2009; ANGUELOVSKI; CARMIN, 2011; BULKELEY; BETSILL, 2013). A major shortcoming of urban climate governance research continues to be its narrow focus on individual case studies on large cities from industrialized countries (voiced by, among others, BETSILL; BULKELEY, 2007; ALBER; KERN, 2008; ROSENZWEIG et al., 2010). This condition reflects the general problem of a dominance of Northern cities in urbanism research. Scholars in the field of post-colonial studies urge that research must overcome the notion of incommensurability of cities in the Global North and South. These researchers stress the need to conduct more comparative and "cosmopolitan" studies, including cities from different contexts (MCFARLANE, 2010; ROBINSON, 2011).

A second trend in climate governance is the growing focus on sustainable and carbon-friendly development in cities' international relations. Through city twinning and urban development cooperation, as well as new forums such as transnational municipal networks, cities are developing joint projects and exchanging knowledge to promote low-carbon development (STATZ; WOHLFAHRT, 2010). The scope of trans-local cooperation[1] may only be estimated. According to a figure published by United Cities and Local Governments (2007), 70% of the world's cities are engaged in city-to-city activities. Although such estimates remain vague, recent developments in urban cooperation may be cited. Van der Pluijm and Melissen (2007) identify a shift towards more professionalization and pragmatism in city-to-city exchange. The professionalization of urban cooperation goes hand-in-hand with the growing recognition of cities by national governments and the European Commission as partners in decentralized development cooperation[2]. Since the late 1980s, most European countries as well as Canada and Japan have established national institutions to guide and support cities in their development engagement (HAFTECK, 2003; PLATFORMA, 2011). In 2008, the European Commission introduced its first thematic funding program for decentralized cooperation (PLATFORMA, 2011).

In addition to these more established forms of urban cooperation, a multiplicity of transnational municipal networks (TMNs) have emerged to foster local sustainable development and climate protection. These networks range from regional networks (e.g., the Climate-Alliance, Energy-Cities and CITYNET) and thematically focused networks (e.g., the Clean Air Initiative and CIVITAS) to global networks covering millions of city inhabitants worldwide (e.g., ICLEI-Local Governments for Sustainability, the C40 Cities Climate Leadership Group and the World Mayors Council on Climate Change).

Emerging theory development on trans-local climate cooperation

The emergence of TMNs has gained growing attention from the research community. In particular, ICLEI and its Cities for Climate Protection (CCP) campaign have been the focus of several studies. The assessment of TMNs is mixed. These networks are highlighted as "[...] one of the first and most extensive examples of transnational governance [...]" (BULKELEY; NEWELL, 2010, p. 59) and, as embodying a new mode of climate governance, being "simultaneously global and local, state and non-state" (BETSILL; BULKELEY, 2006, p. 141). However, the ability of a TMNs to foster knowledge exchange among its members is being questioned (BETSILL; BULKELEY, 2004; MEDEARIS; DOLOWITZ, 2013). TMNs are also criticized for being "networks of pioneers for pioneers" and for having too many passive members (KERN; BULKELEY, 2009, p. 311).

[1] In this study, 'trans-local cooperation' describes any form of international partnership involving two or more cities from different countries. Other frequently used terms for the same phenomenon are 'urban partnerships', 'urban cooperation' and 'city-to-city exchange'.

[2] Decentralized cooperation' is defined as sub-national North-South cooperation towards sustainable development, usually led by local governments (HAFTECK, 2003, p. 333). Although the term is still used in practice, in more recent literature, it has become more common to use the terms 'transnational city-to-city cooperation' (BONTENBAL; VAN LINDERT, 2008) and 'municipal international cooperation' (VAN EWIJK; BAUD, 2009), which are broader and also include non-state actors' activities.

The literature on city twinning and decentralized cooperation provides insight into the challenges typical of trans-local cooperation. Several studies stress the problem of a (perceived) one-sided flow of learning from cities of the industrialized Global North towards developing cities from the Global South and the lack of mutuality in trans-local partnerships (BONTENBAL; VAN LINDERT, 2008; JOHNSON; WILSON, 2009; VAN EWIJK; BAUD, 2009). Bontenbal (2009) and Tjandradewi and Marcotullio (2009) reveal the challenges associated with including local civil society in city-to-city cooperation. A pressure experienced by German cities in particular is that they are expected to provide proof of the efficiency of their development cooperation activities. (NITSCHKE; HELD; WILHELMY, 2009).

In-depth knowledge about drivers, processes and impact of trans-local cooperation on climate action is still lacking. Urban learning remains a "blind box" (WOLMAN; PAGE, 2002, p. 478). The knowledge gap is again especially evident in relation to climate collaboration involving cities from both the Global North and South. This gap is regrettable, as post-colonial researchers argue that more research on connections between cities could help overcome the assumed incommensurability of cities from the Global North and South and lead towards more cosmopolitan urban research (ROBINSON, 2011).

Andonova, Betsill and Bulkeley's (2009) typology of transnational climate change governance networks (see table 1) provides a promising starting point for classifying trans-local climate cooperation (a similar typology has also been developed by Bäckstrand, 2008). With their typology, Andonova, Betsill and Bulkeley (2009, p. 59) begin mapping the "[...] patchwork of transnational governance networks [...]". The typology distinguishes between three institutional forms of transnational governance networks (public, private and hybrid) as well as three governance functions that such networks embody (information sharing, capacity building/ implementation, and rule-setting).

Although the typology sheds light on the "[...] multiplicity and hence the differentiated governance capacity that exists beyond the formal politics of international agreements [...]" (ANDONOVA; BETSILL; BULKELEY, 2009, p. 67), it says little about the impact of different institutional forms on the effectiveness of transnational governance networks. It also does not address the linkages between transnational governance networks and their institutional state environment. With regard to trans-local partnerships, two key questions emerge: What are the benefits and shortcomings of different forms of urban climate cooperation? And how are trans-local climate partnerships effectively embedded into the multi-level state system?

The literature on this topic provides conflicting responses to these questions. Tim Campbell (2012) identifies that globalizing cities increasingly engage in direct horizontal exchange to adopt and share innovation. He argues that urban learning is driven primarily by private "informal leadership networks" (CAMPBELL, 2012, p. 11) and trustful relations between business, civic and youth leaders, guaranteeing continuity in times of political leadership change. Campbell refers to the concept of social capital, which defines trust, norms of reciprocity and networks of civic engagement as crucial prerequisites for developing well-functioning communities (PUTNAM; LEONARDI; NANETTI, 1994). Holley Ralston (2013) reaches a different conclusion in one of the first in-depth studies of transnational cooperation at the sub-national level. Ralston analyzes sustainability partnerships between German and U.S. states and concludes that

Table 1 - Typology of transnational climate-change governance networks

Type of actors			
Function	**Public**	**Hybrid**	**Private**
Information sharing	UK-California initiative	The Climate Group	Pew Business Environmental Leadership Council (BELC)
Capacity building and implementation	Cities for Climate Protection (CCP)	Renewable Energy and Energy Efficiency Partnership (REEEP)	World Bussiness Council for Sustainable Development (WBCSD)
Rule setting	Regional Greenhouse Gas Initiative	Chicago Climate Exchange (CCX)	The Gold Standard

Source: ANDONOVA; BETSILL; BULKELEY, 2009.

partnerships must be formally institutionalized in the state legal system to ensure long-term sustainability and reduce dependency on partnership champions.

Research question and methodology

This study compares three Indo-German trans-local partnerships that exemplify different institutional cooperation arrangements, thereby exploring the conflicting assumptions on the benefit of formally embedding partnerships in state bodies in the case of trans-local collaboration. It addresses the following research question:

What impact does the local and multi-level embedding of partnerships in state institutions have on the effectiveness of Indo-German urban collaboration in low-carbon development?

The three partnerships analyzed in this paper represent the distinct institutional forms highlighted in Andonova, Betsill and Bulkeley's (2009) typology of transnational governance networks: a *private* actor partnership between Bremen and Pune in sustainable development, a state-driven *public* cooperation between Nashik and Hamburg in a waste-to-energy project, and a clean energy partnership between Nagpur and Freiburg as part of a *hybrid* public-private city network.

The data is based on 45 semi-structured expert interviews and observation conducted during several research stays in the six cities studied between August 2012 and December 2013 as well as on the analysis of documentation, such as project feasibility studies, project reports and secondary sources such as case studies.

Bremen-Pune: A long-standing civil society partnership

Partnership content and results

Bremen and Pune began collaborating in environmental and social projects as early as in 1976. The partnership was pioneered by Bremen citizen, Gunther Hilliges, who at the time was engaged in Pune as the head of the non-governmental organization (NGO) Terre des Hommes Germany. Hilliges saw the potential to expand collaborative action between NGOs from Pune and Bremen and helped to establish joint rural biogas projects in the Pune region. In 1979, Hilliges was appointed head of the newly founded Department of Development Cooperation in the Bremen city administration. Together with the partnership associations "Forum Städtesolidarität Bremen-Pune" and "Pune-Bremen City Solidarity Forum" (both founded in 1980), Hilliges continued to develop the partnership over the following years. A major cornerstone in this cooperation was the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, which motivated the two cities to discuss strategies to coordinate their Local Agenda 21 processes. Bremen and Pune signed two Memoranda of Understanding (MoUs) in 1998 and 2003 and set up the "International Office Agenda 21" (IO A21) in Pune to intensify their cooperation. During the following years, the partnership focused on two main areas; the introduction of decentralized wastewater treatment systems (DEWATS) in Pune and the transfer of the Bremen tramway system to Pune.

Both projects were initiated by Hilliges. In the DEWATS project, he met with Dr. Dada Gujar, head of the Pune NGO Maharashtra Arogya Mandal, to discuss the best way to treat the wastewater of the local Ayurveda hospital. Hilliges brought in the Bremen NGO, BORDA, which specializes in small-scale, eco-friendly wastewater treatment in Southeast Asia. With financial support from the German NGO Deutsche Arbeiterwohlfahrt, in 2004-2005 BORDA installed two DEWATS facilities that fully treat the wastewater produced in the hospital. To install additional pilot facilities and to assess the scope for wider mainstreaming of the DEWATS technology in Pune, BORDA hired a consultant, Günther Klatte, who worked at the IO A21 office in 2005-2007. During this time, three additional DEWATS plants were installed in Pune and surrounding towns. However, a large-scale introduction of DEWATS as an alternative to centralized wastewater treatment failed due to a lack of interest and political will by the city administration.

The second major partnership project faced similar challenges. Gunther Hilliges and Vijay Mahajani, head of the Pune partnership association, were impressed by the idea of transferring the Bremen tramway system to Pune to improve public transport in a sustainable and climate-friendly

manner. They convinced the German consultants Jörg Monsees from Consult Team Bremen (CTB) and Friedrich Steiger from BGS Ingenieurconsult International, Frankfurt to join the project and assess the project's feasibility. In 2006 and 2007 Monsees and Steiger, together with Mohan Sakhalkar, a local city planner working in Pune's private sector, set up the Detailed Project Report (DPR). The DPR is an extensive 260-page document that analyzes the financial, socio-economic and environmental conditions for a tramway network in Pune and proposes concrete technical options, planning steps and favorable sites. The report was funded by Pune Municipal Corporation. Despite these encouraging first steps, the Pune tramway system has never been built. The implementation failed primarily because the Maharashtra State Government (as the decision-making unit for city-level transportation) rejected the proposal. The state government prefers to foster metro systems in its major cities instead of tramway networks, which are not common in Indian cities. After the state government's rejection, local political support also waned. Vijay Mahajani, the leading advocate of the tramway transfer, passed away shortly afterwards, and since then, there has been no move to revive the project.

Institutional arrangement

The civil society city partnership between Bremen and Pune exemplifies both the benefits and weaknesses of a low level of state involvement. From the outset, the cooperation focused on civil society exchange, and the partnership has never been formalized into an official sister city agreement. The protagonists took this decision deliberately to bypass political institutional barriers and maintain their independence from frequently changing political leaders.

The two partnership MoUs and the establishment of the IOA 21 were the only attempts to strengthen state involvement in the partnership. However, the MoUs largely remained declarations of intentions, and the impact of the IO A21 was low. The office was located outside of the municipality buildings and was not frequently visited by representatives from the city administration or the city council. The only staff was the local head of the partnership association, Mahajani, and the DEWATS consultant, Klatte.

To summarize, both the DEWATS and tramway initiatives progressed well as long as the projects remained at a small scale. In the installation of the pilot DEWATS plants, as well as in the joint preparation of the tramway DPR, non-state actors from both cities cooperated smoothly. These actors built upon existing social capital in the form of personal relationships and mutual trust established during prior partnership activities. However, as soon as state institutionalization was required for the large-scale implementation (tramway) and mainstreaming (DEWATS) of the projects, these initiatives were thwarted by lack of government support and ultimately failed. The tramway project even resulted in a loss of social capital and had an adverse impact on the entire partnership. Interviewees from both cities highlighted the fact that failed implementation led to a loss of trust and partnership engagement. The pace of the exchange between Pune and Bremen has slowed in recent years, and efforts to renew the MoU in 2010 proved unsuccessful.

Nashik-Hamburg: Development cooperation connecting city actors

Partnership content and results

The collaboration between Nashik Municipal Corporation (NMC) and Hamburg's public water utility, Hamburg Wasser, to construct an innovative waste-to-energy plant in Nashik represents a more formalized and predominantly public approach to trans-local cooperation. Since 2009, the partnership has been run by the German government association for development cooperation, the GIZ, with the goal of implementing the first hybrid waste-to-energy system of its kind in Nashik. The GIZ hired Hamburg Wasser as a consultant to the project due to the public utility's experience working with waste-to-energy systems and developing a technology ('Hamburg Water Cycle®') that GIZ found to be suitable for the Indian urban context. The GIZ, together with Hamburg Wasser, then selected Nashik as the Indian partner, as the city had already established the waste collection infrastructure required for the project.

The pilot waste-to-energy plant treats a daily 31 metric tons of kitchen waste from local hotels and restaurants together with septic waste from municipal toilets in an eco- and climate-friendly manner. The plant produces up to 3,200 kWh of renewable electricity per day and limits uncontrolled methane emissions. In this way, a total of 4,700 tons of CO_2-equivalent emissions are prevented every year. In addition, in the co-fermentation process, all nutrients are recovered to produce a replacement for the artificial fertilizers currently used by local farmers (AUGUSTIN; GIESE; DUBE, 2010).

Hamburg Wasser's major motivation to join the project was to demonstrate Hamburg Water Cycle's technological and political feasibility. Project manager Augustin emphasized that Nashik offers a favorable local institutional arrangement for a combined waste and energy plant, as the departments in the Nashik city administration are more integrated than those in German cities. By proving the feasibility of this project in India, Augustin aims to also convince German decision makers to adopt the technology. Hamburg Wasser's contribution to the project is to provide the technology, prepare a feasibility study and monitor the implementation of the plant. Nashik Municipal Corporation is responsible for guaranteeing the waste collection infrastructure, providing land for the facility and finding a private plant operator. In the preparatory phase, the GIZ facilitated several exchange visits between Nashik officials and experts at Hamburg Wasser to assess the transferability of the technology to the Indian city context. According to the current schedule the plant is going to be constructed in 2014, and its operation is planned to begin in early 2015.

Institutional arrangement

Compared to the largely non-state partnership between Pune and Bremen, the Nashik-Hamburg collaboration is much more deeply embedded in the state system. Close linkages exist with national government institutions in both Germany and India. The German government development association, the GIZ, is the main driver and coordinator in the partnership. Funding for the project is provided by the "International Climate Change Initiative" of the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU), supporting the construction of the waste-to-energy plant with approximately one million euros. In India, the GIZ has concluded a project implementation agreement with the national Ministry of Environment and Forest. The partnership project is also well institutionalized locally in Nashik, as the waste-to-energy plant is part of the city's broader collaboration with the GIZ in the development of a comprehensive local sanitation policy.

How has the high degree of state institutionalization and the GIZ-led top-down approach to the city partnership influenced the waste-to-energy project's success? Simply put, it has helped the project far more than it has the partnership's overall development. A joint project that is as far-reaching as a waste-to-energy plant requires state involvement. In contrast to the DEWATS and tramway projects between Pune and Bremen, which suffered from a lack of political support, the GIZ managed to convince Indian and German officials from all political levels to commit to the project. Doing so, however, was not an easy task. In particular, gaining approval from the Nashik City Council revealed to be a major challenge—one that delayed the project's implementation schedule and resulted in confusion on the side of Hamburg Wasser and the German project funder, the BMU. However, in 2013, the council formally adopted the project and if no further delays are encountered, the plant will be erected in 2014 and begin operating in early 2015.

In addition to receiving multi-level state political support, the partnership project also benefits from state funding provided by the BMU. Without this funding, cooperation would have never been established, as Nashik and Hamburg alone lack the financial means to realize a project of such scale. Interviewees from both cities also emphasized that they would not have the capacity to develop a transnational partnership project of such scope without help of the GIZ. They highlighted the crucial role that GIZ employees are playing in bridging the cultural, social and political differences between the German and Indian city contexts.

The top-down approach to bring cities together has thus worked well for the project evaluated here. The cooperation between Hamburg and Nashik has not expanded to other areas, however. In fact, communication between the two cities occurred

exclusively through GIZ channels with no additional direct bilateral exchange. Regina Dube, head of GIZ's Urban Habitat Program in India, confirmed that this is part of the project's concept, as the GIZ is accountable to the funder, the BMU, regarding the project's progress and thus must control all communication.

To develop social partnership networks between cities as the basis of long-term cooperation, the top-down approach to linking cities falls short. The GIZ-induced cooperation between Hamburg and Nashik has not led to the development of social capital in the form of civic engagement, the involvement of informal leadership networks, and personal, trusting relations between city representatives, all of which Campbell (2012) considers to be crucial conditions for enabling horizontal city exchange. For the reasons described above, the GIZ deliberately connected the two cities in an ad hoc, controlled framework and there seems to be little scope for future cooperation between Nashik and Hamburg outside the GIZ context.

Nagpur-Freiburg: City exchange via a transnational municipal network

Partnership content and results

The exchange between Nagpur and Freiburg, which falls under the city network, ICLEI—Local Governments for Sustainability, embodies a third, emerging approach to trans-local cooperation. Nagpur and Freiburg participated in the "Local Renewables Model Communities Network" (LRMCN), a program instituted by ICLEI in 2005-2012. The LRMCN's objective was to develop renewable energy and energy-efficient model cities in India (and later also in Brazil) with the support of more advanced European partner cities. Nagpur was selected as one of three Indian model communities and partnered with the German city of Freiburg.

Freiburg and Nagpur mainly communicated via two channels. First, ICLEI conducted case studies on existing clean energy projects for all LRMCN member cities and distributed them among the cities in the network. The case studies introduced Nagpur officials to Freiburg's multi-sector approach towards reducing citywide GHG by 40% by 2030 (ICLEI - Local Governments for Sustainability, 2009) and outlined Nagpur's achievements in energy-efficient water management to Freiburg's representatives (ICLEI - Local Governments for Sustainability, 2010). Second, in the early stages of the project, Nagpur and Freiburg conducted mutual exchange visits. Nagpur's Commissioner Lokesh Chandra met Freiburg's Mayor Dieter Salomon as part of a clean energy tour to Europe in September 2006. The head of Freiburg's climate department, Klaus Hoppe, then visited Nagpur and exchanged experiences with local officials and city engineers about the benefits and barriers to transforming urban energy systems. ICLEI's plans to enable more personal exchange between Nagpur and Freiburg remained unsuccessful. The city network designed a series of workshops on city-to-city learning and invited both cities to join. However, due to visa problems as well as budgetary and time constraints, the Freiburg and Nagpur officials were never able to jointly attend. As a consequence, direct exchange between the two cities remained limited to the project's early phase.

According to Nagpur officials and ICLEI representatives, the exchange visits nonetheless had a positive impact on the project development in Nagpur. During the preparatory phase of the local energy strategy, Nagpur officials received firsthand insights into the entire process involved in the development of a low-carbon energy system in an advanced city. This exposure strengthened the officials' motivation and belief in the benefits of such an ambitious endeavor. The reference to concrete achievements made by Freiburg and other European Resource Cities also repeatedly helped to convince local decision makers in Nagpur of the practicality of clean energy project proposals. Due to the lack of concrete joint project work and the multiplicity of factors influencing Nagpur's program implementation, it remains difficult to assess the direct learning effects of the exchange between Nagpur and Freiburg. What is evident, however, is that Nagpur's participation in the LRMCN network had a substantial impact, both locally and at the national level in India.

As part of the LRMCN, ICLEI and Nagpur Municipal Corporation (NMC) erected a local Renewable Energy and Energy Efficiency Resource Centre, located in the city administration building. Throughout

the entire project, the center was staffed with a project manager, initially hired by NMC and later by ICLEI as well as city administration employees. The center served as a technology demonstration site and stakeholder meeting point. The Resource Centre also proposed and coordinated all local energy activities. As an initial step, the Resource Centre staff conducted Nagpur's first citywide energy inventory and published its outcomes in the energy report 2005/06 (which was then updated annually). Based on the report, in 2007 the Nagpur City Council introduced a Renewable Energy and Energy Efficiency Policy, the first ever clean energy policy adopted by an Indian city. The policy set the targets of reducing municipal energy consumption by 20% and overall city energy consumption by at least 3% by 2012 (compared to 2005 levels). An action plan was proposed, and in the following years Nagpur implemented a number of pilot projects, including installing a solar water heater in the municipal hospital, a solar power backup in the Resource Centre and solar and energy-efficient lighting in public buildings. As a second focus area, activities to raise awareness were conducted, involving local schools, residents and city administration staff. By completion of the LRMCN in 2012, Nagpur had not met its energy reduction targets. City officials hope, however, that they will be reached over the coming years, as Nagpur is continuing its local clean energy efforts as part of the Indian Government's Solar Cities Program.

The Solar Cities Program also indicates the influence that Nagpur and the LRMCN had at the national level in India. The LRMCN served as a model for the development of the program, which has been introduced as part of the Government of India's 11th Five-Year Plan. The program supports a total 60 Indian cities in the preparation and implementation of local solar energy strategies. Based on Nagpur's frontrunner role in the LRMCN and the city's experiences with local energy projects and policy-making, the ministry selected Nagpur as one of only two model cities for the Solar Cities Program.

Institutional arrangement

The partnership between Nagpur and Freiburg, similar to that between Nashik-Hamburg, exemplifies an externally led, top-down approach to city cooperation. The LRMCN program was also funded by the German Government (via the Ministry of International Cooperation), and the city network ICLEI served as the project facilitator and moderator. Nagpur and Freiburg were brought together by ICLEI, and throughout the entire partnership, the communication between the two cities remained highly dependent on ICLEI. This dependence became evident in the failed attempt by Freiburg representative Hoppe to maintain direct exchange between the two cities after the exchange visits. Hoppe saw the potential to intensify the partnership between Freiburg and Nagpur, and he repeatedly sent emails to his peers in Nagpur, but he never received any response and eventually gave up. In the interviews conducted, the ICLEI network coordinators said that they were not aware of Hoppe's attempts. Maryke van Staden, coordinator of ICLEI's Climate & Air Team, highlighted that communication by email remains uncommon in many Indian cities. This incident indicates that the involved city officials were lacking in-depth knowledge about each other's communication cultures, which hindered more exchange and learning. The incident also demonstrates that intercultural competencies exemplify a form of social capital of crucial importance for sustaining trans-local partnerships.

The city network, ICLEI, principally allowed more direct city exchange between Freiburg and Nagpur than did the government body, the GIZ, in the Nashik-Hamburg cooperation. However, ICLEI focused its resources on concrete, locally tailored project and policy development rather than on systematic partnership development. This approach led to positive results in Nagpur, and the city's activities and institutional achievements in clean energy development received wider recognition in India. However, whether Nagpur and Freiburg will resume their exchange is uncertain. In the absence of a social capital basis between the two cities, it seems unlikely.

State institutionalization and social capital development – A city partnership trade-off?

The comparison of the three Indo-German city partnerships illustrates that different institutional forms of urban climate and low-carbon collaboration

have emerged. Both top-down induced as well as bottom-up city partnerships co-exist. The case study findings do not clearly confirm or reject either of the earlier cited studies on the importance of state institutionalization of subnational partnerships (RALSTON, 2013) versus the phasing out of top-down learning approaches in urban development (CAMPBELL, 2012). In fact, both high and low levels of embedding urban partnerships into the multi-level state system provide distinct benefits and challenges.

Small-scale, private actor-led partnership projects may benefit from low state institutionalization under the condition that enough social capital exists in the form of personal networks, mutual trust and intercultural competences developed by former partnership activities. This phenomenon is demonstrated by the Pune-Bremen cooperation that successfully managed to construct pilot DEWATS plants (a collaboration between NGOs) and release a feasibility study on a tramway transfer (as a result of private-sector cooperation). These bottom-up initiatives, however, reached their limits when they attempted to obtain state approval for the implementation of their projects on a larger scale. Protagonists especially lacked access to policy networks both locally as well as at higher policy levels of state and central governments. In contrast, the GIZ waste-to-energy project that brought together Nashik and Hamburg was designed to be closely institutionalized into the multi-level state system right from the start. Through GIZ's long-term engagement in Nashik and India, the partnership had good access to local and higher-level policy circles. Despite partial resistance from local politicians, which led to a delay in the implementation schedule, the project partners eventually managed to achieve the required approvals by the local council and the Indian Ministry of Environment and Forest. The ICLEI-led partnership between Nagpur and Freiburg followed a middle course by focusing on local state institutionalization while bypassing dependency on higher state level approval. As a result, the partnership was able to realize citywide energy audits, pilot and awareness projects and a clean energy policy that complied with the local government mandate.

Looking at the post-project sustainability of the partnerships, the three case studies reveal tension between the embedding of partnership projects into the state system and the development of social capital—there might even be a trade-off between the two. Whereas formal institutionalization is a prerequisite for large-scale project implementation, social capital is required to keep a partnership alive beyond a single project. The latter is illustrated by the Bremen-Pune cooperation which has been based for more than three decades on informal networks, personal relations, the development of intercultural competencies and private actor involvement. This type of partnership social capital has not evolved in the externally led collaborations between Nashik-Hamburg and Nagpur-Freiburg. Without the moderation of the GIZ and ICLEI, both partnerships would most likely have never come into existence, and there appears to be little scope for future cooperation. The fact that failed state institutionalization may even destroy existing partnership social capital is in turn demonstrated by the Pune-Bremen partnership, where the unsuccessful attempt to transfer the Bremen tramway system to Pune resulted in a loss of trust and engagement by the partnership's members.

The interplay between political institutions and social capital is generally under-researched (HEYDENREICH-BURCK, 2010, p. 24-25). The identification of a potentially negative correlation between formal state institutionalization and social capital development in trans-local cooperation is a new perspective that requires further elaboration. Examining the history of cities' international relations reveals that after World War II, social capital development was at the heart of urban exchange in Europe, "[...] focusing mainly on building friendship and cultural exchange, facilitating the process of reconciliation after the war." (VAN EWIJK; BAUD, 2009, p. 218). As a result of decentralization, in the 1990s cities' international relations were increasingly institutionalized, and local governments became the major actors in trans-local partnerships (BONTENBAL, 2009). Instead of concentrating on developing personal and cultural relations, trans-local cooperation shifted its focus towards local government capacity building and urban development in cities of the Global South, with Northern cities assisting their Southern counterparts (VAN EWIJK; BAUD, 2009). The result of this process was a growing professionalization of urban

cooperation (VAN DER PLUIJM; MELISSEN, 2007), but it led at the same time to the perception of one-way learning and a lack of mutuality in trans-local partnerships (BONTENBAL; VAN LINDERT, 2008; JOHNSON; WILSON, 2009; VAN EWIJK; BAUD, 2009).

The findings of the three case studies presented in this paper suggest that whereas single partnership projects may strongly benefit from institutionalization, there is also a need to bring social capital development back into the focus of partnerships. This is not only a prerequisite for enabling the post-project sustainability of partnerships but may also pave the way for more equality and mutuality in partnerships. According to Devers-Kanoglu (2009), developing personal relations between partnership protagonists is an enabling condition for "unintended informal learning" in both Northern and Southern cities, which the authors consider a pathway to overcome one-sidedness in partnerships. Giving more attention to social capital development may also be a starting point for addressing another key challenge in urban cooperation. Trans-local partnerships generally struggle with civil society involvement (TJANDRADEWI; MARCOTULLIO, 2009; BONTENBAL, 2009). This phenomenon is in particular a shortcoming with regard to urban climate cooperation, as non-state actors account for one third of all climate experimentation in cities (CASTÁN BROTO; BULKELEY, 2013). Social capital has proven to be a suitable tool to strengthen participatory governance (PUTNAM; FELDSTEIN; COHEN, 2003). It may also help trans-local partnerships to widen their focus beyond local governments and tap the potential of non-state actor involvement.

Conclusion: The role of urban cooperation in global climate governance

What lessons may be drawn from the emergence of urban North-South partnerships in the context of global climate governance? On the international level, there is a clear momentum towards pursuing both horizontal city-to-city cooperation as well as more vertical integration of local climate action into national and international climate strategies. On November 21, 2013, the first ever "Cities Day" was held within official climate negotiations at the COP 19 in Warsaw. UN Secretary General Ban Ki-Moon highlighted that "Cities are central in tackling climate change." (ICLEI - Local Governments for Sustainability Press Release, 22-11-2013). At the same meeting, Pascal Canfin, France's Minister for Development, called for the greater involvement of cities in the post-Kyoto negotiations, emphasizing that "Without cities and local authorities on board, no agreement will be possible in Paris 2015" (ICLEI - Local Governments for Sustainability, 2013). Kreft and Bals (2013) stress that the post-Kyoto agreement must recognize international city and state cooperation. The authors note the need for more transparent emissions accounting for local initiatives and a better coordination of decentralized action and top-down steering of national climate strategies.

Multi-level coordination and accounting of non-nation state climate action are key challenges in contemporary climate governance, which is "[...] multi-layered and fragmented, characterized by a mix of private and public authority." (BÄCKSTRAND, 2008, p. 75-76). The three cases in this study demonstrate the difficulties and tensions arising from efforts to harmonize bottom-up initiatives with top-down coordination in trans-local North-South cooperation. All three Indo-German partnerships illustrate that realizing and sustaining trans-local cooperation, particularly between cities from different global contexts, requires great effort, resilience and networking capacities to engage decision makers and stakeholders both locally and at higher policy levels. The case study findings also support Bäckstrand's (BÄCKSTRAND, 2008, p. 75) conclusion that most "[...] climate partnerships operate in the 'shadow of hierarchy' [...]", as all three forms of urban climate cooperation depended on institutionalization into the state system to realize large-scale projects. Local and trans-local climate action alone will not be able to substitute international agreements. However, city initiatives offer the potential to supplement international and national climate policy by acting as laboratories for experimentation (SCHREURS, 2008; CASTÁN BROTO; BULKELEY, 2013). Urban climate action and cooperation demonstrates that locally tailored low-carbon projects may embody practical co-benefits for economic development, energy and service security as well as environmental

and health improvements in both industrialized and developing cities.

Equally important, trans-local North-South partnerships "[...] bear immense potential for irritations resulting from difference [...]" (DEVERS-KANOGLU, 2009, p. 208) and improve the understanding of the distinct challenges and opportunities resulting from diverse global contexts with regard to climate change. Generally, protagonists in urban cooperation appear to be more ready and willing to overcome the divides of the "Global North versus Global South" rhetoric that have hindered the progress of international climate negotiations. Urban cooperation has already proven its ability to spearhead improved international relations and conflict resolution, such as during post-World War II European reconciliation and in the improvement of East-West relations after the Cold War. City partnerships may therefore once again serve as a model for more constructive international climate collaboration.

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