INDO-GERMAN EXPERT GROUP
ON GREEN AND INCLUSIVE ECONOMY

POLICY PAPER

SUSTAINABLE CITIES – INCLUSIVE, GREEN AND COMPETITIVE

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ABOUT

INDO-GERMAN EXPERT GROUP ON GREEN AND INCLUSIVE ECONOMY

Green Economy has been recognized by the Rio+20 Summit as "one of the important tools available for achieving sustainable development". It is emphasized that Green Economy should "contribute to eradicating poverty as well as sustained economic growth, enhancing social inclusion, improving human welfare and creating opportunities for employment and decent work for all, while maintaining the healthy functioning of the Earth's ecosystems". Such a transition towards a green and inclusive economy requires major efforts both on a national and international level, and cooperation and exchange of experiences is key to support the process.

India and Germany are major players in this transition. Against this backdrop, an interdisciplinary working group of renowned experts from leading research institutions/ political think tanks in India and Germany has been set up in November 2013 to enhance collaborative learning, contribute to informed decision making in both countries and feed into the international debate on a Green and Inclusive Economy.

Key topics are:

- Frameworks and challenges for a green and inclusive transformation
- Natural resources and decoupling growth from resource consumption
- Sustainable lifestyles
- Green and inclusive cities

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1 SETTING THE STAGE

Urbanization in Asia is on a scale that makes even the largest of European cities look small. Urbanization trends worldwide but especially in Asia are daunting. In many countries the majority of the population lives in cities. Due to the enormous increase in population and population density, urbanization processes worldwide are resulting in serious air, water, and noise pollution and loss of biodiversity. Left unchecked, increased motorization, the conversion of agricultural land for urban development, and growing inequality will challenge the health and welfare of inhabitants and the long-term future of urban communities.

Of course, growing populations, rising energy consumption and concentration of economic activities in urban areas demonstrate the importance of cities as major engines of economic growth. These same trends, however, are major contributors to global environmental and climate change (OECD, 2006; World Bank, 2010). Already today, about half of the world's population (54 %) lives in cities and, according to United Nations' projections, by 2050 about 66 % of mankind will live in urban centers (UN, 2014). It is expected that the global population will increase by a total of 2.5 billion by 2050, up to 90 % of which will be accounted for in Asia and Africa alone (United Nations Department of Economic and Social Affairs, 2014). When direct and indirect emissions are taken into account, towns and cities account for a major share of total greenhouse gas emissions.

Especially in Asia, where megacities are becoming the norm, and cities with over one million inhabitants are commonplace, cities have a particularly large potential to make a difference. City governments must take a central role in the development of inclusive and sustainable development strategies.

The trends of rapid urbanization and their economic, ecological and social implications in Organization for Economic Cooperation and Development (OECD) countries, in Asia and in other developing countries are very well known. The problematic structures connected to the unsustainable practices of city development have been researched thoroughly and described in a large number of reports commissioned by national and international organizations, as well as global and regional funding institutions, such as the UN Organizations, World Bank, Asian Development Bank, and World Health Organization (Moir et al., 2014). The World Economic and Social Survey 2013 focuses on three cross-sectorial issues highly relevant in terms of realizing global sustainable development, one of them being sustainable cities.

Cities located in the North and the South face different economic, social and ecological problems (Moir et al., 2014). Many cities in OECD countries are dealing with urban decay and population loss. In India, in contrast, as a result of an increasing population influx into cities from rural areas, urban energy, water, waste and transport systems are reaching their limits and poverty is growing year by year. According to the 2011 census, the 1743 towns of India have an average slum population of 31 % (Registrar General of India, 2011). Moreover, the pressure of urbanization on urban infrastructure systems in India is likely to increase in the next years; according to expectations by the United Nations an additional 400 million people will live in urban agglomerations by 2050 (United Nations Department of Economic and Social Affairs, 2014).

Recognizing such trends, the UN Habitat 2015 report highlights the importance of urban policies which provide for "increased employment, especially among the youth; improved social and economic integration, diminishing of slums, containment of urban sprawl, increased affordability of housing, containment in the proliferation of the informal sector, more sustainable energy consumption patterns and reduction in the emissions of greenhouse gases" (UN 2015, p. 6). Most of these issues are quite common in cities everywhere around the globe.

The relevance of the problems that are connected to rapid urbanization and the need to reverse unsustainable trends of development worldwide is undisputed. There is a need to develop strategic and integrated approaches addressing both challenges and opportunities. The specificities of the strategy for a given city will in the end depend upon its evolutionary pathway, its geographic and physiographic characteristics, the limiting factor of its bio-physical environment, its economic demographics (associated with lifestyles) and the nature and incidence of the burden of poverty that it carries with it (Damodaran and Haldar, 2015). Although problem patterns and challenges vary, many lessons regarding both successful and failed efforts at reform and improvement can be shared among cities.

To explore the conditions shaping climate action and sustainability politics in cities in the North and South, this article builds on best practice cases and discussions held at an Indo-German expert meeting which took place in Bangalore, India in April 2015. Referring to best practice examples from Germany, India and around the world, the article demonstrates how cities in industrialized and fast growing countries can successfully approach sustainability in practice and how cities can collaborate and learn from each other in their aim to become greener, more inclusive and more competitive.

In this study we aim to explore a number of enabling conditions, which can facilitate or alter the course of a city's development and help it address challenges linked to rapid population growth and accompanying challenges linked to infrastructure, employment, education, housing and green spaces.

The article begins with an overview of the concept of sustainable development. Mitigation to climate change is viewed here as a part of a sustainable development path. The article discusses why climate change can be viewed as a serious matter at the urban level. Special emphasis is placed on the concept of inclusive development, which is currently gaining importance as an approach in cities around the globe.

Building on international comparative literature, the analysis addresses typical challenges related to unsustainable practices in cities as well as the potentials that arise for cities in sustainable development and climate action. Enabling conditions will be considered at different levels: local, regional, national as well as international. The final chapter sums up key policy recommendations for supporting transitions towards more sustainable cities.

2 DIMENSIONS OF SUSTAINABLE DEVELOPMENT IN CITIES

Cities have been receiving increased political and scientific attention over the last several decades. A large number of case studies about cities' manifold sustainability and climate initiatives show that cities can be problem solvers (Bulkeley, 2010). Cities have been addressing different focal areas and problems in their interpretation and implementation of sustainability strategies and programs. Comparative intra- and international studies about city action show that an increasing number of cities worldwide have started experimenting with various approaches to sustainable development with a particular emphasis on climate mitigation and adaptation (Schreurs, 2008; Kousky and Schneider, 2003; Castán Broto and Bulkeley, 2013).

2.1 SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE

At the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in 1992, Agenda 21, which is a roadmap of actions for sustainable development, and the Framework Convention on Climate Convention were agreed upon. One of the groundbreaking successes of the sustainable development concept first outlined in the 1987 Brundtland Commission's Report, Our Common Future, and the subsequent Agenda 21 action plan is that a significant tie was established between development and environment. Sustainable development requires the formation of linkages between economic growth, poverty reduction, job creation and the protection of natural life resources. Agenda 21 pointed to the importance of multi-level and multi-actor involvement in sustainable development. In the plan, cities need to be integrally involved in the search and testing of new pathways to sustainable development and the integration of a green and inclusive economy.

The simultaneous adoption of the climate convention and the sustainable development action plan at the Earth Summit indicate the outstanding challenge for sustainable development posed by the future impacts of global warming. Since the end of the 1980s, there is growing awareness of the significant threats that global warming poses for the economic wellbeing and sustainable development of large numbers of human beings, particularly in developing countries. The present and future impacts of climate change have been thoroughly researched and discussed by the Intergovernmental Panel on Climate Change (IPCC). The findings of this large and inter-disciplinary epistemic community leave little room for doubt that human activities, including the burning of fossil fuels, deforestation, the landfilling and burning of wastes, and various agricultural practices are contributing to a dangerous warming of global average temperatures.

Climate change adds to the challenges of implementing sustainable development. However, climate protection strategies, including mitigation and adaptation, also offer manifold linkages to sustainable development pathways.

Both climate protection and sustainable development are characterized by cross-sector, multi-level and multi-actor governance approaches. Climate mitigation and adaption strategies which focus on co-benefits, such as clean air, local and regional

environmental improvements, technological developments and the interests of local industries, can gain public and political acceptance, enhancing the chances of successful implementation. Likewise, the simultaneous promotion of social, economic and environmental goals embodied in the concept of sustainable development can encourage public commitment to change. Both, climate policy action and sustainable development strategies can trigger social and technical innovations, which in turn can result in improvements in a city's economic situation as well as in its environmental and health conditions. Climate governance, however, still has a stronger resonance in the North than in the South, where ideas about the incompatibility of environmental protection and economic development are still strong.

Local governments have a long tradition of being pioneers in sustainable development initiatives. Many good ideas, such as parks, recycling of municipal wastes, and air pollution legislation, were first implemented in cities. In some cases, ideas developed or introduced at the urban level were later adopted by higher levels of government. In some cases, policy change is mandated from higher levels of government, but in other cases, cities are first movers.

There are many cases of mayors, governors, and citizens' groups who have chosen to take actions to address pollution, traffic congestion, urban sprawl, and climate change on their own initiative. Concerned about the slow pace of national and international action, these communities have chosen to move beyond national goals and requirements. There is a large number of examples of cities in developed and developing countries which are experimenting with policy initiatives related to sustainable development and climate change. The way in which cities' initiatives are related to various sectors and development questions reflect how they understand sustainable development in practice, and suggest the motives and drivers behind their actions.

Based on the three-dimensional goal structure of the Agenda 21, local policy action addresses three main dimensions. The first is related to the conservation and management of resources for development, becoming green and greening global policies; the second aims at economic dimensions, making cities more competitive and livable; the third strives for social inclusiveness. As best practice examples illustrate, quite frequently city experiments in the area of sustainability and climate change serve more than only one policy dimension, simultaneously improving the cities' climate and environmental performance while making cities more inclusive and sustainable.

The idea of local climate action plans in the United States goes back at least to the days of the United Nations Conference on Environment and Development. In 1993, Portland, Oregon[1] became the first city in the United States to adopt a plan to reduce greenhouse gas emissions. In 2001, it established a goal to reduce greenhouse gas emissions by 10 % below 1990 levels by 2010. Portland is considered one of the most livable cities in the United States.

In 2005, the Mayor of Seattle adopted a climate action plan committing the city to reduce its greenhouse gas emissions by 7 % of 1990 levels by 2012, 30 % by 2024, and 80 % by 2050[2]. He then went out to

1 http://www.portlandonline.com/osd/index.cfm?c=41896
2 http://www.seattle.gov/climate/

challenge other mayors in the United States to do the same, launching the US Mayors' Climate Protection Agreement.[3] Over 1000 mayors have signed the US Mayors' Climate Protection Agreement.

Similarly, many Japanese cities have taken leadership roles in efforts to address global warming. Kyoto Mayor Yorikane Masumoto decided to take his city's efforts to the international stage by launching the World Mayor's Conference on Climate Change.[4] The inaugural conference was held in Montreal, Canada in 2005. Tokyo has become the first city in the world to launch its own emissions trading system.

2.2 SUSTAINABLE DEVELOPMENT AND SOCIAL INCLUSIVENESS

There are significant differences in how cities perceive sustainable development. In industrialized countries there are currently many debates about environmental issues and green indicators for sustainable development. While some cities in industrialized countries have embraced the concept of sustainability, in many the focus has been on local action for climate change. For cities in 'developing countries' climate change poses existential threats, but at the same time it competes with other pressing issues. Thus, sustainable development ideas often resonate more strongly. One outstanding challenge is lacking social inclusiveness. Social inclusiveness is generally perceived as a development goal which applies without exception to all citizens (Stren, 2001). It places special attention on the needs of the poor, vulnerable and groups suffering from various forms of exclusion. The concept of inclusion in the urban context has been frequently redefined and extended. Inclusiveness originally indicated a new political framing away from the idea of simply "'meeting the basic needs of the urban poor' to a social exclusion perspective" (Beall 2000, p. 821) and now also embraces the notion of citizenship.

Increasing vulnerability to climate change and social exclusion are closely related to urbanization processes (IPCC, 2007). Urbanization and climate change intensify social exclusion as well as vulnerability (IPCC, 2007). The linkages between climate change and social exclusion need closer consideration.

Because of contemporary problem pressures and unsolved problems, social inclusion belongs to the focal areas of the Post-2015 Sustainable Agenda. Key issues which have to be addressed are poverty, unemployment, various forms of inequality, political participation and social cohesion (UNRISD, 2014).

3 http://www.seattle.gov/mayor/climate/
4 http://www.iclei.org/index.php?id=7199

The concept of 'social inclusiveness' is gaining momentum, not only in 'developing' countries but in the context of industrialized countries as well. While social sustainability and inclusiveness have not been at the forefront of the relevant literature on best practice cases up until now, there is some movement in this direction because many cities in the developed world have to deal increasingly with diversity to maintain social cohesion (Moir et al., 2014). Social inclusiveness has therefore not only been given much more prominence in the discussion on sustainable cities in developing countries, it has become a basic issue facing policy makers in rich countries as well.

It is also interesting to consider the economic dimension of sustainable development that has been recognized by cities both in the global North and South. Based on the idea that being 'green' can help cities to be more economically competitive, there is growing awareness of the many good economic reasons for cities to take action. Taking measures to reduce greenhouse gas (GHG) emissions can, for example, result in cities that are more desirable to live in – as they often have better public transportation systems, more green spaces, more bicycle and pedestrian lanes, and stronger community relations. In the long run they are likely to attract a greater number of technologically cutting-edge industries and firms.[5]

Portland, Oregon, for example, has developed the reputation as being one of the greenest cities in North America. In 1995, the Portland metropolitan region adopted one of the earliest smart growth policies, the 2040 Growth Concept, a long-term plan for the management of urban growth through the establishment of urban growth boundaries. The plan led to the development of systems to support walking, bicycling and the use of public transit. It concentrated urban development and at the same time kept distances relatively short between common destination points, such as schools, shops, entertainment venues and residential areas. This has helped to limit the spillover of urban development into neighboring farm and forest land, reduced the demand for vehicles, and cut air pollution and GHG emissions. There is also a growing recognition that the greening of cities can lead to new jobs. The City of Los Angeles' Green LA project was premised on the concept that investment in economic development and job creation will fuel a growing green economy.

5 http://www.cherrywood.org/docs/89~Aus_Clim_Plan.pdf

3 DIFFERENT LEVELS OF CITY ACTION

Promoting sustainable development and addressing climate change requires action at multiple levels of government and within the spheres of politics, economics, and society. National, regional, and local governments have both distinct and complementary roles in developing mitigation and adaptation strategies.

3.1 POLITICAL LEADERSHIP BY LOCAL GOVERNMENTS

The failure of some national governments to take this responsibility seriously has pushed many local governments to be proactive and initiate transformative policies.

Typically there are many governance decisions made by or strongly influenced by decisions at local and regional levels. Urban communities make decisions that determine or influence public transportation systems, land use planning, construction, renewable energy use, energy efficiency measures, waste management, and local education campaigns. Depending on the political system, states, prefectures, provinces and cities may have considerable autonomy in establishing climate change targets and taking climate action or developing sustainability strategies.

The OECD (2010, p. 3) highlights that cities have the possibility to deliver "cost-effective policy responses to climate change," since they are centers of innovation that "can advance clean energy systems, sustainable transportation, spatial development and waste management strategies to reduce greenhouse gases."

One of the conditions explaining city initiatives and new city approaches to the transition of urban planning are new stakeholder constellations. Policy-making occurs in urban networks that go far beyond the exclusive involvement of municipal governmental stakeholders. In a survey of climate change experiments in 100 cities worldwide, Castán Broto and Bulkeley (2013) find that globally non-state actors account for about one third (34 %) of local climate action.

Respective initiatives and governance approaches take place in a "complex process driven by the intersection of the specific challenges of the issue itself and the reconfiguration of political authority across multiple levels and between public and private actors." (Bulkeley 2010, p. 231) Despite the increasing importance of non-governmental stakeholders, the role governments play in sustainable development processes and local climate action should not be underestimated. It remains vital for local governments to adopt a leadership role in those processes.

Empirical evidence from German cities points to the leading role of local governmental actors in respective urban networks. Heinelt and Lamping (2015) studied three ambitious low-carbon development forerunner cities in Germany: Frankfurt, Munich and Stuttgart. These cities have been active in integrating climate action into their public service objectives. These cities set up climate strategies on their own initiative in the absence of any legal obligations or severe local climate impacts.

The city of Stuttgart, for example, developed a financial model, enabling investment in energy efficient buildings through contracting. Munich initiated a climate protection network in 2007, and in 2012 developed the ambitious goal to become the "capital city of renewable energy" by covering the city's energy consumption with renewable energy by 2025. Frankfurt was even awarded a prize as a climate active municipality in 2010, based on the city's

decision to have new public buildings constructed according to passive-house standards.

Heinelt and Lamping (2015) emphasize that mechanisms of communication, framing and knowledge played a vital role in the development of climate action, in cities' leitmotivs and in their urban development planning.

The cities' climate action unfolded in networks that included stakeholders from public authorities, civil society, the corporate sector and the sciences. As the authors' network analysis shows, officials from the city administration played a central role across all three cases. Stuttgart's respective division responsible for "Urban Construction and Environment", was even able to profit from integrated departmental responsibilities combining environmental protection and urban development.

In the case of Munich, the Green party, which was in a governmental coalition with the Social Democratic Party from 1990-2014, was instrumental. It was able to advertise renewable energy deployment as a co-benefit of the city's climate mitigation agenda (Heinelt and Lamping, 2015).

Climate action taken in cities, states and regions can provide for climate initiation and learning from the bottom up (Schreurs, 2008). In a study of U.S. state initiatives, Peterson, McKinstry, and Dernbach (2008) found that if the state climate action targets established by 16 leadership states were emulated nationally, they would cut U.S. GHG emissions by over 30 % by 2020 (the equivalent of 1990 levels). National emulation could save the United States about one hundred billion dollars by 2020. The authors call not only for the introduction of a national cap and trading system, but also for the establishment of national ambient air quality standards for GHGs, the establishment of short, intermediate and long-term emission reduction goals, national and regional performance- or technology-based limits, state implementation plans, and provisions to effectively engage individuals in implementation.

3.2 REGIONAL INITIATIVES

In many instances, it makes more sense to think about sustainable development from a regional as opposed to a single city perspective. Regions are defined not only by geographic proximity, but by their economic and social connections. Towns and cities in a region are often economically inter-connected, share overlapping transportation structures, make use of a common energy supply structure, have longstanding historical ties, and may share cultural and linguistic similarities (although this is not always the case). It therefore makes sense to consider city development in a regional context.

One advantage of such an approach is that regional approaches to climate change mitigation and adaptation can provide a scaling-factor that permit structural changes which would be impossible at a purely local level. Moreover, at the regional level, more resources, greater technical and financial capacity, and environmental know-how may exist than within individual cities or towns. Regions can also develop strategies that can link policies and programs which would otherwise operate in isolation.

There are many examples of regional initiatives and even some that have developed cross-national links. The Northern Virginia Regional Commission and the Verband Region Stuttgart initiated an international partnership and exchange in 1999 (Medearis and Dolowitz, 2013).

Communities in the industrial region of Eindhoven, the Netherlands, came together to build upon their regional strengths in technological research and development in an effort to meet three interlinked goals: a cleaner environment, preserving jobs, and building a technology for the future. The Samenwerkingsverband Region Eindhoven was at the center of the development of the low-emission public transport vehicle, the Philias – an advanced guided bus that is controlled by a magnetic system built into the road – that connects various communities within and around Eindhoven to major regional facilities, including the airport.

According to the European Environment Agency, domestic transport accounts for a large share of EU greenhouse gas emissions (European Environment Agency, 2009). Dealing with transport-related emissions and meeting a long-term emission reduction goal of 80 % or higher, emissions reductions by 2050 will require greater investment in new technologies, fuels, and transportation behavior. At the regional level, greater attention will need to be paid to the development of urban economic hubs and integrated transportation structures.

The European Commission's Green Paper on Urban Transport highlights the many challenges urban transport issues produce: congestion, air pollution, health problems, noise, and GHG emissions. As the Green Paper points out: "Local authorities cannot face all these issues on their own; there is a need for cooperation and coordination at European level. The vital issue of urban mobility needs to be addressed as part of a collective effort at all levels: local, regional, national and European. The European Union must play a leading role in order to focus attention on this issue" (European Commission, 2007).

Moving beyond the kind of common transportation problems afflicting most major urban communities, there is also a need to think at larger regional levels and consider infrastructural and technological changes that will be necessary to green transportation structures, optimize passenger and goods transport, improve connections within and between urban areas, and limit emissions from transport through the introduction of low emission and alternative fuel vehicles. However, this kind of larger structural transformation requires substantial coordination among land use planners, technical specialists, engineers, conservation experts, and administrators at the local, regional, and in some cases, the national level. The regional transportation plan developed for the San Francisco Bay area is interesting in this regard.

3.3 LINKING THE NATIONAL TO THE SUBNATIONAL

National governments play a crucial role in sustainable development (Lafferty and Meadowcroft, 2000) and in climate change governance. They are parties to international climate change agreements, set national GHG emissions targets, establish national energy policy plans and programs, set broad climate change mitigation and adaptation priorities and action plans, define national building standards, and determine national budget allocations, among many other functions. National policies and targets such as national climate policies – if they do exist – are known to work in support of city experimentation (Bulkeley, 2010). They have the potential to improve the success conditions for local initiatives and to foster horizontal and vertical diffusion of exemplary

climate action developed in the city laboratories (Corfee-Morlot et al., 2009).

There are many limitations facing cities and regions in their efforts to foster change. These must be addressed by national governments. Local governments are confronted by numerous barriers that can inhibit their agenda setting and implementation abilities. These include financial, technical, capacity, informational, and jurisdictional obstacles. Indeed, many early adopters of climate change mitigation goals are having trouble fulfilling their early targets. Consequently, not a single worldwide city can be identified which fully matches the regulative expectations found in concepts such as the green economy (Puppim de Oliveira, Jose A. et al., 2013a) or inclusive and sustainable or low carbon cities.

National action plans and goals should be established in a way that provides positive frameworks for complementary and cooperative action at the local level. National governments should establish legal, institutional, and financial frameworks that enhance local government's ability to take actions appropriate to their local conditions, provide sufficient resources to local governments to fulfill obligations, and develop organizational structures that facilitate cooperative action, both horizontally across local regions and vertically between different levels of government.

Examples from India illustrate the role that national programs but also political institutions and private stakeholders can play as facilitators for action in sustainable development.

India's central government took significant steps to facilitate domestic city exchange and learning on urban development. In 2007, it introduced the Peer Experience and Reflected Learning (PEARL) program as part of the Jawarhalal Nehru National Urban Reform Mission (JnNURM) to support city exchange, especially in the area of urban infrastructure development. A total of 167 Indian cities were sub-divided into six groups according to their size, socio-economic profile and geographical location (Mega Cities, Industrial Cities, Mixed Economy Cities, Cultural Cities, Cities of Environmental Importance and North East Cities) to facilitate partnerships of cities with equal interests. The exchange of knowledge is supposed to take place primarily online through communication and documentation at the PEARL website. Thirty best practice examples have been uploaded by the National Institute of Urban Affairs (NIUA) that coordinates the initiative. From a global perspective this program is rather unique as Campbell (2012, p. 209) emphasizes in his study of trans-local learning worldwide: "Only a handful of nations have focused on horizontal exchange as a matter of policy. India is a bellwether."

India's judiciary and particularly the national Supreme Court have been significant drivers behind the greening of India's cities since the 1980s. Illustrative is the case of the initiation of clean air measures. The introduction of Compressed Natural Gas (CNG) as a mandatory fuel in Delhi is a thoroughly-researched and often-cited example of urban governance which was originally initiated by civil society actors and brought forward by India's courts. In the mid-1980s, Delhi's air pollution had been denounced by the media, a litigator, a national research institute, the National Environmental Engineering Research Institute (NEERI) and, since the 1990s, in part tirelessly so, by a Delhi-based environmental non-governmental organization (NGO), the Centre for Environmental Sciences (Rajamani 2007). In 1998,

India's Supreme Court prescribed clean natural gas (CNG) as the mandatory fuel in public transportation vehicles, and the Delhi government was forced to adapt the city's entire fleet to the new technical standard by 2001 (Goyal and Sidhartha, 2003).

Indeed, this example of Delhi's clean air policy illustrates the role of civil society actors, institutions such as public litigation, and the role of India's courts' "Judicial activism" in advancing environmental action. The Court not only pushed public action by setting out obligations for governmental reporting, it even pre-empted public action by court decisions, such as the case of Delhi vehicular pollution, which culminated in the introduction of CNG as an alternative vehicular fuel (Rajamani, 2007).

3.4 CITY SUSTAINABILITY AT AN INTERNATIONAL LEVEL

As a reaction to the developments described above, also on an international level, there has been an increasing focus on cities to take action for sustainable development. Chapter 28 of Agenda 21 highlights the importance of cities in the transition towards more sustainable societies: "Local authorities construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and assist in implementing national and subnational environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilizing and responding to the public in order to promote sustainable development." (United Nations Conference on Environment and Development, 1992).

The concept of urban sustainability continues to be recognized by the international community. The 2016 conference of the UN-Habitat, the urban agency of the UN, which will take place in Quito, Ecuador will particularly focus on 'Housing and Sustainable Urban Development' and identify seven areas aiming at transforming "cities and human settlements into centers of greater environmental, economic and social sustainability" (United Nations Human Settlements Program 2015). In proposals for the 2015 Sustainable Development Goals, "making cities and human settlements inclusive, safe, resilient and sustainable" is explicitly named as a goal. Urban sustainability will remain central to the United Nations development agenda beyond 2015.

The important role of cities for sustainable development has been further developed at the European level, such as in the Charter of European Cities and Towns Towards Sustainability, which was adopted in 1994 in Aalborg, Denmark and which was signed by approximately 2500 local and regional governmental administrations in 39 countries. Following the principles of the local Agenda 21, the 4th European Conference on Sustainable Cities and Towns was held again in 2004. The commitments aiming at action on a local level were in particular carried forward by transnational networks.

3.5 INTEGRATING LOCAL, REGIONAL, NATIONAL AND INTERNATIONAL INITIATIVES

Both governance for sustainable development and climate action are marked by newly emerging multi-stakeholder and multi-level structures. Various authority structures are at work and do

interact. As we have seen above, local climate action approaches taken in cities, subnational states and regions can provide for climate initiation and learning from the bottom up (Schreurs, 2008). However, a local government's ability to promote sustainable development and address climate change depends greatly on the country's institutional political set-up. Due to the involvement of multiple levels of government and different spheres of politics, economics, and society effective coordination is required to promote efficiencies and constructive complementarities. Coordination across departments and agencies and between different levels of government can be a key driver for effective urban climate responses (Bulkeley, 2013).

Failure to coordinate activities between the national, prefectural, and municipal levels can mean that local and state plans' emission reduction targets end up being developed largely in isolation from each other. This has become a major issue of concern in Germany, where new efforts to enhance coordination in planning across different levels of government have been strengthened (Ohlhorst et al., 2014).

There is a strong need to improve vertical and horizontal integration among cities, regions, national, and supranational bodies involved in establishing and implementing climate change policies and programs (OECD & Bloomberg, 2014; McKinsey Global, 2010). Frequently, goals and strategies are being designed with little consideration for how they fit into the plans, capacities, and interests of other levels of government. There have been insufficient efforts to systematize approaches to data collection (in terms of emission sources, emission trends, and policy effectiveness), to develop effective strategies for the support of lower levels of government to achieve goals, or to share information about best practices, worst practices, cost effectiveness, and the like.

OECD Secretary-General Angel put particular emphasis on this fact at the OECD Mayors Conference: "Climate change is a comprehensive challenge. Addressing it successfully will need the combined partnership of national governments worldwide, local authorities – including cities –, the energy industry, other business and consumers. We are already seeing action by many of these partners, but a more coordinated, comprehensive and ambitious response is needed."

Consequently, national governments need to support regional and local efforts, without constraining the creativity that can be generated at the local level. The necessity of further integration has been recognized not only by scholars but increasingly by policy makers and interest groups as well.

Interlinkages between the national and local levels can enable or constrain local climate initiatives (Corfee-Morlot et al., 2009). In India, for example, financial federalism is largely interfering with independent political experimentation by states and cities (Rao and Bird, 2014). Mainly controlled by national institutions, the financial transfer system places states "at the mercy of the central government" (Parikh and Weingast, 1997, p. 1607) and cities at the mercy of India's states, even though theoretically the states are equipped with a considerable degree of self-rule relevant to sustainable development and climate policy.

Initiatives for improved integration were taken up in the USA, where the US branch of the municipal network ICLEI-Local Governments for Sustainability spelled out in its December 2008 blueprint for President Obama and the 111th Congress,

"Empowering Local Government Climate Action," that there is need for a strong "federal-local-state partnership on climate change." The blueprint[6] called upon the federal government to take a leadership role in the development of a national climate policy, but also to provide local governments with greater financial and technical support. Similar recommendations for further integration were made by the Finnish Local and Regional Authorities.

California takes the need to link state goals and regional and local performance seriously. The state's Global Warming Solutions Act of 2006 was authored by State Senator Darrell Steinberg. It directed the California Air Resources Board to set targets for the reduction of greenhouse gas emissions and to ensure that cities and counties be involved in the plan's development. The Act also focused on ways in which regional transportation planning processes could achieve reductions in greenhouse gas emissions. The regulation set up a collaborative process between metropolitan planning organizations and the Air Resources Board to establish greenhouse gas emissions targets for each region in the state. It required the inclusion of a "Sustainable Communities Strategy" in each metropolitan planning organization's regional transportation plan, and made changes in housing laws to tie housing planning into the transportation planning process. As these cases show, more comprehensive and inclusive transition processes can bring about plans that promote synergies and positive change (McKinsey, 2010; Mois, 2014).

6 http://www.climatecommunities.us/documents/blueprint.pdf

4 POTENTIALS FOR CITY ACTION

There are many reasons motivating local governments and regions to act on sustainable development and climate change. On the one hand, these include environmental pollution, growing concerns among local leaders about the costs of inaction with regard to climate change, and growing frustrations with the wide disparities in social and economic assets. The challenges related to rapid urbanization, development and environmental change are considerable. On the other hand, there are many co-benefits that can be achieved which improve cities' competitiveness. Transnational city networks and city cooperation efforts can facilitate certain initiatives for action on sustainable development.

4.1 CO-BENEFITS

It is well known from international comparative research that actions for sustainable development by subnational states, provinces and cities are strongly driven by the potential for political, economic and environmental co-benefits, such as clean air, local and regional environmental improvements. Also important are technology research and development and the economic assets of a community (Kousky and Schneider, 2003; Betsill and Rabe, 2009; Rabe et al., 2006). The co-benefit approach was first proposed by the IPCC in 2001 and the OECD in 2003; it was later discussed in greater detail by the IPCC in 2007, the Japanese Ministry of Environment in 2008, the IPCC in 2014, and in various climate research organizations and consultancy commissions. Kousky and Schneider (2003, p. 369) conclude that since its introduction, the co-benefit approach has become an important powerful strategic concept: "The existence of a myriad of local co-benefits gives rise to the opportunity to craft policy that addresses multiple concerns simultaneously." As will be outlined below, in India co-benefits-based actions that provide for both development and climate mitigation are becoming a more significant driver of domestic climate policies (Dubash, 2013; Dubash et al., 2013).

One of the most effective steps that can be taken to address climate change in the short-term is to introduce measures that will promote energy efficiency savings. This is a win-win strategy as it saves customer (including government) money on fuel bills while reducing carbon dioxide and other harmful emissions. In most cities and regions, there is still tremendous room for energy-efficiency improvements; through better insulation in existing housing stock, use of LED light bulbs instead of incandescent ones, capturing of waste heat from industrial activities, reducing the distance traveled by car, and having local industries look at what they can do to cut back in the waste they produce, just to name a few.

In many cities, governments are beginning to adopt so-called Fifty-fifty programs, whereby they encourage public schools, libraries, and hospitals to cut their energy costs with the incentive that if they do, they can win back 50 % of the savings achieved. In other cities, there are campaigns to educate citizens, companies, and shops to set their air conditioners at 26 degrees C in summer, rather than the far cooler temperatures they are often set at (such a campaign was launched in China). These may be combined with campaigns to convince individuals to dress weather-appropriately. In Japan's Cool Biz Campaign, men are urged to shed their neckties in the heat of Tokyo's humid summers. This might be an idea for India where air conditioning

is very popular, but blackouts are also a matter of great concern.

In 2007, Seoul made an Energy Declaration, spelling out its commitment to reduce the city's energy consumption by 15 % and cutting greenhouse gas emissions by 25 % through 2020. It also announced plans to expand the consumption of renewables and enhance energy efficiency, cutting energy demand by 12 % until 2010 and by 15 % until 2020 (compared to a base year of 2000). In cooperation with the Fraunhofer Institute in Germany, Seoul developed plans for Energy Zero Houses to be built near the World Cup Park. Seoul hosted the third Summit of the C40 Large Cities Climate Leadership Group in May 2009, helping to bring visibility to Seoul's and Korea's climate change initiatives, while at the same time applying pressure on the city and the nation to perform. It also has a campaign for "one less nuclear power plant" that is reducing energy demand equivalent to one nuclear power plant's generation through individuals cutting their energy use.

A study conducted by the United Nations on "Green Jobs: Can the Transition to Environmental Sustainability Spur New Kinds and Higher Levels of Employment?" suggested that a silver-lining in the climate change story will be the creation of millions of new green jobs. These jobs will not simply be white-collar jobs dealing with green issues (although there will also be such positions), but jobs in green manufacturing, green construction, and green energy. The report predicted that in Germany environmental technology will quadruple over the coming years, reaching 16 % of manufacturing output by 2030 and employing more people than the automotive and machine tool industries combined. According to the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, the renewable energy sector alone employed close to 250,000 people and generated over $240 billion in annual revenues in the mid-2000s. By 2014, the number of people employed in the renewable energy sector had increased to 370,000 in Germany. IRENA reports an estimated 391,000 renewable energy jobs in India.

In India the co-benefits approach has a very particular meaning in regard to both domestic climate mitigation and adaptation policy. Climate action in India is unfolding against the background of conflicting objectives. The domestic climate politics discourse is still dominated by the development-first paradigm (Doll et al., 2013; Dubash, 2013; Dubash et al., 2013; Fisher, 2013; Thaker and Leiserowitz, 2014). Climate change issues are subordinated to the prerogatives of economic development and poverty reduction. Yet, the threatening scenario of climate change, which impacts many economic sectors and hampers human livelihoods, has become increasingly apparent. A co-benefit approach, one that thoroughly scrutinizes the positive side effects of climate mitigation policies, could possibly bridge conflicting objectives in India's climate policy (Dubash et al., 2013). Co-benefits can be found in respect to energy access and security, employment, new green markets, clean air, water as well as waste management, all of which have the potential to bridge the gap between necessary climate mitigation efforts and the need to provide for economic growth and poverty eradication.

So far, the co-benefit approach has not been widely implemented in India, though it has been integrated in a number of important policy documents, such as

India's National Action Plan for Climate and various documents published by India's previous Planning Commission. Various examples of urban projects in Asia have been researched, which in different ways involved the implementation of co-benefits (Doll et al., 2013; Doll, Christopher N. H. and Balaban, 2013; Puppim de Oliveira et al., 2013; Puppim de Oliveira, Jose A. et al., 2013). These studies look at the Delhi Metro Project, mitigation action in the Hyderabad transportation sector, the introduction of the natural gas-fueled public transportation busses in Delhi, a project improving solid waste management in Kolkata, a solid waste management project in Mumbai, which was registered under Clean Development Mechanism (CDM) and a waste management improvement scheme in Surat.

Studies conclude that the net co-benefits realized in various city sectors in respect to environmental improvements in Asia are still marginal, and perhaps more integrated strategic approaches to realizing co-benefits across sectors are required. Interestingly, Kousky and Schneider discovered that local governments in the United States implement co-benefits without undertaking an explicit cost-benefit analysis previous to establishing climate initiatives, and that they "appear to be more focused on demonstrable action" (Kousky and Schneider, 2003, p. 370). This insight suggests that city climate action develops incrementally, rather than in a systematic and most cost efficient way. It could also indicate that capacity for the development of scientifically and economically substantiated policy measures at the city level might be lacking.

4.2 THE ROLE OF TRANSNATIONAL AND INTERNATIONAL NETWORKS FACILITATING CITY ACTION

City climate measures unfold against the backdrop of informal and formal urban networks, which are influential agenda setters and involved in policy formulation of emerging climate measures taken at the city level. Cities align themselves to transnational climate change networks, which can provide for collective action in various regards. The output and influence of transnational networks includes the formulation of joint GHG reduction targets, lobbying and influence in international and regional climate regimes, exchange of experiences, stimulation of learning processes and diffusion of policies (cf. Bulkeley, 2010). There are now a dozen or more international networks for local initiatives on climate change and sustainability, as well as numerous bilateral and multilateral arrangements.

In Europe, in February 2009, 400 cities agreed to the Covenant of Mayors' initiative on climate change, pledging to go beyond the EU's 20% greenhouse gas reduction goal by 2020 relative to 1990 levels through the implementation of Sustainable Energy Action Plans. As of April 2015, there were over 6000 signatories. The Covenant of Mayors' initiative spelled out steps to be taken for the development of an action plan, including the establishment of a baseline emission inventory and agreement to submit implementation reports and share experience. The Covenant highlights the role of local governments in the implementation of energy efficiency measures, renewable energy projects, and other energy-related

activities. The Covenant also emphasizes many areas were local governments can make a difference. For example, local governments are both consumers and providers of services. Public buildings use energy and resources; thus, energy saving programs and actions in public buildings can be highly relevant. Moreover, local governments are planners, developers and regulators. They are advisors and motivators, and they can serve as role models.

In 2014, in the lead up to the Paris 2015 climate negotiations, the Compact of Mayors, the world's largest network of cities, was launched in a cooperative arrangement between the C40 Cities Climate Leadership Group, the United Cities and Local Governments, and ICLEI Local Governments for Sustainability. Participating cities are making pledges of action for reducing their greenhouse gas emissions and for transparent data reporting and monitoring[7].

4.2.1 CITY COOPERATION ON SUSTAINABLE AND LOW CARBON DEVELOPMENT IN GERMANY AND INDIA

A large number of cities worldwide align themselves internationally through bilateral partnerships with cities in other countries. According to the United Cities and Local Governments (2007), an estimated 70 % of the cities worldwide engage in city-to-city activities. In both state and non-state-led city partnerships, sustainable development and climate change are among the main focuses of North-South urban cooperation, as Statz and Wohlfahrt (2010) point out in their study on municipal sustainability partnerships and networks.

German municipalities are very active in establishing trans-local relationships. According to a database by the Rat der Gemeinden und Regionen Europas (RGRE), the German section of the Council of European Municipalities and Regions, German municipalities have set up a total of 5434 formal "partnerships", plus 610 project-oriented and temporary "friendships" and 1079 "contacts" without any formal agreement with municipalities abroad. The large majority of these trans-local relations are set up with cities from other European countries (90.7 %), and in particular with French cities (32.3 %).[8]

Partnerships between German cities and cities from the Global South are, however, rare. Nitschke et al. (2009), in reference to Heinz and Leitermann (2004), point out that only about 3 % of all formal city partnerships of German cities deal with the issue of development cooperation. Arguing that "the potential of German cities for cooperative development projects is not yet fully realized" (Heinz and Leitermann, 2004, p. 135), Nitschke et al. also identify a number of specific challenges German cities face when they want to establish trans-local partnership projects with cities from the Global South. They find that, compared to other European countries, German cities receive less institutional and financial support for conducting development cooperation (Heinz and Leitermann, 2004). While German cities enjoy relatively wide-ranging decision-making competences in climate-related policy fields, their scope to set up international partnerships is more limited.

7 http://c40-production-images.s3.amazonaws.com/other_uploads/images/125_FINAL_FINAL_MAYORS_COMPACT_092314.original.pdf?1411481427

8 http://www.rgre.de/partnerschaften0.html (database query from 06-03-2015)

In both state and non-state-led city partnerships, sustainable development and climate change are among the major topics of cooperation, especially in partnerships with cities from the Global South (Statz et al., 2010). The city of Bremen, for example, has been engaging in environmental, social and economic development projects with international partner cities since the 1970s. Bremen's partnership activities, amongst others with the Indian city of Pune, are largely conducted by non-state individuals and organizations (Beermann, 2014). Statz et al. (2010) list additional municipalities such as Lauingen (cooperation with Lagos Island, Nigeria), Ludwigshafen (exchange with Sumgait, Azerbaijan), Dresden (partnerships with Lviv, Ukraine and Wroclaw, Poland) and Erfurt (cooperation with Vilnus, Lithuania and other cities) that focus on environmental and climate change projects in their trans-local partnership work. More recently, the German Federal Government has also started to actively foster urban North-South cooperation in the area of climate change. Since 2011, the German Ministry for Economic Cooperation and Development (BMZ) has facilitated a program called "50 Municipal Climate Partnerships until 2015", supporting selected German cities in the establishment of climate change and low carbon collaboration with African, Latin American and Asian cities (Engagement Global GmbH, 2014).

Indian cities are also increasingly active in setting up city partnerships in the areas of sustainable and low carbon development. At the international level, several Indian cities have established partnerships with cities from the Global North that go beyond the traditional twinning focus on cultural and individual citizen exchange. Delhi, for example, has closely collaborated with Tokyo in the design and construction of its new metro system. Another example is Ahmedabad, which has partnered with the Spanish city of Valladolid in the development of a comprehensive program on ecological heritage preservation. A third example is the partnership between Guntur, Bologna (Italy) and Vaxjö (Sweden) in implementing ecoBUDGET, a city-level environmental management system. Indian cities also actively engage in South-South city partnerships, as demonstrated by Coimbatore which has exchanged knowledge and experiences in renewable energy and energy efficiency strategies with the cities of Ekurhuleni (South Africa) and Yogyakarta (Indonesia), as part of the "Local Renewables Model Communities Network", facilitated by the city network ICLEI-Local Governments for Sustainability.

A major driver for Indian cities engaging in international cooperation is the urgent need for innovative and sustainable solutions that address the ever increasing pressure on urban energy, water and transport infrastructures. The increasing urbanization and industrialization has led to a rapid growth of energy and water consumption, solid waste and sewage streams, as well as individual and public transport. As a result, many cities suffer from regular power cuts due to a fragile and overburdened energy infrastructure, the drinking water often remains in a poor condition, and city managers have to deal with overflowing waste management systems and congested streets. Mukhopadhyay and Revi (2012) argue that, due to these pressures and the fact that Indian cities are still in the process of development and expansion, they are more open towards

learning from other cities and not as locked-in as, for example, European cities. A major challenge, however, remains the lack of independent and accessible documentation on sustainable and climate governance experiences that would allow Indian cities to learn from their peers (Sharma and Tomar, 2010).

An additional barrier Indian cities face when they want to establish formalized city partnerships or international partnership projects is their strong dependence on national and state level governments for approval and financial support. A recent study shows that, even if partnership stakeholders have access to central and state government institutions and receive consent for joint projects, the approval procedure often leads to considerable time delays and budget constraints (Beermann, 2014). Fisher (2012) explains that in India, the dominance of the national government is stronger than any transnational linkages, and the national government's decisions shape climate governance at all policy levels, including the local level. As a result, the scope of action for transnational climate governance networks is limited and they usually act in conjunction with the national government, rather than in opposition.

5 CONCLUSIONS AND RECOMMENDATIONS

Cities are places where the challenges of global change culminate dramatically. The trend of rapid urbanization and its social, economic and ecological implications demonstrate the growing importance of cities. The relevance of the problems associated with rapid urbanization and the need to reverse troublesome social, economic and ecological developments in rapidly growing cities is undisputed, bringing with it enormous governance challenges.

A groundbreaking success of the Earth Summit in 1992 was the connecting of development and the environment in the form of sustainable development. Sustainable development links poverty reduction, in the form of job creation, economic growth and increased competitiveness, with the protection of the natural foundations of life. In addition, the simultaneous adoption of the climate convention and the Agenda 21 at the Rio summit indicated the continued challenges for sustainable development posed by the impacts of global warming.

This trend towards unsustainable urbanization has yet to be reversed, whereas the challenges are increasing. No city can currently claim to be truly sustainable. Nonetheless, a surprisingly large number of city initiatives addressing the challenges of global change are being carried out across the world. Cities have become key players in the global governance systems for sustainable development and climate control. Cities are involved in the search for and testing of new approaches to sustainable development. Transnational urban networks, complex actor constellations, and newly emerging multi-level governance structures are driving the transition towards greener and more inclusive and competitive cities worldwide.

In many respects, different cities face very diverse economic, social and ecological challenges, and these differences are particularly pronounced between cities in the Global North and the Global South. Climate governance has more resonance in the North than in the South, for example. For cities in 'developing countries' climate change poses existential threats while competing with other pressing social and economic issues. The challenge of social exclusion is of particular relevance, as it is closely related to the process of rapid urbanization. Climate change intensifies social exclusion, as well as the vulnerability of those affected by it. The exact linkages between urbanization, climate change and social exclusion require further consideration.

Various factors shape city action and help enable and accelerate the transition towards greener and more inclusive and competitive cities. There are certain conditions which enable innovation across city sectors such as urban transportation, energy supply and usage, construction, the creation of new markets and employment, and most importantly, inclusion and the development of social capital. One of the primary conditions relates to the overall governance structures in which city action is nested. The Agenda 21 governance model pointed to the importance of multi-level and multi-stakeholder involvement in sustainable development. There is a need for multi-level governance structures that enable the diffusion of innovation and action, both horizontally and vertically.

The innovative capacity of city laboratories and city leadership can only unfold under conditions of political and economic empowerment. This may require changes in regulatory frameworks to allow

for greater decision-making at the local and regional level on important questions pertaining to energy facilities, transportation and infrastructure.

Vertically, more attention needs to be paid to how national governments can support action at the local and regional levels, i.e. the levels of government that are closest to where the impacts of global change will be most dramatically felt. It is also at these levels that much of the implementation of policy measures will have to occur. This suggests the need for the establishment of regular channels of communication among national planners as well as regional and local government officials about targets, goals, strategies and measures. National strategies have the potential to improve the conditions for success of local city experiments and to foster learning and the diffusion of exemplary climate action developed in city laboratories.

National governments can, and should, lead the way, for example through the establishment of greenhouse gas caps, the introduction of emission trading systems, or the use of carbon taxes. At a minimum, governments must establish the legal basis that encourages local action. National measures should then be coordinated via the development and implementation of action plans at regional and local levels.

Without national standards, an uncoordinated patchwork of targets, goals, and programs is likely to emerge. In the absence of national standards there is little incentive for communities to act. While many cities and regions have launched their own initiatives, there are even more examples of cities and regions that have not yet recognized the serious need for immediate action.

At the same time, national governments should allow local and regional communities to move beyond national standards. National governments must therefore provide a policy framework that supports local and regional action. They can also facilitate local action through the provision of information about effective approaches to developing and implementing action plans; training on the establishment of greenhouse gas inventories and monitoring mechanisms; and suggestions for effective stakeholder dialogues. National governments must also be prepared to provide financial support and incentives for effective local and regional action.

Local and regional governments also require comparable data and information, as many do not have, for example, accurate data on the sources and level of greenhouse gas emissions in their community. In order to measure progress in this field, local and regional governments must develop inventories that identify emissions from the transport sector, household and commercial energy use, land clearing, waste disposal and other emission sources. Establishing a system that allows for periodic assessments of progress is necessary in order to find out if the actions taken have an impact and, if so, whether they meet their initial targets.

Multi-level governance structures connect domestic policy-making levels with levels of governance beyond the state and have the potential to provide effective and legitimate policies (Enderlein et al., 2010). Emerging multi-level governance structures must incorporate and support the development of transnational urban city networks which boost the horizontal and vertical diffusion of best practices. Local climate action taken in cities, subnational

states and regions can provide for climate innovation and learning from the bottom up. The involvement of transnational networks is of utmost importance in facilitating communication between local and regional governments, both within countries and between them. Transnational networks and partnerships require support and additional resources, especially in the case of North-South international exchange. The establishment of a major global database of local climate change initiatives could serve as a repository for climate change action plans, success stories, challenges encountered, information about governance strategies, and implementation efforts.

A stronger focus is also required on how activities involving different levels can best be coordinated both vertically and horizontally. Frequently, goals and strategies are being established with little consideration for how they fit with the plans, capacities and interests of other levels of government. Too few efforts have been made to systematize in-country approaches to data collection (in terms of emission sources, emission trends, and policy effectiveness); to develop effective strategies that support lower levels of government to achieve their goals; or to share information about best practices, worst practices, cost effectiveness, and the like.

With regard to the competitiveness of cities, stronger integration and coordination is required in order to achieve co-benefits. While cities are often well informed about the potentials of tangible co-benefits at a local level, they are also restricted by their available resources. In order to systematically reach such co-benefits, greater research on the precise costs and benefits and the development of a knowledge-based approach to these is necessary. Vertical and horizontal networks could potentially trigger common learning processes in regard to competitiveness. The factors, or rather mechanisms, which influence city initiatives, action and frameworks, as well as conditions for success, remain important future research areas. In particular, the question of the political implementation of co-benefits and how such co-benefits can be further incorporated into India's emerging multi-level climate governance structures call for further research.

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