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In 2014 a report by the Intergovernmental Panel on Climate Change (IPCC) warned that the impacts of climate change, such as heat waves, floods, storm surge, and health epidemics adversely impact the poor and disadvantaged, particularly in urban areas (Revi et al., 2014). Four years later, in its report highlighting the importance of limiting temperature rises by 2100 to 1.5°C above pre-industrial levels (rather than the previous target of 2°C), the IPCC stated that “Climate change impacts and responses are closely linked to sustainable development which balances social well-being, economic prosperity and environmental protection. The United Nations Sustainable Development Goals [SDGs] provide an established framework for assessing the links between global warming of 1.5°C or 2°C and development goals that include poverty eradication, reducing inequalities, and climate action” (IPCC, 2018: 20). It warned that any adaptation and mitigation efforts must work in tandem with the SDGs (IPCC, 2018: 21). Questions of ethics and equity need to be considered when addressing both impacts and mitigation efforts in order to highlight uneven distribution of possible adverse effects on disadvantaged sections of societies.

The observations of the IPCC’s *Global Warming of 1.5°C* report are particularly important for developing countries with significant SDG backlogs. In these countries, given the current neoliberal setting, the elite capture of policymaking and politics means mitigation efforts have the potential to cause further impoverishment, massive exclusions through both state interventions and market operations, and wide, persistent and growing inequalities. Joseph Stiglitz (2012) argues that inequality paves the way for the economically and politically powerful groups in society to capture or monopolise natural and financial resources. In the Indian context, for example, the car-owning lobby is powerful and makes a lot of noise when the right of the way for its private vehicles is reduced because of provisions for public transport or pedestrians. The link between inequality and elite capture of politics in the context of urban India will be further explored below.

Mitigation efforts are likely to conflict with many SDGs unless synergistic pathways are chosen.

India's Nationally Determined Contributions (NDCs) under the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement include: reducing the national greenhouse gas (GHG) intensity of its GDP by 33% to 35% below 2005 levels by 2030; 40% of the power capacity to be based on non-fossil fuel sources (in particular solar power); and creating additional carbon sinks of 2.5 to 3 billion tonnes of carbon dioxide (CO₂) equivalent through additional forest and tree cover by 2030.¹ The localisation of these commitments in cities requires a new urban policy and programme perspective, which, for example, would include the following efforts: a shift to electric mobility; increasing public and non-motorised transport and making land available for it; energy-efficient buildings; releasing land in cities and their immediate surroundings for open and green spaces and plantations for carbon sequestration; preservation of water bodies; land allocations for public transport; managing urban waste; and paying a carbon tax for energy conservation, among others.

The question is how the SDGs link with urban development agendas in Indian cities in the context of the policies and actions related to climate change and whether these are synergistic or conflicting. Indian cities, like those of other emerging economies, are undergoing multiple transitions in demography, income, governance, physical expansion and infrastructure while continuing to maintain and sometimes even expand existing social, income and gender inequalities. Amidst these inequities, development deficits in housing, potable water, sanitation, infrastructure for economic growth, employment and a clean environment have to be solved. Meeting the SDGs is therefore important. However, mitigation efforts related to climate change are likely to conflict with many SDGs unless synergistic pathways are deliberately chosen.

This chapter conceptualises these links in the context of current SDG achievements in urban India. The links between the SDGs and the climate change mitigation efforts required will be explored by looking at the synergies or trade-offs between the two sets of agendas. The next section presents the status of the SDGs in urban India. The second section discusses the links between the SDGs and climate change mitigation efforts in urban areas in India. Due to the scarce empirical evidence available, this discussion is conceptual. The last section examines the links between the urban agendas of large countries such as India and the global climate and sustainable development agendas, suggesting these relationships should work from the bottom up. The context of implementation is different in each city. For the Indian case, a "one-size-fits-all" approach to the implementation of global agendas would not work. In the recent past, urban development agendas for each city have been left to the state governments – the middle tier of administration in India – in consultation with municipal governments. Together, they apply for financial assistance from the national government, rather than the national government determining local actions. The importance of creating city-level actions for mitigation and resilience in moving forward was recently stressed by the *Global Research and Action Agenda on Cities and Climate Change Science* that was the result of the IPCC Cities and Climate Change Science Conference held in Edmonton, Canada in March 2018.² By examining ongoing climate change mitigation efforts in urban India, this chapter illustrates the need to further investigate

1. Accessed on January 22nd 2019 at: <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf>
2. https://citiesipcc.org/wp-content/uploads/2018/09/Research-Agenda-Aug-10_Final_Long-version.pdf

the links between city, national and global policies and action. With the country being on the cusp of rapid urbanisation and economic growth, cities are required to progress on inclusive low-carbon pathways to meet both the SDGs and NDCs. With India representing 16% of the global population, it will have to play a key role in meeting global challenges.

I. The SDGs in urban India

At the macro level, India's economy has registered the fastest economic growth rates in recent years,³ but it remains 130th out of 189 countries on the Human Development Index (UNDP, 2018: 25). The country therefore has large development deficits that could be solved by achieving the SDGs' targets. Meeting the SDGs is also important because India is emerging as a highly unequal country (Oxfam, 2019; Himanshu, 2018). Its Gini Coefficient for income is 0.51 (Table 1), while that for wealth is 0.83, and these values are rising (Himanshu, 2018: 17). In urban areas, Mahadevia and Sarkar (2012) show that consumption inequalities have increased over time. Hence, meeting the SDGs and their targets in India is going to be tough unless there is a drastic shift in government policies and investments in the areas of human well-being and the urban sector.

In this section we assess the achievements with regard to the SDGs in urban India. In the 2011 census, 31.7% (377 million) of the national population lived in urban areas (Census, 2011). This is a low percentage and it is expected that the country will experience a high rate of urbanisation in the coming decades (MGI, 2010). The nation will therefore have to simultaneously address the challenges of urbanisation – providing housing and other services to incoming migrants, many of whom will be in the low income category due to continuing rural distress (Himanshu, 2016) – and having 30.9% of the population living below the poverty line (Government of India, Planning Commission, 2014: 66). Climate change impacts such as declining water availability and increased frequency of droughts in rural areas is likely to further aggravate distress migration to cities as a disaster coping strategy (Mallya et al., 2016). This rural-to-urban migration would further development deficits in urban areas. Urban areas must therefore also focus on the SDG targets.

The current achievements with regards to the SDGs indicate lags on some of the individual goals. Slightly more than a quarter (26.4%) of the urban population was below the official poverty line, defined as deficit in consumption of per capita 2100 kcal per day in 2011–12 (see Table 1 which gives achievements of indicators for select SDGs). The infant mortality rate (IMR) is high at 29 per 1,000 live births in 2015–16; about 17% of children (aged 6–23 months) that were not breastfeeding did not have an adequate diet; 29% of children under 5 were underweight; the sex ratio at birth was adverse (899 females per 1,000 males); half the women did not continue schooling beyond 10 years old; and 30% of the population did not have access to sanitation in urban areas (Table 1). Two-thirds of workers in urban areas were informally employed. Nearly a quarter of urban households (18.8 million) face housing shortages and 16.9% (13.4 million) live in slums (Table 1).

3. Information accessed on January 21st 2019 from: <https://economictimes.indiatimes.com/news/economy/indicators/india-remains-fastest-growing-economy-ahead-of-china-despite-up/downs/articleshow/67334194.cms>.

Table 1: Achievements related to specific SDGs in urban India			
SDG	Indicator	Achievement	Numbers in millions*
1 - Poverty reduction	Poverty (% below Poverty Line) (2011–12)*	26.4	102.5
3 - Health	Health: infant mortality rate (IMR) (per 1,000 live births)**	29	-
	% children aged 6–23 months (non-breastfeeding) getting adequate diet**	16.9	-
	% children under 5 years underweight**	29.1	-
5 – Gender equality	Sex ratio at birth for children born in the last five years (females per 1,000 males)**	899	-
	Women who are literate (%)	81.4	-
	Women with 10 or more years of schooling (%)**	51.5	-
6 – Clean water & sanitation	Households with clean drinking water source (%)**	91.1	9.8
	Households with access to improved sanitation facility (%)**	70.3	32.7
7 – Affordable & clean energy	Households using clean energy for cooking (%)**	80.6	81.5
8 – Decent work	% Workers in informal employment ***	67	89.3
10 – Reduced inequality	Inequality (Gini Coefficient) (2013) ****	0.51	-
11 – Sustainable cities & communities	Households facing housing shortage (%) (2012) ¹	23.8	18.8
	Households living in slums (%) (2010) [®]	16.9	13.4

Note: Data of achievements for each of the goals is not available for urban India

* Calculated by author.

As per Rangarajan Committee's methodology (Government of India, Planning Commission, 2014: 66).

International Institute for Population Sciences (2016: 2–3).

Calculated by the author based on NSSO (2012).

International Monetary Fund report.⁵

® MoHUPA (2012).

- The number of households living in slums. Accessed May 13th 2017: http://www.censusindia.gov.in/2011census/hlo/Slum_table/hl-slum/SHH0101-crc.pdf.
- Data presented in an article accessed on January 21th 2019: <https://www.livemint.com/Politics/mTf8d5oOqzMwvzaGy4yMN/IMF-warns-of-growing-inequality-in-India-and-China.html>.

Of direct relevance to climate change and the SDGs is the urban transport sector. As well as greenhouse gases the urban transport sector emits other air pollutants that have the immediate impact of creating local air pollution. Currently, Indian cities have large public transport deficits, leading to high use of private motorised transport, which causes severe congestion on the roads, thus increasing travel time to almost double that expected in some cities (Juyal et al., 2018). At the same time, high urban inequality means that a section of the urban population is extremely dependent on walking and cycling, apart from in the four Indian cities with a developed metro network: Delhi, Mumbai, Kolkata and Chennai (Dhar et al., 2016). On the one hand, there is a need to increase access to public transport, especially to enable women to access work and other services (for example education and health) (Mahadevia, 2015). This would have a positive impact on a few SDGs such as those concerning decent work, education, health, gender equality and poverty, and inequality reduction. On the other

hand, if public transit is fuelled by fossil fuels this will lead to an increase in greenhouse gases. What is more, with an increase in income levels, the failure to improve public transport will inevitably lead to a transition to private motorised transport and increased energy demand and CO₂ emissions (Shukla et al., 2015). Currently, in the World Health Organization's air quality database,⁶ ten Indian cities figure among the most polluted 25 for PM₁₀, and 13 for PM_{2.5}. Pollution levels are very high in Indian cities that have low levels of mobility, in particular that of women (Mahadevia, 2015). Improvement on some of the SDGs could impact climate change as well as local air quality, and as a result other SDGs such as health and climate.

Conflicts between climate mitigation actions and the SDGs are aggravated in conditions of high inequality.

II. Links between climate change mitigation efforts and the SDGs in cities

The SDGs are part of the 2030 Agenda for Sustainable Development, which expands on the previously accepted definition of sustainable development as “meeting the needs of the present generation without compromising the needs of the future generation” given by the Brundland Commission (WCED, 1987). The SDGs specifically target the agendas of poverty and hunger alleviation, promoting decent life for people and their overall well-being. They particularly address gender equality issues across all development goals, while meeting the climate change and environmental sustainability goals through global partnerships. The 2030 Agenda and the Paris Agreement, in which UN member states declared their Intended Nationally Determined Contributions (INDCs) to meeting the climate change goals, were both agreed upon in 2015. The IPCC's *Global Warming of 1.5°C* (2018) emphasised that climate change goals and the SDGs need to be approached jointly, and flagged up the synergies and trade-offs between the two agendas. Given that the INDCs issued after the Paris Agreement would not limit global warming to 1.5°C (IPCC, 2018: 20), stronger actions would be required on the mitigation front, which could in turn have an adverse impact on the SDGs. However, as the report suggests, the introduction of sensitive public policy and planning can potentially assist with managing conflicts and trade-offs between the two agendas and contribute to creating synergies between them.

Potential conflicts between climate mitigation actions and the SDGs are aggravated in conditions of high inequality, which facilitates policy capture by elites. For example, when the Bus Rapid Transit System (BRTS) was implemented in the Indian city of Ahmedabad, the road space available for private motorised vehicles was not greatly affected. Nevertheless, it was compensated for by evicting vendors operating on the sides of streets and narrowing footpaths, causing great inconvenience to pedestrians. For the vendors, streets are their livelihood spaces and their displacement leads to a decline in their incomes and thus increased poverty and inequality. The idea of a BRTS is to make people shift from private to public transport by making the former more inconvenient (i.e. taking away road space for private vehicles leads to more congestion). However, in Indian cities, current policy on road space allocation tilts heavily in favour of private vehicles, displacing livelihood activities such as vending and reducing the space for pedestrians and cyclists. In most cities in India, in a conflict between private vehicle users' need for road space and those of vendors, pedestrians and cyclists, the private vehicle owners are given priority. This elite capture of policymak-

6. Accessed on January 21st 2019: <https://www.who.int/airpollution/data/cities/en/>

ing fundamentally undermines the attainment of the SDGs on climate change, decent employment and reduced inequality, as well as others.

Various conflicts between the two agendas also arise because both require public land. The urban poor being unable to afford housing at market prices, means public land must be allocated to their housing. If not, housing poverty may spill over into overall poverty, hunger and generally falling living standards. SDGs 1, 5 and 11 would not be met. But the solutions to mitigating the effects of climate change on life in Indian cities also require public land to be allocated to them. For example: (i) increased heat episodes due to average temperature rises lead to higher electricity consumption by cooling devices. Locally, temperatures experienced can be reduced by extending open and green spaces, which can then help lower energy consumption in buildings. (ii) Waste management, which requires facilities to be built, reduces the emissions of some greenhouse gases such as methane. (iii) Public and non-motorised transport can reduce emissions from transport. And (iv) water conservation is required for dual purposes – adaptation to water shortages and reducing urban heat island formation, which in turn reduces energy demand in buildings. But, as mentioned, all these activities would require public land, which may lead to fewer being available for purposes such as housing for the urban poor.

Para-transit is another obvious case in point. Auto-rickshaws and their variants contribute to air pollution because of their poor maintenance and poor-quality fuel. This has led them to be banned from cities or forced to use relatively cleaner technologies such as compressed natural gas (CNG) or even batteries. Improved public transport can lead to lower demand for such para-transit. But if they are not supported, the decline in driver incomes could leave them without a livelihood, adversely affecting SDG 8 on decent employment. The 2018 IPCC report recognises this: “Mitigation options deployed in each sector can be associated with potential positive effects (synergies) or negative effects (trade-offs) with the ... SDGs” (IPCC, 2018: 22). Meeting the NDCs in developing country contexts needs to be well-managed in terms of sustainable development benefits or else these actions can lead to mal-development.

At the same time, temperature rises beyond 1.5°C are likely to have adverse impacts on the SDGs (IPCC, 2018: 20). In this chapter we therefore argue for strong mitigation efforts, keeping in mind the possibilities for synergistic actions and also the need for trade-offs in situations of possible conflicts (between mitigation and mitigation, mitigation and SDGs, and SDG and SDG). Table 2 maps synergies and trade-offs between mitigation efforts and the SDGs in Indian cities and identifies areas for future empirical research. These links are mediated by enabling conditions such as coordination between different levels of governance, institutional capacity, policy instruments, technological innovation, transfer and mobilisation of finance and changes in human behaviour and lifestyles (IPCC, 2018: 21). Take the example of the transition from para-transit vehicles to clean fuel: it would require a financing policy and finance would need to be made available. Apportioning land for street vendors when public transit is being planned requires land-use policy and street-design guidelines. Popularising electric vehicles requires fiscal policies and motor vehicle legislation at all levels of governance.

Table 2: Climate change mitigation actions and SDG links

SDG		Synergies with mitigation efforts in cities	Trade-offs with mitigation efforts in cities
1 & 2	No Poverty & Zero Hunger	<ul style="list-style-type: none"> • Employment through afforestation • Urban agriculture • Employment through waste management 	<ul style="list-style-type: none"> • Increased energy consumption • Lands devoted to afforestation can reduce urban agriculture • Increase in all consumption with indirect impacts on all resource use
3	Good Health & Well Being	<ul style="list-style-type: none"> • Pollution reduction measures • Increased public transport that uses clean fuel • Deployment of clean energy • Increased walking and cycling 	<ul style="list-style-type: none"> • Shift of low-income households from informal to formal housing, construction of health infrastructure leading to increase in energy consumption in building sector (embodied and through electricity consumption)
4	Quality Education	<ul style="list-style-type: none"> • Mixed land uses leading to higher accessibility to education 	<ul style="list-style-type: none"> • Construction of education infrastructure, leading to increase in energy consumption in building sector (embodied and through electricity consumption)
5	Gender Equality	<ul style="list-style-type: none"> • Improvement in public transport increases women's mobility and hence improves employment and empowerment • Improved health due to pollution controls would lead to less unpaid time for care activities • Mixed land use makes multi-tasking easier for women 	<ul style="list-style-type: none"> • Women are under-consuming energy (directly as well as indirectly due to, for example, not making trips) and meeting SDGs for women would lead to increased consumption
6	Clean Water & Sanitation	<ul style="list-style-type: none"> • Reduces healthcare expenditure, which can then be devoted to use of cleaner technologies 	<ul style="list-style-type: none"> • Infrastructure construction can interfere with informal settlements
7	Affordable & Clean Energy	<ul style="list-style-type: none"> • Eases women's household and care giving work • Enables low-income households to take up household work, their children to study and to help cope with urban heat island impacts 	<ul style="list-style-type: none"> • Increases energy consumption
8	Decent Work & Economic Growth	<ul style="list-style-type: none"> • Increases households' ability to invest in clean technologies 	<ul style="list-style-type: none"> • Increases consumption • Increases trips to work and for other purposes
10	Reduced Inequalities	<ul style="list-style-type: none"> • Equitable urban planning efforts that are synergistic with mitigation 	<ul style="list-style-type: none"> • Increased consumption of resources
11	Sustainable Cities & Communities	<ul style="list-style-type: none"> • All mitigation efforts lead to environmental sustainability • If these efforts are equitable, they can help reduce conflicts and violence 	<ul style="list-style-type: none"> • Evictions from informal settlements in order to build public transport, urban green spaces, biodiversity parks, solar parks, water recharging systems, etc. • Evictions can lead to immiseration, conflicts and violence
15	Life on Land	<ul style="list-style-type: none"> • Increased biodiversity can provide opportunities for generating green employment 	<ul style="list-style-type: none"> • Land devoted to biodiversity conservation reduces land available for human habitat, mainly housing, which in turn leads to increased land prices and hence the informalisation of housing and workplaces
16	Peace, Justice & Strong Institutions	<ul style="list-style-type: none"> • Public participation in decision-making 	-

Source: author.

The low carbon urbanisation pathway should simultaneously address the SDGs.

An example of how the two agendas can be effectively linked in the Indian context is provided in the Indian Deep Decarbonization Pathways Project (DDPP) report (Shukla et al., 2015). The report develops two scenarios: a “conventional” 1.5°C scenario, and a second “sustainable” scenario which takes an integrated approach to social, economic and environmental goals through interventions in, for example, investments in health, education and technology innovation, improving governance and promoting sustainable consumption behaviour (Shukla et al., 2015). In both scenarios, Indian energy consumption and hence GHG emissions are expected to rise by 2030. In both scenarios the report proposes a more equitable model of urbanisation which advocates for small and medium-sized towns, an even distribution of the urban population, the creation of new low-carbon infrastructures (particularly in the mobility sector), and the improvement of green infrastructure.

Conclusion

In this chapter we have examined climate mitigation activities in cities in the context of sustainable development pathways, identifying upfront the possibilities for conflicts so as to be able to formulate possibilities for policymakers to enhance synergies. With India being on a high economic and urbanisation growth trajectory, the global pressures on the country to meet the climate mitigation agenda and in particular the 1.5°C target are strong. However, urban India has severe deficits with regards to poverty, health, housing, employment and other indicators of the SDGs while remaining at low levels of urbanisation. As India’s urbanisation progresses, the government will be required to address mitigation of greenhouse gases (the government ratified the Paris Agreement in 2015). This chapter sought to remind us that while attempting to meet its Paris Agreement commitments, India should not compromise on the SDGs. The world has now set itself the target of 1.5°C temperature reduction, which requires more ambitious mitigation efforts. In such a situation, the low carbon urbanisation pathway should simultaneously address the SDGs. Addressing the two agendas simultaneously requires an understanding of their links – synergistic or otherwise – and of how the enabling conditions discussed above could mediate to create synergies or address potential conflicts.

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Notas al final

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