Human Face of Climate Change

From Risk to Resilience in Indian Cities

An Agenda for Policy and Action

TANDEM RESEARCH

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1 Resilience For All

Future Cities[1] in India are going to be shaped by an interplay between three major drivers of change: ubiquitous digitalization; demographic change; and climate change and related transformations in environmental conditions. India will add over 400 million urban dwellers between 2014 and 2050 bringing the urban population to over 800 million.[2] It is estimated that by 2030, India will be 50% urban[3] - by the same year, cities are projected to generate 70% of new jobs, and create more than 70% of the Indian GDP.

The narrative around cities as engines of double digit growth, smart innovation and expanding infrastructure, often mask the acute challenges of polarization, inclusion and equitable access to development in Indian cities. Social inequities along the lines of gender, ethnicity, caste and income levels are a persistent and defining feature of the life and experience of urban communities. Complex social vulnerabilities restrict the resilience and adaptive capacities of communities to cope with change and adverse events in cities.

Underlying causes of vulnerability are complex and interlinked. More immediate issues of poverty, marginalization, lack of rights and entitlements and livelihood security are embedded in deeper structural inequities of social systems and the slow erosion of solidarity, culture and social networks.[4] Nowhere are the social vulnerabilities more pronounced than in informal settlements, which are 'home' to 24% of urban population in India. People in informal settlements lack security of tenure, and live in poor quality and temporary housing, and without access to sufficient clean water and sanitation. Under the perpetual fear of state or private demolition and eviction, they remain most vulnerable to shocks.

According to the Global Climate Risk Index of 2018, India is the 6th most vulnerable country to climate change impacts.[5] World Bank estimates suggest that India will lose 2.8% of its GDP because of climate change impact by 2050. The country witnesses an average of 3,570 deaths annually, attributable to climate-related events.[6] Cities are particularly vulnerable to climate impacts, due to their concentration of resources, infrastructure, economic contribution and inhabitants. It is expected that climate impacts on Indian cities will include: a general increase in temperatures by 2–4°C, an increase of 7–20% in annual precipitation, with increased intensity, alongside increases in riverine flooding, cyclones, storm surges, and sea-level rise, risk of droughts and extreme water scarcity.[7] Yet, development plans for most cities have inadequate provisions for response and adaptation.[8]

'Resilient Cities' has emerged as one of the most ubiquitous policy narratives in response to climate change in dynamic and emerging cities of the developing world.[9] Visions of 'resilient cities' bring with them wider visions of society and need to be understood as 'social imaginaries'.[10] Undoubtedly - adaptive action to climate impacts is both important and urgent in India - but it's equally critical to unpack the diversity of ideas and practices that various

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actors associate with resilience. "Resilience is plurally perceived and pursued; complex power dynamics are inherent in the social and institutional processes by which particular sets of resilience strategies come to dominate." [11]

The dominant narrative around 'resilient cities' tends to focus on 'climate proofing'. It emerges from centralized planning cultures and disaster research and tends to exclusively focus on infrastructure investments and planning interventions. Informal settlements are often seen as 'slums' and planning failures - places to be cleaned up, or worse, cleared out. These narratives tend to distort or overlook the very serious issues of access and inclusion for resilience in future cities.

A resilience framing is helpful to think through the issues of preparedness in the face of unexpected, unknown and surprising impacts related to climate change. However, it is equally important to answer the more fundamental, or even simple, question: Whose resilience and to what? There are real examples of trade-offs - where large scale infrastructure built for resilience has led to further marginalization of the most vulnerable urban populations.[12] In the pursuit of resilience, hard engineering and technocratic programs of urban infrastructure are often used to 'wall out' and displace poor and informal communities, which are most exposed to climate risks.[13]

Our research shows that we need a much more complex and 'social' understanding of resilience to climate impacts in Indian cities. In Delhi's Hauz Rani settlement, Rahit, displaced from his village because of failing crop cycles and debt, lives in an 'illegal', un-serviced urban settlement only to get further exposed to new urban climate-related risks. Without proper identity, social networks, or livelihood security, he makes do and ekes out a marginal existence. Twenty-three-year old Sunny, in Katra Wazir Khan in Agra, has grown up hearing that land next to the Yamuna, where he lives with his family, will be someday taken from them by the government to 'make room' for the river, or worse, to still a river front condominium.[14] In the urban village of Caranzalem on the outskirts of Panaji, Devi Naik struggles with not just the changing seas but also the loss of coastal commons due to increasing tourism development.[15]

Policies for building the resilience of Rahit, Sunny and Devi to current and future climatic changes would need to address their current development concerns as well as provide for their future needs. Their 'lifeboat strategies' - to lash up something temporary and provisional from knowledge and skills acquired in everyday life - will not be enough. A complex portfolio of policies to secure their economic well-being; provide livelihood opportunities; secure 'legal' identity; enable access to urban services; secure access to natural resources (in Panaji in particular); and build basic infrastructure will be required. Above all, deliberative policy processes that engage multiple perspectives, world-views and plural social imaginaries of resilience, including those of vulnerable communities, will need to be supported.[16]

2 Policy Gaps

India has adopted various initiatives to comply with the global climate agreements. However, these measures overwhelmingly focus on green energy transitions and fall short of addressing urban climate resilience and urban poverty and development in an integrated way. For most of the last two decades, the narrative construction of the climate problem in India has been as a diplomatic rather than a developmental problem'.[17] The central national initiative on climate change - the National Action Plan on Climate Change (NAPCC), 2008 aimed at mitigating and adapting to climate change - does not address adaptation and resilience, especially in urban contexts. The NAPCC also has not been reviewed or updated in the decade since its inception and serves more as an instrument to comply with international requirements and commitments for national climate change actions.[18]

The national mission on Sustainable Habitat is the only mission under NAPCC that focuses on urban climate actions through better solid waste management, energy conservation, building codes and shifts to public transport. Consequently, urban development policies and planning generally do not take into account the impact of climate change on vulnerable communities and the need to build their coping capacities. City resilience has not made it into the national policy discourse in any meaningful way, which could translate to a central mandate for cities.[19] Often because of the increased political attention to the issue, climate concerns have been found to be added superficially to the existing policies instead of addressing the fundamental changes required at the local level.[20] Adaptation in cities and the vulnerabilities of urban poor living in informal settlements are almost entirely ignored.

In India's federalist structure, institutional and financial capacities of city level governance remain weak.[21] India's urban development policies are mostly driven by national ministries such as the Ministry of Housing and Urban Affairs and Ministry Environment, Forests and Climate Change, who then provide guidelines and financial resources for state governments to implement plans through their municipal bodies in cities.[22] The multi-level policy architecture often leads to overlapping mandates and lack of coordination across scales of governance and also between various departments.[23] Studies suggest that where local governments demonstrate proactive strategies on issues like climate change, they often lack legal mandate from national governments to implement advanced measures.[24] Implementing city level resilience and integrating it with urban development plans have been problematic as climate change has not emerged as a priority agenda for a city administrations.[25]

While climate change actions are emerging in Indian cities through initiatives such as the Smart City Mission and international city partnerships for sustainable and low carbon development,[26] their strong dependence on national and state governments for approval and financial support is a barrier for effective action.[27]

For the realization of the proposed actions of NAPCC

"For example, there is no intermediary body that enables the long list of projects emerging from state plans to be developed into bankable climate finance projects."

at the sub national level, State Governments were called upon in 2009 to prepare their own State Action Plan on Climate Change (SAPCC) consistent with strategies in the NAPCC. The SAPCCs common framework largely focused on sub-national planning, building capacities for vulnerability assessment and identifying investment opportunities based on the state's priorities.[28] By 2014, 30 states had prepared their SAPCC, compiling both adaptation and mitigation strategies. However, these suffer from coordination failures. "For example, there is no intermediary body that enables the long list of projects emerging from state plans to be developed into bankable climate finance projects."[29] The SAPCCs are definitely a step forward from the NAPCC and many have recognized urban poverty and increased vulnerability of 'slum dwellers' as a major challenge. The Uttar Pradesh SAPCC mentions "Urban poverty is a big challenge and many migrants and dwellers in city slums are most vulnerable to climate change."[30] However, the goals of infrastructure, urban services improvements and state climate action plans are not yet integrated towards a common resilience and development framework. SAPCC's remain weak and have been ineffective in catalyzing climate action in Indian cities.[31]

The central government has undertaken several urban development schemes to promote urban infrastructure development and sustained urbanization in India. Major ongoing initiatives include: The Smart Cities Mission (SCM), Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Project, Pradhan Mantri Awas Yojana (Urban) or Housing for All by 2022 Mission and Jawaharlal Nehru National Urban Renewal Mission (JNNURM). Some of these schemes include focus on public transportation, affordable housing, reducing pollution – issues that are indirectly associated with climate resilience. Social vulnerabilities and climate resilience of informal settlers is not addressed directly under any of these missions. The policy focus is overwhelmingly on hard infrastructural measures or mainstreaming climate resilience into urban planning. However, these rarely address how to solve the issue of informal settlements which are at the core of the climate vulnerability problem.

3 Policy Pathways

Addressing climate change impacts in cities will require action at multiple levels of policy making including national, state, city and community level. However, it is the municipal level that is perhaps the most critical and also the weakest. As the impacts of climate change are felt directly at the local level, it is at this level that institutional solutions that target wide numbers of people need to be introduced.[32] An effective national policy framework would bring forth the importance of, and the need to, introduce urban climate resilience; draw out a structure of the institutions and regulations needed to implement it; and identify windows for financing these actions.

1. National Level Actions

National political frameworks condition the relationship between national, state, and local climate initiatives. A local government's ability to introduce climate resilience strategies depends on the country's institutional set-up as well as the availability of resources, technical expertise, and political will. The national government needs to create a national framework to facilitate action on climate resilience by state government and provide them with funds to implement programs and policies.

The NAPCC identifies measures that promote a 'co-benefits' approach - balancing economic growth and climate action, instead of exclusive strategies to tackle climate change. The NAPCC needs to be urgently updated - global understanding of climate impacts and frameworks for addressing these have evolved significantly in the past ten years or so. This action plan also needs to address the issue of urban resilience directly. Similarly, flagship schemes and urban development projects like Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Rajiv Awas Yojana (RAY) among others, can integrate climate resilience within their mandates more effectively. Urban poor living in informal settlements are the most vulnerable population due to lack of access to proper housing, basic services and support.[33] Including informal settlements and their resilience needs within the domain of these schemes will be critical.

Climate resilience of urban poor depend on a range of underlying social and economic vulnerabilities. Lack of access to good education, absence of social security systems, loopholes in labor laws, lack of formal employment options, and a lack of legal status are all directly related to climate resilience. To truly enable resilient communities, social development cannot be isolated from climate resilient development; just as the climate impacts can't be isolated from the range of everyday challenges they face. Consequently, cross-sectoral policies that contribute to human resource development, livelihoods security and gender equality are critical. It is important to institutionalize and shift the responsibility for climate adaptation from single agencies or the central ministry to multiple cross-cutting domains of health, sanitation, housing, human resource development, and urban poverty alleviation,

by mandating national and state ministries in the respective domains to help draft policies to aid the national missions on climate action.

As observed in the case study in Agra, most state and city governing institutions lack the tools, resource and capacities they need to effectively serve people living in informal settlements in Indian cities; the people themselves have limited social mobility and access to information. In order to change that, developing adaptation strategies at multiple scales with the government, civil society, and private sector is imperative. This may include fast-track national policies that enable traditional and tourism-based livelihoods, for example for fishermen in Panaji and marble craftsmen in small and medium industries (SME) in Agra. Initiatives to help alleviate below-poverty-line households and improve on the conditions of urban services and household facilities in sanitation and food supplies is imperative in Delhi. Poor households also struggle to access small loans to build or retrofit their homes because their rights on the lands on which they live are not recognized.

Resilience implications of natural resource policies also need to be thought through - for example, the recent Coastal Regulation Zone notification 2018 (CRZ 2018) has dramatically reduced the setback within which no construction or development is permitted from 200 meters along the coastline to 50 meters.[34] This further threatens access to beaches and coastal commons for traditional fisher-folk living in urban villages in coastal cities like Panaji.

2. State Level Policies

State governments have jurisdiction over public health and sanitation, agriculture, land improvement and water. Political and financial decisions about public infrastructure, land-use management, and public investments also state subjects. The state governments and local governing bodies need to recognize the unique climate context of their cities and the vulnerabilities of its inhabitants, especially the urban poor. Following updates in the NAPCC, Indian states need to strengthen their SAPCCs and translate the policies into on-ground actions by coordinating between the national and local level agencies.

At the state level, it is crucial to identify the unique position of spatial planning to define and ascertain the development regulations of the state. These can directly be used to address susceptibility and resilience building against climate impacts. Often land-use demarcations directly contribute to the condition of informal settlements; special provisions can be taken to reduce the vulnerability of these dense pockets to extreme events and hazards. State level land-use planning can help direct urban growths and infrastructure development in safer areas while preserving critical natural ecosystems and peri-urban green areas that act as first line of defense against climate change and extreme weather events. For example, newer urban expansions can be directed away from low-lying areas in coastal cities, and the protection and revival of lake-beds and wetlands can help prevent flooding. Developed Asian countries such as Singapore,[35] Taiwan[36] and South Korea have taken regional level steps towards climate resilience by expanding their boundaries of urban planning and mainstreaming resilience into spatial planning. Their approaches can be studied in detail for policy guidance.

3. City Level Actions

Adaptation and resilience are predominantly local processes, involving local authorities, communities, and urban stakeholders. Municipal governments are very important and they need to enable more participative decision-making and involve the wider community in designing and implementing adaptation policies.[37] Resilience planning at this level requires communication, cooperation, and coordination between different stakeholders. This type of coordination between the government bodies, civil society and private partners is best handled locally. The

incremental cost of adaptation for city governments can be considered in the context of, or in addition to, already planned development costs. For example, if a city is already exploring whether to invest in infrastructure or service to an informal settlement, the cost of adaptation should be absorbed in existing development plans.

As climate change impacts are unevenly distributed among individuals and communities due to differential exposures and vulnerabilities, there is a need to assess adaptive capacity at a local scale and situate them within city, state and national governance. A vulnerability report is helpful in offering an assessment of the threats; exposure and sensitivity of the city to climate impacts; and given constraints on time, capacity and policy mandates. Research, capacity building and data management need to be initiated as starting points considering that knowledge about specific climate change related impacts on urban centers is not available and differs from city to city.

The first step to achieving this is creating a framework for vulnerability assessment with the assistance of local civil society organizations and research institutions. Evidence-based vulnerability assessment is key to learning from the experiences of informal households, complementing policy making and programming processes at local, state and national levels. Successful adaptation measures by individual households can be scaled up and implemented on a larger scale. Policies providing individuals living in informal settlements with economic stability, and empowering community members to engage in local politics will aid capacity building efforts. An assessment framework will also be useful for local stakeholders and community members to track progress.

A city level detailed profiling and vulnerability assessment can build an understanding of principle threats in the area; the potential exposure in terms of urban services, assets or functions most impacted; and the differential vulnerabilities of people and communities exposed to these impacts in the degree of sensitivity. This will help identify and target adaptation measures keeping in light the systems and communities with the greatest vulnerability. These measures can thereby be implemented and mainstreamed into higher level policies.

An approach that worked in one state or city might be totally inappropriate in another. While technical and financial help from central and state governmental agencies is needed, only a strong local civic agency can ensure that the local needs, urban forms, social priorities, and environmental conditions are reflected in local plans for urban development. This requires urban local bodies to be well equipped not only in terms of financial and political powers but also expertise, knowledge and credibility.

Local municipal bodies in Indian cities often have to deal with variation in policies with shifting governments. This leads to grievance, continuous criticism of local government for insufficient and inefficient services, and pessimistic citizens who do not trust their local authorities. Local governments need to advance their expertise, authority, and credibility needed to deal with local problems. For example, 100 Resilient Cities, formerly the Asian Cities Climate Change Resilience Network (ACCCRN), helps improve national research and train government institutions for a better technical capacity. They placed an expert Climate Resilience officer (CRO) within local teams and municipalities to strengthen the resilience building actions locally. In Surat, the CRO (Kamlesh Yagnik) is a learned expert and Founder Trustee of Surat Climate Change Trust (SCCT) who has studied vulnerabilities, impact and adaptation strategies for climate change in Surat. In collaboration with the local government, he worked on early-warning systems for river floods, initiated various e-governance projects for city administration and provided support and guidance for city-wide resilience strategy. Strengthened local bodies potentially mean better assessments and focused actions.

Building public awareness and community outreach is primarily a local effort, involving a host of strategies to share information and education on associated health risks and simple mitigation measures for households to employ. Local and national media, along with new media platforms such as Whatsapp and social media channels, are effective for building public awareness towards the issue. Similarly, for coastal communities, early warning systems can significantly reduce impacts of affected communities through correct communication and reliability of the institution. For this, it is important to have a strong political commitment and durable institutional capacities along with public understanding and trust in the system.

Under extreme circumstances, like in flood-prone Agra slums, there is a need to support efforts to relocate resources for communities considering relocation as an effective and necessary solution. Relocation of informal settlements is itself a complex phenomenon and the solutions might lie in effective community engagement and participatory planning. Similarly, in case of Delhi's Khirki village, which is prone to facing extreme heat waves and water scarcity, the community can be engaged to understand rain water harvesting and greening impacts better. This will enable retrofitting greens and roof-based rainwater harvesting solutions within the community with help of municipal support.

Political economy and vested interests determine to a large extent local governments' choices of adaptation measures, if any are taken at all. Weak checks-and-balances systems make such decisions possible. Innovation in digital technology and e-governance provide a unique opportunity to tackle issues of climate data, public awareness, governance and transparency. E-governance platforms have the capacity to restructure transparency and accountability systems, and therefore significantly transform the governmental performance for urban climate resilience. Internet platforms such as social media, online citizen charters and feedback centres allow citizen participation in political processes. Similarly, feedback loops and openly visible legal and financial responsibilities of different government agencies further enable faster and better service delivery.

Technology could also be deployed in monitoring and efficient management of urban services such as electricity and water supply. There is potential to use tools and systems to keep tabs on water quality; supply and network maintenance; early warning systems for flood and drought control; detecting leaks in underground pipelines; smart meters to prevent misuse of electricity, etc. Modern analytics tools, predictive systems, big data technologies and machine learning will all play an important role in the future of climate change and how developing countries deploy these resources for inclusive development in cities.

3. Community Level

Different communities have their own perceptions regarding vulnerability and capacity depending on their geographic and socio-economic conditions, and experiences acquired through each disaster. Since most informal settllements are illegal, there is a low chance of residents procuring basic facilities such as clean water and sanitation, roads, energy and public transport. Water shortages, heat waves and floods trigger a chain reaction that affects other aspects of their lives such as health, livelihoods and capacity to withstand climate change impacts. As a result, people survive disasters and crises through their own means, which are important starting points for any risk assessment. Initiatives that strengthen community networks and internal institutions are important for building local level resilience.

It has been shown that many traditional coping tools and practices exist (e.g. pooling of funds for water tanks in Agra slums, park maintenance in Khirki village through intervention of the local Mosque, etc.) and the role of an external and local organization is to recognize and support these protective mechanisms. Traditional knowledge and frugal solutions employed by households can be scaled up. Small measures like

"Strong community groups and detailed community-level information systems can be extremely effective for initiating engagement in such partnerships."

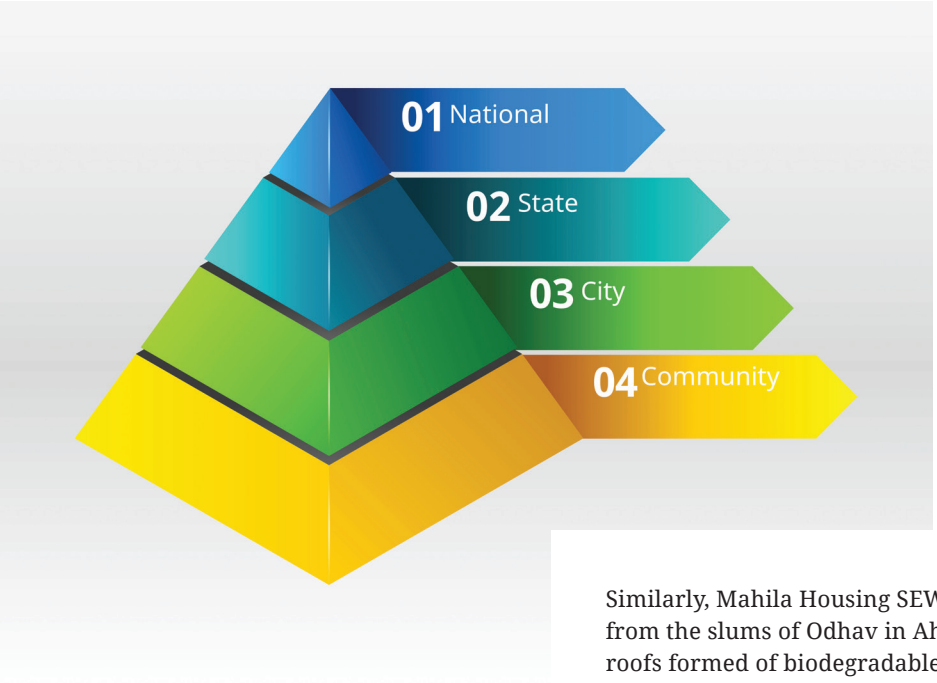
free public water taps, reflective paint on roofs, and training of medical staff to identify early signs of climate-induced diseases can help reduce mortality risks. Specific awareness campaigns and outreach programmes in collaboration with local NGOs and community leaders can sensitize communities towards resilience efforts.

Similarly, urban regulations at local levels such as building by-laws provide information and design parameters to regulate building construction and planning unique to each urban area. These can encourage climatologically-informed building construction, incorporating vernacular resilience techniques employed by households in the region. A significant challenge remains in the filtering down of these regulations into unplanned and informal neighborhoods. However, a strong community network and relevant institutions within them can enable positive changes. Strong social networks are important for communities where residents work together to build resilience at the local level. A community engagement model should be encouraged involving local organizations, incentivized companies and through institutional participation.

Climate adaptation at the grassroots can only happen when measures are taken to provide social and economic security to vulnerable groups. Tenure security, employment, financial insecurity, and social networks also affect the sensitivity of the urban poor to climate change and disaster risk. Economic vulnerability hampers their investments in services and housing improvements. Therefore, within these informal settlements, steps need to be taken to identify and issue land and property licenses or right of occupancy to improve security of tenure, which could be used as collateral for economic empowerment.

Identifying historical patterns and observable changes due to climate change and understanding their impacts on people requires local knowledge, as well as in determining the extent of exposure of people, assets, and livelihoods. For the urban poor, understanding what the city can and cannot provide is an important step. "Strong community groups and detailed community-level information systems can be extremely effective for initiating engagement in such partnerships."[38] Participatory planning also helps mainstream specific social issues related to gender, livelihoods, health or education into adaptation strategies - thereby empowering the most affected groups.

For example, GenderCC - Women for Climate Justice, a global network working for climate and gender justice - has started a pilot initiative for the inclusion of gender into climate adaptation in some slums of Delhi. In slums like Bhalswa and Bawana in Delhi, women's groups have started to hold the government accountable for providing basic services under the initiative. Community-level participation of women has since spurred more toilet construction as well as street lights in the areas to ensure women's safety. The women groups now organize monthly meetings with the local municipal councilor to communicate their needs and challenges. This reflects a change in women's level of participation in public dialogue.[39]



Similarly, Mahila Housing SEWA Trust assisted women from the slums of Odhav in Ahmedabad to make roofs formed of biodegradable polymer that help significantly reduce temperature during summers.[40] In Kampung Melayu, an informal settlement in Indonesian capital Jakarta, residents have responded to an increase in the severity and frequency of flooding by developing an early warning flood system. “Neighborhood and village heads receive SMS messages on their mobile phones from floodgate areas upriver when the water level is getting high. They can then spread the news in the community by broadcasting from the minaret of the local mosque so that residents can prepare for the coming inundation.”[41] Despite obvious benefits of participatory planning, this does not always happen in Indian cities partly due to negative perceptions around policies related to informal settlements. There is a need to bring to forth successful examples from Indian and other developing countries cities where partnerships between communities and local governments have led to climate and disaster risk reduction for the urban poor.

4 Conclusion

Climate change and associated disaster risks are increasing in Indian cities and will continue to disproportionately impact the poor and vulnerable populations. Adverse effects of climate change result in a loss of life, poor wellbeing, damage to household and community assets, disruption of livelihoods and loss of income for these populations. Solutions that recognize localized risks and address them in the context of wider socioeconomic development are thus urgently needed.

Policies need to strengthen the agency and capacity of vulnerable communities to absorb,[42] adapt and recover from the adverse effects of climate change and disasters rapidly, without compromising their long-term socio-economic development.[43] This requires a more systematic approach to ensure that considerations of resilience are explicitly integrated into the design and development of infrastructure of upcoming urban projects. National, state and local policies on development and climate resilience should not operate in silos. Above all, there is a need for what Iris Murdoch calls '**attention**': the humble and empathetic entering into the lived experience of communities eking out a living with resources at hand and knowledge and skills acquired in everyday life, to support their agency and capacity.

Endnotes

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Tandem Research's 'Future Cities' initiative focuses on three themes: Resilience, Technology & Culture. How do we design cities that are resilient to shocks and changes; that represent an equitable distribution of technology gains; and that are thriving centers for cultural and civic participation?