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Strategic Foresight and Futures Thinking in Urban Development: Reframing Planning Perspectives and Decolonising Urban Futures

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**FUTURE CITIES SERIES:
PRACTICAL PLANNING GUIDANCE
FOR INNOVATIVE, RESILIENT AND
INCLUSIVE CITIES OF THE FUTURE**

DISCUSSION PAPER 1

OCTOBER 2022

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FOR INNOVATIVE, RESILIENT AND
INCLUSIVE CITIES OF THE FUTURE**

DISCUSSION PAPER 1

OCTOBER 2022

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About UN-Habitat

The United Nations Human Settlements Programme (UN-Habitat) is the United Nations programme working towards a better urban future. Aimed at promoting socially and environmentally sustainable human settlement development, UN-Habitat works with partners to promote urbanisation as a positive transformative force for people and communities, reducing inequality, discrimination and poverty. UN-Habitat provides technical assistance, policy advice, knowledge and capacity building to national and local governments in over 90 countries.

About ISOCARP

Since 1965, the International Society of City and Regional Planners (ISOCARP) has been bringing together individual and institutional members from more than 80 countries with the vision to make cities and human settlements inclusive, safe, resilient and sustainable through integrative participatory urban and territorial planning. Being a global association, ISOCARP offers planners from all over the world opportunities to find the right people and collaborate in developing, disseminating and comparing ideas, initiatives, proposals and projects.

About CoP Urban Innovation

The Community of Practice (CoP) on Urban Innovation – with the motto Urban Future – builds upon the MoU between ISOCARP and UN-Habitat. As a platform for collaboration, CoP Urban Innovation aims to identify and up-scale proven effective innovations in urban design, urban planning and governance, climate change, the economy of innovation, and social innovation. Innovation has become an increasingly important issue as many development-oriented organisations, including UN-Habitat, continue to grapple with the challenges of sustainable urbanisation. For UN-Habitat, innovation is not only a recognised tool for change identified by the Secretary General, it is becoming a critical internal mindset and tool to deliver the most creative, context-sensitive and dynamic solutions to our partners and beneficiaries. It is also important as a device to provide inclusive and sustainable impacts with our partners. As a vibrant collective of individuals interested in planning and sustainable urbanisation, ISOCARP is also keen to embrace the potential of innovation to understand its role in delivering inclusive and resilient cities.

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1

URBAN FUTURES

Innovations Shaping Our Cities



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Welcome to the first publication resulting from the collaboration between UN-Habitat (United Nations Human Settlements Programme) and ISOCARP (International Society of City and Regional Planners) as part of the joint Community of Practice (CoP) on Urban Innovation. This inaugural CoP Urban Innovation publication – titled Future Cities – aims to explore breakthrough ideas, new knowledge, and new practices related to urban planning and governance innovations for sustainable urban development.

Increasingly, innovation is becoming an important issue shaping the future of our cities. Many development-orientated organisations, urban practitioners, policymakers, politicians and stakeholders continue to grapple with the challenges of sustainable urbanisation.

For UN-Habitat and ISOCARP, innovation represents a recognised positive agency for sustainable change in cities. It is also a critical internal mindset and means to deliver the most creative, context-sensitive and dynamic solutions in cities. Innovation is the process, actions and outcomes that can create and provide new knowledge, tools and sustainable solutions to improve the living conditions for all in cities.

Innovation can take many forms and is not necessarily about high-tech solutions – the best solutions are often very low-tech, whether digital or non-digital, taking shape as a process, practical tool or application, or mindset and cultural change. When approached from a collaborative perspective, urban innovation can efficiently deliver impact at scale, putting people at the centre of the development process and ensuring that no one and no place is left behind.

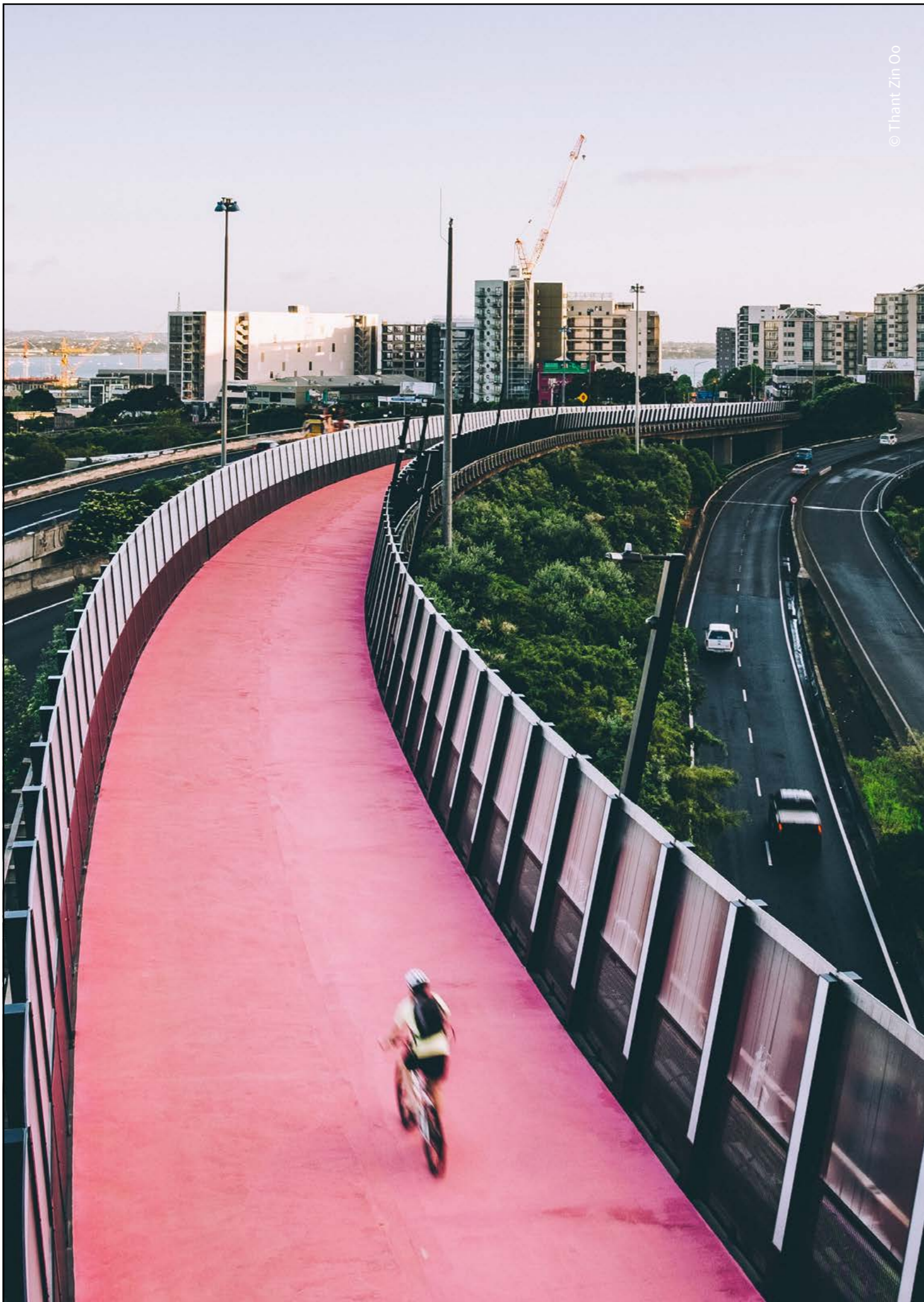
Innovation is an essential problem-solving system for our everyday living and our capacity to tackle the most pressing challenges the world faces today. Most of these challenges, including those resulting from unplanned or unsustainable urbanisation, are interconnected, meaning that the next generation of innovators has a responsibility and opportunity to respond with innovative knowledge, insights and actions.

To be viable in various global contexts, cities require low-cost, practical and tested solutions that build sustainable communities, healthy lives and economies that leverage creativity and digital transformation. Among all its policy and practice dimensions, the practice of urban planning is affected by innovation and driving new and innovative ways to improve the urban environment.

Within this first Future Cities publication, you will find a set of papers exploring how planning innovation significantly contributes to sustainable urban development. From the role of strategic foresight and future thinking to innovations in climate action and social inclusion, to name a few topics, the papers provide practical examples of innovation in the practice of urban planning and governance.

The publication concludes with a reflection on the lessons and implications of the ideas raised. It provides readers with valuable and engaging ideas to bring or continue to engage with innovation in their planning responses for sustainable urban development. Overall, we wish to highlight the potential that innovative planning approaches offer many urban stakeholders, including planners.

Enjoy the ideas and knowledge shared!



2

FUTURES THINKING

Strategic Foresight and Futures Thinking in Urban Development: Reframing Planning Perspectives and Decolonising Urban Futures

TJARK GALL AND ZAHEER ALLAM

The SDGs, Paris Agreement, New Urban Agenda, and European Green Deal stress that our future is at stake in the face of an intensifying climate crisis. Urban areas are simultaneously victims, battlegrounds, and innovative labs to find new solutions. The current circumstances require immediate global and simultaneously localised action while providing a window of opportunity for urban leaders to shape a sustainable and inclusive future. Yet, any innovation toward urban futures necessitates a transdisciplinary perspective on trends, developments, and possible transition levers. This contribution aims to provide a conceptual foundation for sustainable transitions towards preferred futures by presenting current research, supplemented by reference cases on integrating this into urban practice and innovation.

¹UNESCO, “Futures Literacy.”

While used frequently, a clear definition of *futures* is paramount. What are futures, and why referring to them as multiple and not one future? What are the ways to work with or towards them? Existing approaches range from scenarios and visions to numerical forecasts. Summarised in the term *futures literacy*, i.e., the capability ‘to better understand the role that the future plays’,¹ the goal is to strengthen future thinking for planners and policymakers alike. Some core elements are the conceptualisation of multiple possible and preferred futures. Others are on the advantages of exploratory and experimental futures or the decolonisation of futures. The latter has particular relevance for the planning field, where plans are often drawn for several decades and, in many cases, already outdated or even destructive after a fraction of the time.

This contribution outlines the conceptual components of futures thinking and simultaneously presents methods and tools to implement strategic foresight and futures thinking into innovative planning, design, and policymaking. Firstly, specific references from the urban systems field highlight ways of integrating these approaches into practice. The following section provides a brief theoretical foundation, focusing on multiple and preferred futures and the decolonisation of futures, to be followed by three innovative types of application in the urban context. The first introduces scenario planning, the second urban visions, and the last is the integration of urban citizens of today and tomorrow.

A brief Introduction to sustainable urban futures

Urban planning, design, and governance are the fields that share society’s task to take the existing urban areas and their embedded challenges and develop plans and policies that aim to transform them favourably. This requires a comprehensive understanding of:

- The current situation and its challenges, trends, and ongoing development
- The arising challenges and circumstances of tomorrow
- The adequate methods and tools to link the present to the future

Unfortunately, the past century highlighted urban planners as prone to make decisions that lead to more or different challenges later. Currently, cities globally are trying to convert ageing infrastructure from, for example, the highways and motorways that dissect our cities² and globally cause millions of fatalities annually and air pollution,³ to the artificially contained water bodies that result in flooding.

At the core of the issue lies great uncertainty about the future and the urban managers’ attempt to anticipate the impacts that any proposed solutions might have. This uncertainty drives the necessity for and is the foundation of the field of future studies. A central tenant of which is the desire to improve our understanding of the future and integrate it into strategic methods. Many of its key concepts are visualised in a cone-shaped diagram (Figure 1). Influenced by the past, people are today part of a single global state. Moving further along the time axis, the more possibilities arise. At any time in the future, there are various possible scenarios, grouped into possible, plausible, or probable ones.

Further, preferred futures, defined as those that a particular social group wants based on their priorities, allow to form urban visions. From such visions, it is possible to go backwards, analyse what actions would need to be taken, and translate this into plans and policies – always keeping in mind that multiple outcomes remain possible and must be considered in the process. The focus here is on the practical implications of working with scenarios and visions and defining what preferred by a specific social group might mean.

²Lecroart, “From Expressways to Boulevards.”

³WHO, *Global status report on road safety 2018*; Anenberg et al., *Global Snapshot*.

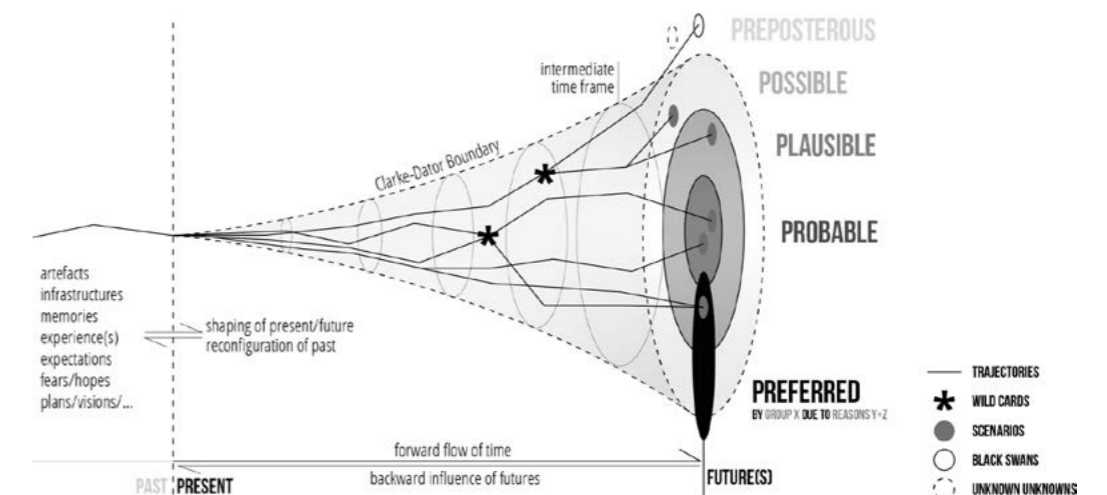


Figure 1 : Futures cone showing increasing possibility space and different types of scenarios. © Gall et al., 2022

Finally, the notion of decolonising futures is highly relevant in the planning context.⁴ Planning decisions today will positively or negatively impact the next generations to come. Today, it is possible to evaluate which past decisions were successful and which were not. The same will hold for the future. Roughly 6.7 billion urban residents will judge in 2050 about our current choices.⁵ Decolonising the future shall allow future populations to make their own decisions, or as stated in the second part of the well-known quote from the Brundtland Report⁶ in 1987: not to compromise ‘the ability of future generations to meet their own needs’. This can be translated into two precise learnings: first, any decision today that will be at the expense of future generations should be avoided. Second, where possible, everything that is planned and designed today should serve for the flexibility of tomorrow. This will allow future generations to appropriate what they inherited in their best knowledge. Examples are constructing dismountable and recyclable or reparable buildings, flexible infrastructures that will change future needs (e.g., less parking, different mobility services), or spatial planning frameworks that will enable densification, changing uses, and evolving mobility concepts. The following section introduces some approaches to integrate this paradigm into urban planning and governance practice.

Translating futures theory into practice

How to incorporate scenario planning, urban visions, and future generations’ needs into planning and decision-making practice? This section describes how urban stakeholders have worked successfully with urban futures in three specific contexts. Each section focuses on one goal. This research refers to several cases to present the central ideas and point towards further in-depth knowledge. Despite the separate discussion, the three approaches are closely linked and should be applied jointly.

Planning with multiple possible urban scenarios

Planning for different possible futures can be facilitated by scenario planning. With its early beginnings in the middle of the past century, scenario planning has been used in various ways, including territorial socio-economic scenarios,⁷ spatial and urban planning,⁸ or scenarios for sub-systems of the urban ecosystem, such as the transportation mobility sector.⁹ It refers to methods that create alternatives, or more precisely: alternative, multiple futures to open up the present, contour the range of uncertainty, reduce risk, offer alternatives, create more flexible organisational mindsets.¹⁰ Scenarios can inform and guide decision-makers by creating normative or descriptive alternatives, expanding cognitive limitations from bounded realities, and formulating relatable and plausible future narratives.¹¹ Finally, scenarios can be seen as a story that describes potential futures, including the process of reaching that future (Figures 2–4).¹²

Purposes of scenarios are vast, ranging from creating alternative pathways, allowing for imagination (visions), creating fear/urgency (dystopia) or hope (utopia). Further, they can support the testing of assumptions of impacts of

⁴Candy, “The Futures of Everyday Life.”

⁵UN DESA, *World Urbanization Prospects*.

⁶WCED, *Our Common Future*.

⁷Godet and Durand, *La prospective stratégique*.

⁸Goodspeed, *Scenario Planning*.

⁹International Transport Forum, *Travel Transitions*.

¹⁰Inayatullah, “Future Studies.”

¹¹Crawford, “A comprehensive scenario intervention typology;” Weidema et al., *Scenarios in life cycle assessment*.

¹²Parson et al., *Global-Change Scenarios*.

Figure 2 : Scenario planning workshop at 57th ISOCARP World Planning Congress, November 2021 in Doha, Qatar. © Authors



Figure 3 : Scenario localisation workshop for Paris-Saclay, April 2022. © Authors



Figure 4 : Working materials for interactive scenario workshop of Anthropolis Chair. © Authors



¹³Wilkinson and Eidinow, “Evolving practices;” Weidema et al., *Scenarios in life cycle assessment*.

¹⁴Crawford, “A comprehensive scenario intervention typology.”

today’s decisions, make plans and policies more ‘future-proof’ and robust, or inspire, enable, and enforce existing policies. Scenarios can be rational-objectivist, social-constructivist, or normative-deterministic, each with its respective advantages.¹³ Further, the methods can be classified by their goals into *predictive scenarios* (what will happen), *exploratory scenarios* (what could happen), and *normative scenarios* (what shall happen) concerned with achieving future objectives. The latter comes in two sub-categories: *preserving systems* and *transforming systems*.¹⁴

Planners and experts usually try to determine *what will happen* to plan for the expected circumstances. This includes private development, the future needs

of the population, or environmental risks. However, history proved a high margin of error. Thus, exploring *what could happen* already allows to prepare better for what possible future conditions might arise. For example, a master plan might be developed for the anticipated population growth of one million people over the next ten years. Exploratory scenario planning enables to evaluate how the prepared plans could turn out if there were two million or only 500,000 inhabitants.¹⁵ Could the existing and planned infrastructure accommodate them? Would it be possible to adapt to the new requirements in time? Could changes to the original plan improve the flexibility toward varying future developments? Asking these questions can simultaneously create more adaptive urban frameworks and plans, allow for more self-determination of future planners, and remind today's experts that it is not always possible to know what the future will bring.

When facing various future scenarios, it is possible to further evaluate them and assess, for example, their sustainability aspects or level of consideration for vulnerable groups. This allows to choose one or several preferred scenarios and explore possible pathways and what must happen when to get there. These normative, *what shall happen* scenarios are closely linked to the development of urban visions and can provide a valuable foundation for them. The following section outlines some key ideas of visions and links to some interesting examples.¹⁶

Mainstreaming urban visions

Visions are an essential component in the *futures* domain of urban planning, especially in helping bring people together as they pursue shared objectives and common goals of welfare, desired goals, and quality of life standards. On this front, numerous agencies are active in driving global agendas. The United Nations Human Settlements Programme (UN-Habitat) highlighted five key dimensions that, when pursued, would lead to prosperity in the future of cities: environmental sustainability, equity and social inclusion, productivity, infrastructure, and quality of life.¹⁷ While these can provide a sound basis for developing visions for sustainable urban fabrics, numerous other dynamics had since emerged in the planning arena, especially post-2015 when the world faced sustained climate challenges and welcomed more policy frameworks such as the Sustainable Development Goals, the Paris Agreement, the New Urban Agenda, and the 2030 Agenda for Sustainable Development. These helped shape analytical frameworks that guide urban *narratives* and *visions* cohesively and seamlessly. Especially in the face of climate change, the Covid-19 pandemic and the anticipated financial crisis blur the expected environmental sustainability and socio-economic development outcomes. To form cohesive narratives, especially regarding financing and taking responsibility. However, in building urban visions, cohesion is paramount. It can help different groups appreciate and acknowledge past narratives (e.g., cultural identities, success, and failures) and build on those to shape desired pathways. In retrospect, it is possible to introduce concrete and actionable policies and objectives that would help strengthen the success of existing visions while at the same time

¹⁵ Goodspeed, *Scenario Planning*.

¹⁶ For an extensive overview of scenario planning, see Robert Goodspeed's *Scenario Planning for Cities and Region*.

¹⁷ UN-Habitat, *State of the World's Cities*.

¹⁸ Salingros, *Anti-Architecture and Deconstruction*.

¹⁹ "Transforming Urban Curacao."

²⁰ "Positive City Exchange."

correcting and sealing loopholes in current policies. For instance, urban planning principles inspired vehicular flows within urban areas and, over time, became an issue of magnitude in contemporary cities. While such was considered a better 'vision', promoted by then-celebrated urbanist Le Corbusier,¹⁸ car-dominated cities have been proven to be unrealistic and unsustainable; hence, the urge in many cities to adopt alternative planning models that focus more on people-centric elements.

Consequently, it is vital to ensure that anticipated future outcomes espoused in current urban visions will not endanger future generations similarly. Thus, contemporary visions need to be created flexible such that it will be possible for the next urban generations to tweak them to fit their realities. This is particularly relevant with climate change as a 'wicked problem', meaning that the nature of the problem is ever-changing with shifting urgencies, demanding that policies react accordingly.

	Engage	Design	Activate	Accelerate	Support
Standardisation	Evaluation	Visualisation	Simulation	Funding	Sharing
Policy development	Review	Revision	Planning	Budgeting	Analysis
Innovation partnerships	Appointment	Linking	Collaborating	Prioritising	Portfolio management
Organisational development	Identification	Leadership	Intrapreneurship	Self organisation	Twinning
Citizen engagement	Acknowledgement	Deliberation	Localisation	Connection	Amplification
Project development	Pitching	Prototyping	Delivering	Capitalising	Storytelling

Table 1 : Bold City Vision Framework for 2050 with six main processes and 30 sub-processes. © +CityxChange

Further, urban fabrics can ultimately be perceived as the foundational precepts for many services, such as transport, energy, or water. Therefore, it is essential to design urban visions with interdisciplinary viewpoints. Additionally, well-crafted visions that consider sustainability transition needs and societal welfare must also include implementation pathways to ensure political and financial interests. The latter is particularly important in the global south, where local governments often do not have financial means for urban development and rely on partnerships, for example, with the private sector, international agencies, and participatory networks with the public. The list of promising urban visions currently in development or already established is long: United Nations Office for Project Services (UNOPS), in partnership with the ministry of Curaçao and support of members of the International Society of City and Regional Planners (ISOCARP), localised the New Urban Agenda through community expert-led urban visions.¹⁹ The EU-funded project +CityxChange,²⁰ with ISOCARP Institute as one of the partners, develops Bold City Visions 2050 for Trondheim, Norway, Limerick, Ireland, and five other European cities. Following a defined, integrated process (Table 1), the openly accessible development framework is rooted

in co-creation, sustainability, and inclusion. The resulting visions guide the mainstreaming of sustainable practices and values into various local plans and policies.²¹ Since the establishment of the framework, it has been replicated in other cities and widely disseminated, among others, via the Trondheim established Geneva UN Charter Centre of Excellence on sustainable urban development.²² In different contexts, specific, optimistic, and well-developed visions like the Agenda Teresina 2030 in Brazil have led to global attention, new partnerships, investments, and various promising local solutions, such as transport monitors and open data platforms.²³ Each of these examples shows the potential that effective, strategic, and integrated urban visions can have on global, national, and local scales. It can be translated into mainstreaming objectives and enabling local action. The following section zooms in further on the role of citizens in possible and preferred futures.

Integrating urban citizens of tomorrow

Visions can only be compelling if adopted by urban residents. Thus, it is key to frame them according to ‘urban users’ while considering the different variables and discourses for the private and public sectors and the political gains. This practice of viewing urban fabrics as a complex ecosystem, and the pursuit of its understanding as intricate, comprehensive networks, can be considered to achieve *wholeness*, a concept introduced by Christopher Alexander, which can lead to more sustainable and human outcomes. To effectively unpack this practice, it is paramount to understand and map the underlying dynamics of our societies and urban communities. Urban areas are the foremost physical places where people live, learn, work, trade, socialise, entertain, exercise, etc. New tools, such as big data and the possibility to unveil human patterns for increasing efficiency and performance, support the understanding of contextual traits in specific geographies, being particularly important as different neighbourhoods in the same city have varying identities, calling for varied approaches. To better achieve this, a two-pronged approach is proposed, including 1) the use of Personas, and 2) Future-Immersion. This can be paraphrased as people-centred design,²⁴ which considers the design or planning consequences for both present and future residents. Three specific approaches are presented: personas-based design, tech-enabled future immersion, and a cooperative Japanese method.

1. **Personas** are fictional characters derived from qualitative and quantitative data to support design processes. Depending on the application, they are mainly constituted of a name, photo, socio-economic information, a short story, and more detailed information (Figure 5). Initially developed as user personas for software development, design teams at Microsoft extended the application and laid out the methodological foundations used until today.²⁵ Since then, they evolved further towards future personas.²⁶ These can be developed depending on available information, resources, and requirements. The input data can come from focus groups, surveys²⁷ or big data.²⁸ Specific narratives can further supplement personas.²⁹ Furthermore, personas can ensure a more equitable consideration of statistically underrepresented groups such as people with disabilities.

²¹ Ibid.

²² UNECE, “UNECE and City of Trondheim, Norway.”

²³ SEMPLAN, “Agenda 2030.”

²⁴ Gall et al., “Re-defining the System Boundaries.”

²⁵ Cooper, *The inmates are running the asylum*; Pruitt and Grudin, “Personas: Practice and Theory.”

²⁶ Fergnani, “The future persona;” Fergnani and Jackson, “Extracting scenario archetypes;” Fuglerud et al., “Co-creating Persona Scenarios;” Salminen et al., “Persona Transparency.”

²⁷ Schäfer et al., “Survey-based personas.”

²⁸ Stevenson and Mattson, “The Personification of Big Data.”

²⁹ Vallet et al., “Tangible futures.”

³⁰ Rohr et al., *Travel in Britain in 2035*.

³¹ Research Chair from IRT SystemX and CentraleSupélec, University Paris-Saclay (www.chaire-anthropolis.fr).

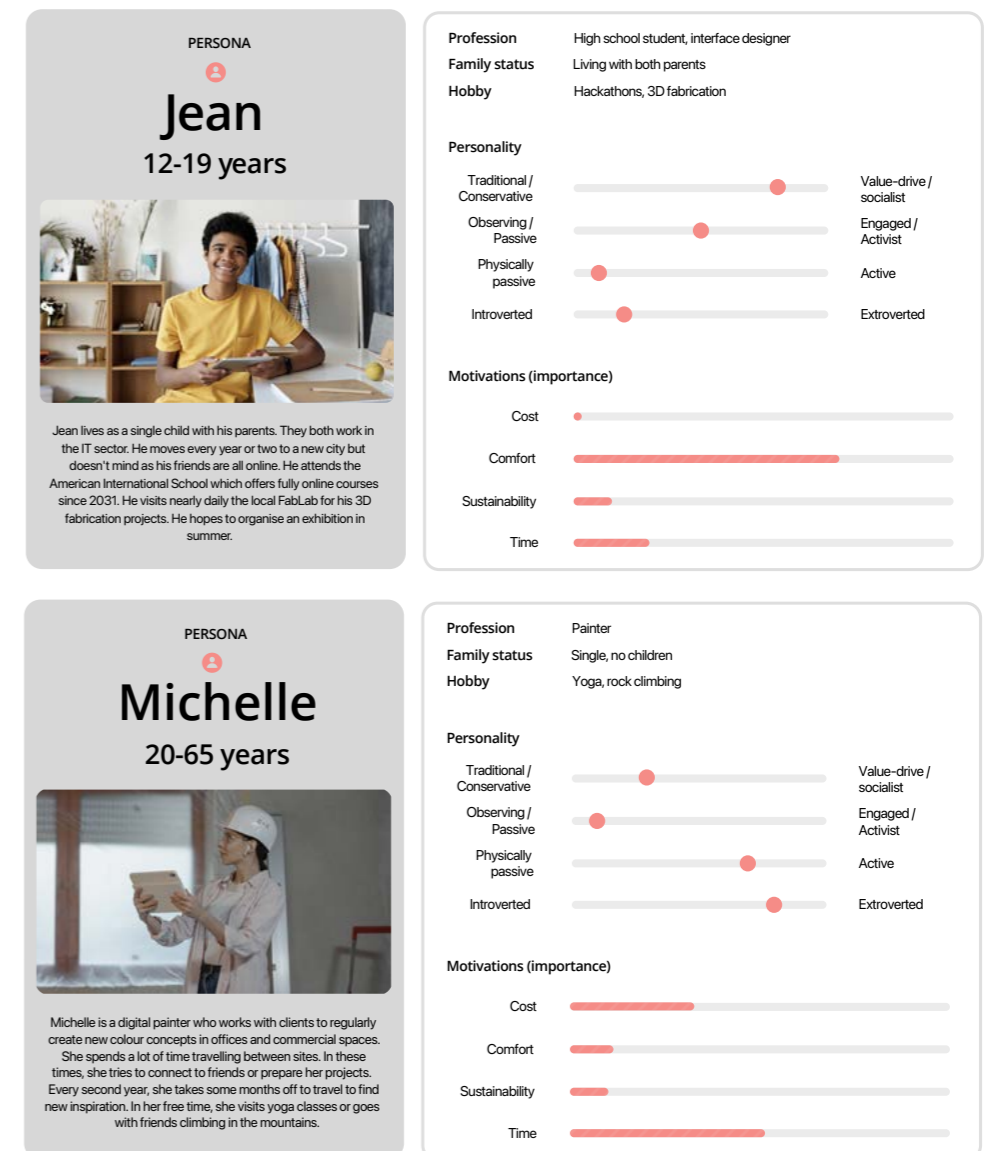
³² Vallet et al., “Tangible futures.”

³³ Vallet et al., “Matching Synthetic Populations with Personas.”

Figure 5 : Sample personas from an interactive workshop to explore urban mobility futures for Rouen (FR) in 2050.

© Authors

While personas can be used in different phases of future scenarios or visions, their central application is narration and visualisation and telling stories through individual perspectives.³⁰ As part of the Anthropolis Chair,³¹ personas are one of the design tools for people-centred solutions for urban mobility in an area of 27 municipalities south of Paris in cooperation with the public authorities, industry, and academia. In the first step, present personas and narratives were developed to understand the needs, travel quality, and pain points of people working and living in the area.³² In the next step, persona development was linked to agent-based simulation. This allows development evidence-based personas while complementing the quantitative agent-based approach with qualitative data. Secondly, mixed-data input allows modelling future personas and the corresponding synthetic populations for one or several periods.³³ The resulting design and planning artefacts strengthen the design process of more future-proof and people-centred urban services. Further, the outcomes can support planning decisions by considering multifaceted needs and impacts on future residents across qualitative and quantitative domains.



2. **Tech-based future-immersion** techniques open new possibilities arising from an emerging field of augmented realities. These build on data sourced from various domains not limited to urban fabrics. The resulting connected network of services can lead to a rich ecosystem aiding urban governance and public participation in urban development and policies. A recent example is that of the *Metaverse*, a concept initially coined in 1992 by Neal Stephenson.³⁴ It was brought to light by Meta (formerly Facebook), which can be described as a futurist digital world that is immersive and feels tangibly interconnected to everyday objects and humans' real lives and bodies. While its applications can seem futuristic, the substantial funding flows by both public and private organisations. It suggests that mixed-reality virtual immersion may play a vital role in the near future, allowing enhanced urban (scenario) planning via augmented realities. While it is dangerous to ascertain that humans will live solely in digital cities in the future (considering the risks to mental health and liveability), the facilities that such a concept may offer in building better urban service provision and immersion in planning and design practice can be undoubtedly encompassed.

³⁴“Stephenson, *Snow crash*.”

³⁵Nakagawa and Saijo, “Future Design.”

³⁶Uwasu et al., “Citizen-Participatory Scenario Design Methodology.”

3. A similar analogue pathway is already in use and **immerses planning workshop participants** in the future through roleplay. This method is increasingly used in Japan and improves the consideration of future residents.³⁵ In comparison to the persona-based approach that aims to provide design aids, its focus lies on expanding the mind of planning professionals and citizens involved in co-creative practices. In a typical setting, our interest remains often on immediate consequences and personal interests, restricted to our paradigms. One group is primed as future residents or stakeholders through different artefacts of data, stories, and other aids to account for this. Afterwards, the primed future group and the control group that is only representing themselves in the present are tasked to – partially alone, partially jointly – discuss and decide on different planning issues. When the decisions and plans are evaluated, the future resident's group prioritises solutions that are better in the long-term and have overall decreased negative impacts than the control group.³⁶ Thus, a formalised approach that reminds planners, decision-makers, and active residents of their present and future civic responsibility can already contribute to an improved participatory process.

The systematic and multi-level integration of current and future urban citizens can bring various advantages and has already ample successful examples to build on, both analogue and digital. Such solutions may enable increased liveability in cities today and tomorrow. Citizen integration for more people-centred policies can be achieved in current and low-resource contexts. This, however, must be enabled by political will, multi-level governance and the possible integration of the private sector to ensure sound, efficient implementation pathways.

Conclusion

This contribution highlighted some possible avenues for how future literacy can innovate urban planning and governance processes. The focus lies on applications that can be realised without extensive resources and can lead to tangible impacts. Even if they just outlined a few key strategic areas from a broader field of possible approaches and tools, they have the potential to contribute to more sustainable and people-centred futures if used in a combined and integrated approach. Simultaneously, they can partially decolonise the future and allow the next generations to make good decisions with knowledge far more significant than today. Three primary steps can enable the implementation:

- Openly discussing and addressing future uncertainties of the urban context and integrating capacity development activities on concepts of futures studies
- Learning from and exchanging with public and private urban entities that actively integrate various approaches in their workflows via, e.g., international city networks
- Building a multi-level (international to local) policy and regulatory foundation that allows or even invites uncertainty in planning practice and enables the more comprehensive implementation and experimentation of approaches

Accordingly, futures literacy can contribute to more innovative and effective plans and policies and is an increasingly relevant interdisciplinary capability to facilitate urban innovation and urban system transitions. Working strategically with multiple possible futures secures consideration of various pathways, better preparation, and innovation towards preferred futures and visions. At the same time, it braces for the challenges of tomorrow by leaving room for flexibility and building a stable foundation for sustainable and people-centred urban futures.



3

IMPLEMENTING CHANGE

Assessing the Implications of Planning Policy Innovation for Urban Drought Resilience: The Case of Water Supply in Windhoek, Namibia

ERIC YANKSON

Introduction

This paper assesses the implications of planning policy innovation for drought resilience, focusing on water supply in Windhoek, Namibia. The rationale for the analysis centres around the need to evaluate how innovation can help prevent or mitigate the negative impacts of climate change on natural resource conservation and use. The focus on Windhoek is essential given the arid conditions which characterise the city, resulting in several spells of drought in its recent history. Planning policy innovation is defined here as any spatial planning intervention which utilises novel approaches or offers technologically adept solutions to environmental and other challenges. For instance, a national green policy mechanism can help ensure a climate-friendly economy to engender a sustainable urban transition process.¹ Moreover, cities may engage in cross-border networks with other urban areas to create global platforms for addressing climate change issues.²

Policy innovation comprises introducing new ideas or concepts, their diffusion or implementation, and their impacts.³ These may, for instance, entail the formulation and adoption of low-carbon policies toward minimising climate change effects.⁴ With specific reference to sustainable urban development, the United Nations Human Settlements Programme (UN-Habitat) defines innovation in the processes, endeavours, and results that generate novel solutions and lead to improvements in the quality of life of city dwellers. It entails the utilisation of alternative approaches such as horizontal networks and collaborative partnerships towards attaining desired outcomes. Innovation is a people-centred approach that ensures greater inclusiveness. Moreover, it is a technologically oriented strategy that may entail the adoption of digital or non-digital tools.⁵

Planning policy innovation may have direct implications for urban resilience. City resilience entails the ability of an urban system to withstand shocks such that its residents, especially the poor and vulnerable, can thrive irrespective of these dynamics – evident in the process of engineering resilience terms which entails the ability of a system to return to its previous state after a disturbance.⁶ However, *ecological resilience* conceptualises the term ‘bouncing forward’ and

¹ Lee and Woo, “Green new deal policy.”

² Rashidi and Patt, “Subsistence over symbolism.”

³ Jordan and Huitema, “Innovations in climate policy.”

⁴ Hildén et al., “Climate policy innovation.”

⁵ UN-Habitat, *Guidance note*.

⁶ Arup International Development, *City resilience framework*.

⁷ Meerow and Stults, “Comparing conceptualizations of urban climate resilience.”

⁸ Wardekker, “Contrasting the framing of urban climate resilience.”

⁹ Friend and Moench, “What is the purpose of urban climate resilience?”

¹⁰ Rey et al., “Developing drought resilience.”

¹¹ Scanlon et al., “Enhancing drought resilience.”

¹² Nhamo et al., “Preparedness or repeated short-term relief aid?”

¹³ van Rensburg and Tortajada, “An assessment of the 2015-2017 drought.”

¹⁴ Olivieri et al., “Enhancing governance capacity.”

¹⁵ van Rensburg and Tortajada, “An assessment.”

¹⁶ Ibid.

refers to the ability of a system to move to a new, more desirable state after a disturbance to its previous form.⁷ *Resilience planning* is a long-term adaptation mechanism associated with complex climate systems. By extension, *resilient community development* focuses on how communities can build a long-term adaptive approach toward climate change transformation.⁸ The physical and social assets influence the climate resilience that communities possess. Physical assets include capital resources and infrastructure, resulting in a better state of the built environment towards withstanding shocks. Moreover, social assets comprise human relationships or neighbourhood ties, resulting in the mobilisation of networks towards minimising the vulnerability associated with climate change impacts.⁹

As noted, this paper assesses the implications of planning policy innovation for drought resilience, focusing specifically on the water supply in Windhoek. Drought refers to a natural hazard situation, usually in arid climates, in which a characteristically low level of rainfall results in dry conditions and scarcity of resources such as water. This also may negatively effect the supply of water supply and current and future agricultural productivity.¹⁰ Thus, *drought resilience* can be defined in terms of the capacity to recover from shocks caused by water shortages.¹¹ In sub-Saharan Africa, the Southern African region is susceptible to the impacts of drought due to the reliance on climate-dependent sectors such as agriculture, hydroelectric generation, and fisheries. The reactive nature of many planning approaches has exacerbated the situation, which imply that the focus often tends to be on drought management rather than forecasting. Decreasing levels of rainfall and rising levels of aridity amidst climate change continue to compound the situation. For instance, there was a 26 percent decline in rainfall levels between 1960 and 2007 and during 1980 to 2007 there was an 11 percent increase in aridity within the region.¹²

With specific reference to the case study, about 70–75 percent of Windhoek’s water supply emanates from the three dams of Von Bach, Swakoppoort and Omatako, with the remaining 20–25 percent coming from reclaimed water and 5 percent or less emanating from groundwater.¹³ The Grootfontein-Omatako Eastern National Water Carrier, which connects the reservoirs from the three dams and comprises surface and ground water, can generate 95 percent of the city’s water needs.¹⁴ The above developments notwithstanding, water supply has always been a challenging issue for Namibia. With a dry climate and erratic rainfall patterns, the country has experienced droughts at various times, such as 1980–1982, 1994–1996 and 2015–2017.¹⁵ Given its rapid urbanisation, Windhoek has borne the brunt of many of these water supply challenges. For instance, the Windhoek drought of 2015–2017 originates from the 2012/13 season when the recoding of systematic shortfalls in rainfall levels indicated a situation whose effects were evident in subsequent periods.¹⁶

Planning policy innovation framework for drought resilience

This paper proposes an analytical framework that explains the linkages between planning policy innovation and drought resilience regarding water

supply (Figure 1). Specifically, planning policy innovation concerning green technology innovation, natural resource governance and resource efficiency is defined. These three indicators critically unpack innovative elements in the urban water supply. Green technology innovation entails protecting the environment through adopting technology modernisation approaches and has the advantage of conserving resources, minimising pollution through reduced carbon emissions, ensuring better waste management and improving human capital.¹⁷ Natural resource governance refers to the customs, usages, institutional and regulatory frameworks that define the use of natural resources.¹⁸ Natural resource governance, as used here, refers to a scientific or technologically adept approach to the management or utilisation of natural resources such as water. Additionally, resource efficiency entails reducing waste to prevent shortages, minimising the impacts of climate change, and

¹⁷ Wang et al., “Green technology innovation;” Rennings et al., “The influence of different characteristics;” Du and Li, “Towards a green world;” UNCTAD, *Technology and innovation report 2018*.
¹⁸ IUCN, “Natural resource governance framework.”

²⁰ Walker et al., “Resilience, adaptability and transformability;” Spears et al., “Effective management.”
²¹ Keck and Sakdapolrak, “What is social resilience?”
²² Mayor and Ramos, “Regions and economic resilience.”

mitigating adverse environmental consequences – all of which are important for improving residents’ quality of life.¹⁹

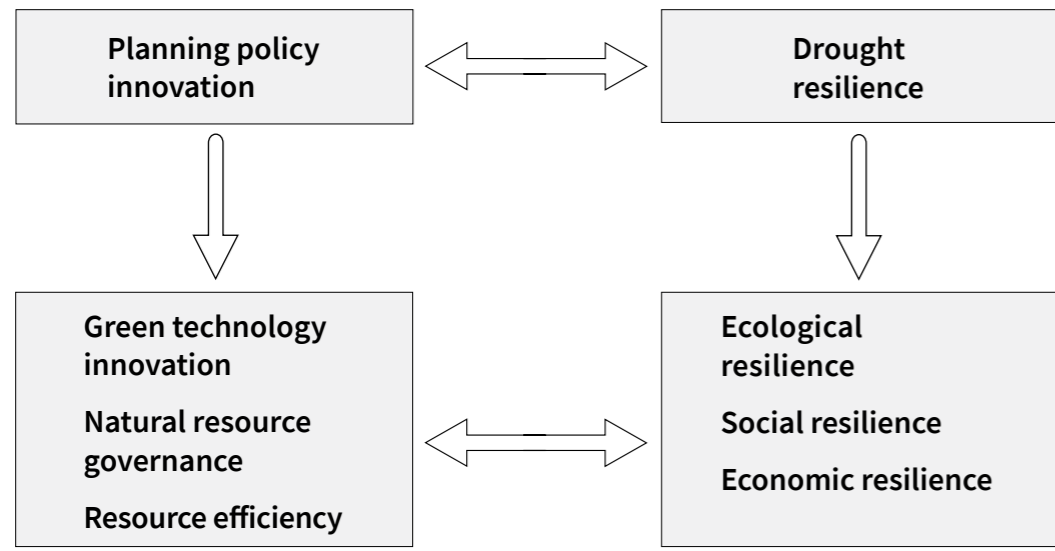
Drought resilience can be defined as ecological, social and economic resilience. Ecological resilience entails the ability of a natural system to withstand shock and recover while experiencing change.²⁰ Social resilience may be defined based on the ability of society to cope with, adapt to or transform existing systems and institutional frameworks to ensure better human welfare.²¹ Finally, economic resilience describes the ability to recover from an external shock to an economic system, such that it either returns to its previous state or moves on to a better state of affairs.²² The proposed analytical framework (Table 1) is applied to evaluate drought resilience in Windhoek with respect to its water supply.

Green technology innovation

Namibia’s drought policy and strategy minimises the phenomenon’s effects on water supply and the natural environment. Part of the approach entails adopting technologies and interventions that mitigate drought. These include reducing agricultural risks, identifying alternative income sources, and water supply and demand management strategies.²³ The approach also comprises creating a favourable policy environment that protects land rights, devolves powers, ensures proper pricing for water resources, and interventions for enhancing the agricultural sector.²⁴

The City of Windhoek has adopted partnership building (especially public-private partnerships) to ensure a reliable water supply. For instance, the Gorengab water reclamation facility was built in 1968 to reclaim sewage wastewater for reuse and a newer facility in 2002. The partnership approach brought together local experiences with international inputs, resulting in establishing a system that generates water of acceptable international standards.²⁵ Moreover, the collaboration between the City of Windhoek and the industry played an essential role in addressing the water shortage.²⁶ Thus, establishments such as Namibia Breweries Limited have taken various measures to reduce their water consumption levels. The success of their efforts has been boosted by financial and related support from the City of Windhoek. However, these largely positive results notwithstanding, successes in the construction sector were limited due to concerns about the potential implications of implementing water-saving measures for jobs.²⁷

The City of Windhoek has also adopted a Water Demand Management Strategy (WDMS) and a Drought Response Plan (DRP) to ensure water conservation. The WDMS rolls out interventions to limit water use based on assessments of the drought situation. Additionally, the DRP entails regulations on water supply and use as per existing drought conditions. This helps improve residents’ quality of life through a reliable water supply. They also enhance communities’ health, security, and economic well-being.²⁸ Additionally, the Windhoek Managed Aquifer Recharge Scheme seeks to store water in the underground aquifer during plenty so it can be used when drought occurs.²⁹



¹⁹ UNEP, “Why does resource efficiency matter?”

²³ Republic of Namibia: National Drought Task Force. *National drought policy and strategy*.
²⁴ Ibid.
²⁵ Ndebele-Murisa, “City to city learning.”
²⁶ van Rensburg and Tortajada, “An assessment.”
²⁷ Ibid.

Figure 1 : Elements of planning policy innovation and drought resilience. © Author

Planning policy innovation	Drought resilience	Conceptual linkages
Green technology innovation	Ecological resilience	Green policies
	Social resilience	Public-private partnerships
	Economic resilience	Water demand management
Natural resource governance	Ecological resilience	Water governance
	Social resilience	Awareness creation
	Economic resilience	Diversification of water sources
Resource efficiency	Ecological resilience	Pollution control
	Social resilience	Climate adaptation
	Economic resilience	Waste minimisation

Table 1: Conceptual linkages between planning policy innovation and drought resilience. © Author

²⁸ Department of Infrastructure, Water and Technical Services, *Water management plan. Version 1*; Department of Infrastructure, Water and Technical Services, *Water management plan. Version 2*; Scott et al., “The story of water in Windhoek.”
²⁹ N.A., “Windhoek plans to tap into aquifer;” Murray et al., “The Windhoek managed aquifer recharge scheme;” Scott et al., “The story of water in Windhoek.”

Natural resource governance

The city blueprint approach is an innovative integrated mechanism that comprises three sub-models from a water governance perspective. These include the trends and pressures framework (TPF), the city blueprint performance framework (CBPF) and the governance capacity framework (GCF).³⁰ The TPF encompasses the economic, social, environmental and other dynamics which affect water supply. In the case of Windhoek, this reveals the socio-economic inequities and arid conditions which impact the water supply. Moreover, it underscores the need for strong leadership to address the situation. Also, the CBPF refers to the integrated water management system that comprises diverse sources and how this shapes climate adaptation and its effects on water security. Specific reference to Windhoek shows a technical infrastructure gap that must be addressed to ensure adequate water supply. Finally, the GCF entails the ability of cities to offer governance solutions to their water challenges through collaborative networks. The innovations of the City of Windhoek have resulted in interventions such as water reclamation to ensure better resilience. Furthermore, the sense of collaboration among stakeholders in this sector has generally benefited the project and community. Notwithstanding, there are implementation challenges and mistrust due to top-down decision-making.

The City of Windhoek embarked on a Water Save campaign in 2016 to encourage water users to cut down on their consumption levels by 40 percent. Through awareness creation and other related strategies, 2017 witnessed a 33 percent reduction in water usage.³¹ Specifically, an intensive public education campaign played an important role in water shortages.³² At the national level, the Ministry of Agriculture, Water and Land Reform launched a National Water Saving Campaign in 2017 to cut down on waste in all government departments and agencies.³³

Windhoek's approach to natural resource governance entails diversifying its water supply sources. The reclamation of wastewater which occurred from the 1960s onwards has been an important strategy.³⁴ This currently accounts for 25 percent of the city's water supply.³⁵ Other approaches include the utilisation of the aquifer as a receptacle for surface and reclaimed water to enhance storage capacity.³⁶ Moreover, there are plans to transfer water from the Okavango River. However, these proposals are stalled sometimes by their cost implications and cross-border national interests.³⁷

Resource efficiency

Regarding resource efficiency, the introduction of regulations on pollution in Windhoek has meant that those responsible for water pollution bear the brunt of the costs.³⁸ The regulations have also minimised the erection of polluting establishments close to the land, which serve as sources of groundwater.³⁹ For instance, the Windhoek aquifer has been declared a protected zone to save it from any developments that could compromise its ability to supply the city

³⁰ Olivieri et al., "Enhancing governance capacity."

³¹ Scott et al., "The story of water in Windhoek."

³² van Rensburg and Tortajada, "An assessment."

³³ Scott et al., "The story of water in Windhoek."

³⁴ Haarhoff and Van Der Merwe, "Twenty-five years of wastewater reclamation;" Olivieri et al., "Enhancing governance capacity."

³⁵ Ibid.

³⁶ Lewis et al., "Urban water management;" Olivieri et al., "Enhancing governance capacity."

³⁷ Ibid.

³⁸ Moyo, *Wastewater production*; Olivieri et al., "Enhancing governance capacity."

³⁹ Lewis et al., "Urban water management;" Olivieri et al., "Enhancing governance capacity."

⁴⁰ N.A., "Windhoek plans to tap into aquifer;" Weidlich, "N\$73m;" Scott et al., "The story of water in Windhoek."

⁴¹ Republic of Namibia: Ministry of Environment and Tourism, *National policy*.

⁴² Lewis et al., "Urban water management;" Olivieri et al., "Enhancing governance capacity."

⁴³ Republic of Namibia: Ministry of Agriculture, Water and Forestry, *Technical summary*; Olivieri et al., "Enhancing governance capacity."

⁴⁴ Lahnsteiner and Lempert, "Water management;" Scott et al., "The story of water in Windhoek."

⁴⁵ Arup International Development, *City resilience framework*.

⁴⁶ IUCN, "Natural resource governance framework."

with water in times of drought.⁴⁰ Namibia's climate change policy seeks to enhance the nation's adaptation to the phenomenon by incorporating it into various development interventions. This entails context-specific initiatives at various levels of government, as well as stakeholder engagement. Moreover, it requires awareness creation and capacity building among relevant actors. Given the limited availability of resources, the policy underscores the need for cost-effectiveness and equity.⁴¹

The City of Windhoek has also made several planning policy interventions, resulting in reductions in water losses. In 1993, for instance, a dual-pipe system was implemented to channel waste water for use in irrigating parks, gardens, and pitches or playgrounds. This served as a substitute for 6 percent of potable water.⁴² Pipe repairs have also reduced technical losses of water from 18 percent in 1997–1998 to 13 percent in 2001–2002.⁴³ Furthermore, a Cabinet Committee on Water Security has made important decisions regarding the Windhoek aquifer at the national level. It has also come up with proposals for long-term water security. In addition, the committee has put in place a Water Crisis management Strategy and sought to improve water supply infrastructure through the provision of boreholes.⁴⁴

Implications for Windhoek's urban resilience

City resilience and natural resource governance frameworks may be regarded as preeminent approaches for effective water management to mitigate adverse climate impacts such as drought. A city resilience framework minimises human vulnerability through better environmental management to ensure sustainable development. Moreover, it promotes the supply of essential services. It also ensures diverse livelihood opportunities, a stronger sense of community, empowered stakeholders, improved urban management, and an integrated approach to development planning.⁴⁵ Additionally, a natural resource governance framework defines modalities for decision-makers at all levels to make just and informed choices regarding the utilisation of natural resources to create equitable outcomes.⁴⁶ Windhoek's approach to water management amidst drought conditions reveals diverse approaches which other city leaders can adopt. Some of the key lessons are given below.

1. The city's strategy may be described as **bouncing back and forward**. Bouncing back occurs through the aquifer recharge system, which essentially seeks to retain underground water for future use. Also, bouncing forward is evident in the use of technologically adept approaches such as water reclamation, which results in a more desirable state for previously affluent resources. Moreover, resilience planning is demonstrated by the long-term approaches adopted to manage water resources amidst rapid urbanisation and population growth. This simultaneously serves as a strategy for resilient community development, i.e., local communities' ability to build long-term adaptive capacity to climate change.

2. Windhoek also utilises both **physical and social assets** to manage water resources. The physical assets are evident in terms of the finances, physical infrastructure and technology tools adopted to ensure resilience in the water supply. Moreover, the social assets primarily comprise the city's water sector stakeholders. This paper underscores the role of partnership building in enhancing resilience when it comes to the urban water supply. This is evident in the efforts of local authorities, industry, and other actors to address the city's water challenges.
3. **Planning policy innovation**, if well formulated and implemented, can lead to a more reliable source of water supply. As already noted, this occurs because of reductions in water wastage and diversification in the sources of water supply. Thus, much of the population of this city continues to be served with water despite the rapid pace of urbanisation and population growth. Planning policy innovation also results in a scientific approach to managing and utilising water resources. This is evident in the establishment of the Windhoek Managed Aquifer Recharge System and the reliance on various technology tools for water management. Furthermore, the scientific approach implies a proactive planning mechanism that is responsive to the ever-changing needs of natural resource governance.

Conclusions

As elaborated, planning policy may be understood in terms of tools, processes and outcomes. Regarding urban water supply, for instance, the tools are evident from using technology-based mechanisms such as water demand management and an aquifer system. The processes include the various platforms such as stakeholder engagements and awareness creation, resulting in a better water management approach. Moreover, the outcomes entail positive developments such as pollution control and waste minimisation associated with planning policy innovation for water use.

Innovation in planning policy is both a political and social construction. As a political phenomenon, it requires the central government's initiatives, local authorities, mayors, and other public officials to succeed. Furthermore, as a social construction, it underscores the importance of social networks such as stakeholder engagement and the efforts of local communities to yield results. Similarly, the analysis reveals that planning policy innovation confounds national and local policy interventions. The national-level policy provides the overarching framework, while urban planning constitutes the specific domain for mitigating impacts on cities. These require the agency of political actors such as public officials, mayors and local councillors to succeed.

Concerning the nexus between innovation and planning, at the most fundamental level, innovation enhances the effectiveness of urban planning. This occurs because the concept constitutes an alternative paradigm that seeks to change the status quo. As a result, it prioritises the introduction of novel approaches or mechanisms in accomplishing the task of planning, i.e., improving

citizens' health, safety, and well-being. With specific reference to water supply, this implies looking beyond the conventional focus on distributing available resources to residents. Thus, the emphasis shifts to technologically adept ways of conserving and supplying this resource such that it caters for the needs of both present and future generations.

Furthermore, while planning is a political and technical endeavour, innovation is primarily a scientific and technological phenomenon. The political aspects of planning are evident in the need to engage stakeholders such as government officials and other relevant actors to provide public services like water. Moreover, the need to resolve conflicting interests and allocate limited resources lend credence to this assertion. Also, the technical elements of planning comprise the planner's role in spearheading the orderly development of cities through service provision and other functions. On the other hand, innovation may be regarded as a scientific endeavour due to its efficiency-based approach toward enhanced water supply. Moreover, the technological aspects are evident in the use of advanced tools or techniques for enhancing drought resilience.

Ultimately, innovation in the planning process constitutes a nuanced response to the challenges posed by climate change. With specific reference to drought, the phenomenon reduces the availability of water, creating the need for alternative approaches to water management that cut down on waste. This portends the need for out-of-the-box approaches that recognise this resource's scarcity and the need to conserve it. Thus, innovation ensures the adoption of green concepts in the planning process toward enhancing drought resilience. This implies that it creates avenues for a sustainable approach to urban planning through more ecologically sound choices.

Land, Livelihood and Living Conditions: Innovations to Address Vulnerabilities of the Urban Poor through Integrated Governance in Odisha, India

TATHAGATA CHATTERJI

Introduction

While the world at large is steadily moving towards an urban future, over one billion people or 24 percent of the global urban population continue to live in slums. Slum clusters in fast-growing cities of the Global South frequently depict the most visible concentration of urban poverty, sub-standard housing quality, extreme overcrowding, unhygienic living conditions, and inadequate access to water, sanitation, and other basic amenities (Figures 1–3). Adverse living conditions make slum areas more vulnerable to epidemics, natural disasters, and climate change threats compared to other parts of cities. The Covid-19 pandemic has further widened the urban divide in the Global South, as slum-dwellers, who are predominantly engaged in the informal economy, have been hit disproportionately harder by the lockdowns and suffered huge livelihood losses.

Perceptions of and urban policies about slum settlements have come a long way over the past decades. While several cities had earlier sought to undertake slum clearance and relocation, they have now recognised the contributions of people living in these impoverished neighbourhoods in providing a range of services essential for the functioning of the city. Not only do many slums, such as Dharavi in Mumbai (Figure 4), provide shelter to millions of people, but they are also vibrant economic clusters that facilitate bottom-up entrepreneurship, generate jobs, and contribute positively to the city economy. Taking into consideration the close interdependencies between access to shelter, tenure security, livelihood, and healthy living conditions, recent global policy discourses, including the Sustainable Development Goals (SDG) and the New Urban Agenda, have started emphasising in-situ upliftment of slums over their relocation wherever possible.¹ Policy lessons of slum upgrading also strongly suggest the need to include residents in the planning process.² Reflecting upon such a participatory approach, this paper discusses innovation in improving living conditions of the urban poor through a comprehensive slum upgrading programme being implemented by the Indian state of Odisha. More precisely, the case study provides valuable lessons regarding collaborative planning, community engagement, gender inclusion, and data-driven governance to achieve urban sustainability objectives in developing countries.

¹UN-Habitat, *Key Slum Upgrading Messages*.

²UN-Habitat, *The Urban SDG Monitoring Series: Monitoring SDG 11.1.1*.



Figure 1 : Slums in South Africa.



Figure 2 : A view of Soweto and Lindi, suburbs of Nairobi belonging to Kibera, the largest urban slum in Africa.

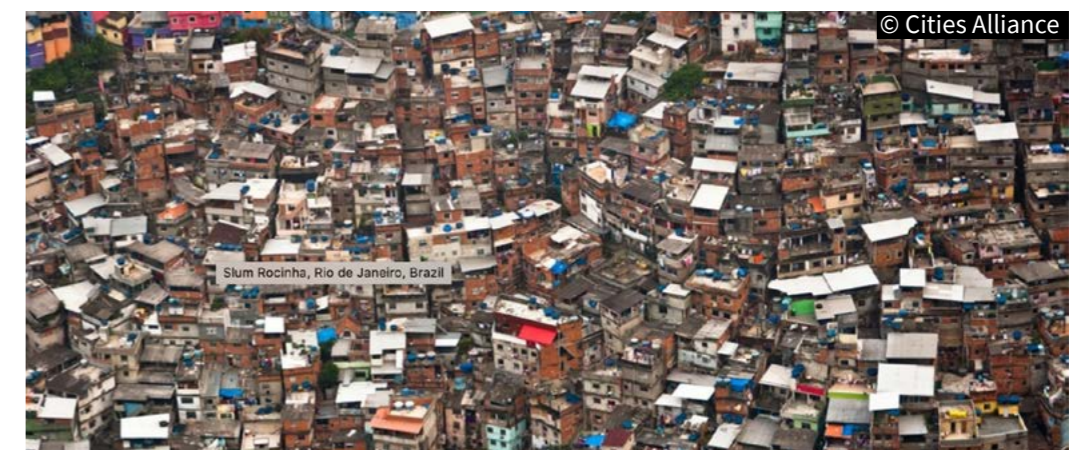


Figure 3 : Slum Rocinha, Rio de Janeiro, Brasil.



Figure 4 : Dharavi slum in Mumbai.

Towards participatory slum upgrading in Odisha

Participatory slum upgrading, however, faces many implementation challenges. On the one hand, civic agencies encounter difficulties in extending infrastructure services to informal settlements, until they are regularised and included in official land records – which is a long-drawn legal process. On the other hand, slum residents are also unwilling to invest in environmental betterment on their own, as they do not have property rights and live under constant threat of eviction. Moreover, participatory planning involving slum residents is also time-consuming, as it requires extensive co-ordination with large numbers of stakeholders. Most cities in the Global South lack institutional capacities to undertake such complex interventions or sustain them over long periods. Meanwhile, without regular and timely investments, the rudimentary infrastructure available in the slum areas deteriorates and environmental conditions further worsen.

Odisha, located on India's eastern coast, is a natural resource-rich and predominantly rural state with a low per capita GDP of INR 116,614 (about US\$ 1,500).³ However, in recent years Odisha's economic growth rate has accelerated, and the state has also started to rapidly urbanise. According to the Indian Census (2011), the state had an urban population of about 7 million, 23 percent of whom were slum dwellers. Coastal parts of the state are more urbanised but also more disaster-prone. Tropical cyclones and floods, which hit the state regularly, most directly impact the lives and livelihoods of slum dwellers (Figure 5).

Taking note of the difficulties faced by the urban poor, the state government took a policy decision to integrate the slum areas into the regular urban governance mechanism across the state through a multipronged strategy. Aimed at reducing vulnerability of the urban poor, the state government provides tenure security thus turning existing slum settlements into vibrant and liveable habitats, and prioritises small and medium-sized towns in the first phase, as smaller towns have been growing at a faster rate than large cities. Accordingly, in the first phase, 63 small and 46 medium-sized towns were covered, with five bigger cities to follow in the second stage. The legal dimension of the policy was addressed by enacting the Odisha Land Rights to Slum Dwellers Act of 2017.



³ PRS Legislative Research, "Odisha Budget Analysis 2020-21."

⁴ In Odisha, small towns refer to areas governed as Notified Area Committees; medium-sized towns are governed by municipalities; bigger cities are governed as Municipal Corporations.

⁵ Department of Housing and Urban Development, Government of Odisha, "The Jaga Mission."

⁶ World Habitat Awards, "Odisha Liveable Habitat Mission."

The Odisha Land Rights to Slum Dwellers Act (2017) is landmark legislation to make cities in Odisha more equal by empowering the urban poor. Under the Act, a 'certificate of land right' is issued to the slum dwellers for residential usage and provides a legal basis for the regularisation of slums along with the provision of basic civic amenities. The Act covers slum settlements with at least 20 households located on government land. It allows the legalisation of land in actual occupation by slum households up to a maximum limit of 60 sqm in small towns and 45 sqm in medium-sized towns.⁴ Up to 30 sqm of land is allotted free. The balance amount is payable at a nominal rate. Slums located in environmentally vulnerable and disaster-prone areas are to be relocated and provided with 30 sqm of land. The beneficiaries are not allowed to transfer or sell the property, but they can pass on the ownership to their children. Allocation of land rights also focuses on gender inclusion, and the property documents are issued in the names of both spouses. They are also allowed to mortgage their property papers as collateral for additional housing loans from financial institutions.

Jaga Mission: Combined land titling and slum upgrading initiative

The Odisha state government sought to overcome the above challenges innovatively by launching the Jaga Mission (Odisha Liveable Habitat Mission), a composite land titling and slum upgrading programme. Since its inception in 2017, the programme has been able to provide land titles to over 51,000 households and complete household survey of all 197,000 households spread across 109 small and medium-sized towns and spurred comprehensive slum upgrading throughout the state.⁵

The Jaga Mission shows how an integrated multi-city planning strategy for slum areas can reduce disaster risks by improving housing conditions and increasing access to safe water and sanitation facilities, generate low-skill employment opportunities, and empower marginalised communities by institutionalising their inclusion in local governance structures. In accomplishing the multipronged developmental objectives, the programme has demonstrated several innovative approaches in its planning process regarding:

- Combination of top-down and bottom-up planning involving multiple stakeholders located at different levels of government
- Application of advanced geospatial technology in a people-friendly manner
- A replicable and scalable model to provide livelihood support to urban poor

In 2019, the Jaga Mission was awarded the World Habitat Award.⁶ As participatory slum upgrading is a key global sustainability target (SDG 11.1.1), Odisha's innovative planning strategies can provide key inputs to other developing countries in Asia, Africa, and Latin America facing similar challenges. The critical innovative mechanisms undertaken towards implementing the participatory slum upgrading in Odisha are given in more detail below.

Figure 5 : Nolia Sahi slum in coastal Odisha.

Innovation 1: Multi-level governance arrangement

Governance arrangements for operationalising the land titling and slum upgrading programme are complex, as large numbers of actors are involved. In addition to the legislative initiatives discussed above, this effort involves various administrative processes, such as land-use change, identification of eligible slums, mapping of land, and validation of demographic details before property rights can be conferred and titles granted. Moreover, in Odisha, the state government did not merely issue land rights, but sought to use them as an entry point for bringing about transformative change in the slum habitats by providing basic infrastructure services such as water supply, toilets, drainage, paved roads, streetlights, direct in-house electricity supply, community centres, and play areas (Figure 6).⁷ The government has also sought to improve economic outcomes for the urban poor by generating new livelihood opportunities.

⁷Tata Trusts, “Government of Odisha and Tata Trusts awarded the Geospatial Excellence Awards 2019.”

⁸Ministry of Housing and Urban Affairs, Government of India, “Pradhan Mantri Aawas Yojana – Housing for All Mission.”



Figure 6 : A community centre developed as part of the Jaga Mission.

To plan, finance, and implement these ambitious developmental objectives, the Jaga Mission put in place an innovative integrated governance framework that encompassed government agencies at various administrative levels, non-profit organisations, and local communities. It is pertinent here to note that, in common with most other states in India, municipal governments of small and medium-sized towns in Odisha are weak. They neither had the technical capacity to manage the complexities involved in slum upgrading nor the funds to meet additional infrastructure needs. As such, one of the most pressing challenges for the Jaga Mission was capacity and resource mobilisation.

Financing for the programme was arranged by synergising resources from various central and state government-sponsored welfare schemes and by leveraging corporate social responsibility (CSR) funds. For example, allotment of land ownership certificates made slum households eligible to access housing building assistance of INR 150,000 (about US\$ 2,000) provided by the Central Government under the PMAY (*Pradhan Mantri Aawas Yojana*; in English: Housing for All Mission) scheme.⁸ Similarly, funds for building toilets came from the Swachh Bharat (“Clean India”) Mission of the Central Government. Water pipelines were laid by prioritising slum areas under Basudha Mission, a state government scheme for providing potable water to all households.

The state government addressed the technical capacity deficit by enlisting three nationally renowned research-oriented organisations with expertise in participatory planning, namely Tata Trusts, Centre for Policy Research, and Janagraha. These three organisations played significant roles in every phase of the project – from conceptual design to monitoring, to field level support for municipal bodies. The bodies hired urban planners and other development professionals as Jaga fellows to provide ‘handholding’ assistance to the local governments. Moreover, 24 local non-governmental organisations (NGOs) were mobilised to improve the interface between local governments and slum dwellers.

Urban planning systems and procedures posed another critical challenge. Globally, successful slum-upgrading exercises demonstrate bottom-up planning with extensive community consultations and stakeholder engagement. In this case, complex financial arrangements involving national and state-level agencies, and the need for simultaneous programme implementation on a state-wide scale, demanded extensive vertical co-ordination and strong centralised control. To strike a balance between the contrasting demands of bottom-up and top-down planning approaches, an innovative four-tier institutional arrangement was conceptualised. At its apex, the programme is anchored by the Housing and Urban Development Department of the Government of Odisha. At the city level, each municipal body was required to constitute an Urban Area Slum Redevelopment and Resettlement Committee for inter-departmental co-ordination. Locally, each Municipal Ward Office was entrusted with nodal responsibility. At the bottom level, each slum settlement was required to form a Slum Dwellers Associations (SDA) to facilitate community consultation.

While the strengthened role of municipal Ward Offices in project delivery has reduced the distance between people and government, the involvement of the SDAs has increased accountability and transparency in governance. All residents of each slum area are members of the association and can be directly involved in planning and mapping activities impacting their neighbourhood. All upgrading projects require the concurrence of the SDAs, which must also approve all payments to contractors. Indeed, the inclusion of the SDAs into the institutional framework of the Jaga Mission has led to the emergence of a new form of urban governance through direct participation and empowerment of people at the bottom of society.

Innovation 2: Slum mapping and participatory planning

City governments all over the world face problems due to data inadequacy when dealing with informal settlements, and authentic information is hard to come by. Compared to regular neighbourhoods, slum areas are more dynamic places in terms of migration and frequently have large floating populations. Accurate measurement of land parcels, which is essential for granting property titles, is also much more complicated as informal settlements are densely packed and haphazard in layout. Physical surveying of such areas is not only time consuming,

but also often faces local resistance. Slum residents are often distrustful of civic agencies and fear eviction. To overcome these challenges appropriately and efficiently, the Jaga Mission came up with an innovative approach, involving the application of advanced drone mapping technology, followed by the deployment of community volunteers for ground truthing.⁹ Apart from speeding up the survey process, high-resolution drone maps helped with ground-level data verification and community envisioning exercises.

⁹ Chakraborty, “Building resilience.”

¹⁰ Department of Housing and Urban Development, Government of Odisha, “The Jaga Mission.”

¹¹ Chakraborty, “Building resilience.”

Indeed, the reliability, transparency, and inclusivity of cadastral data management proved a key factor behind the success of the Jaga Mission. Drone mapping helped the Jaga Mission generate high-resolution geospatial data for all 1886 slum settlements spread across 109 towns in less than two months.¹⁰ In only six-and-a-half hours, the drones were able to map 1.5 sqkm of land with a high degree of precision, a task that would have otherwise taken much more time and money through a conventional survey using digital global positioning system technology.¹¹ Data captured by the drones were used to geo-fence the boundaries of slum clusters and were then matched with revenue department land records. Subsequently, these maps were used by local NGOs to carry out field verification with the help of the SDAs to identify individual residents’ property boundaries, carry out door-to-door surveys to capture demographic data, and identify the list of beneficiaries for land titling.

After allocating the land titles, in the second step, the Jaga Mission focused on improving the physical and social infrastructure of the slum clusters through a participatory planning process. While the allotment of land titles made each slum household eligible for individual housing assistance under the PMAY scheme, the government emphasised the orderly development of common areas and basic infrastructure through the provision of individual / community toilets, paved roads, streetlights, water supply, drainage, power supply, community centres, parks, and play areas. To understand the requirements of each slum settlement, the Jaga Mission entrusted the municipal Ward Office with participatory infrastructure needs assessment surveys in co-ordination with SDAs and with the help of local NGOs and Jaga Fellows (Figures 7, 8). Local area maps developed through drone surveys were crucial visual tools for such community-level consultations. The municipal governments then collated the identified needs to obtain infrastructure gap assessment profiles for each slum before issuing work orders.

After the basic services are provided, the SDAs can apply to the municipal bodies to have their clusters delisted as slums and to achieve equal treatment with other residential areas. The SDAs are also allowed to rename their areas to avoid social stigma associated with slums. Thus, by institutionalising the role of the SDAs in the decision-making hierarchy of urban governance, the Jaga Mission has innovatively strengthened participatory planning practices and empowered people at the margins of society.

Innovation 3: Slum upgrading as a livelihood support mechanism

In addition to providing tenure security and improving liveability conditions in the slum habitats, another key objective of the Odisha government was to provide livelihood support to the urban poor engaged in the informal economy. Here, in an innovative governance intervention, the Jaga Mission was designed to have synergy with Shakti Mission, a long-standing programme focusing on poverty eradication. The Shakti Mission programme organises poor women into neighbourhood-based Self-Help Groups for micro-entrepreneurial activities and has over the years become a pivot for grass-roots social empowerment.



© Aditya Padhi and Pragyadipta Behra

Figure 7 : Volunteers doing a participatory infrastructure needs assessment survey in Bhadrak Odisha.



© Aditya Padhi and Pragyadipta Behra

Figure 8 : Participatory infrastructure needs assessment survey in Bhadrak, Odisha.

The policy template created to engage the urban poor in small-scale construction activities became useful in scaling up welfare benefits during the Covid-19 crisis. Large numbers of people from Odisha who had been working in the informal economies of big cities such as Mumbai, Delhi, Surat, and Bangalore faced acute livelihood vulnerabilities when lockdowns were imposed and began returning to their home state in March 2020. Based on the experience gained through the Jaga Mission, the Odisha government immediately launched an innovative scheme called the Urban Wage Employment Initiative. Municipal governments in the state began to engage the returning migrant workers in a variety of labour-intensive low-skill civil works, such as road building, digging of drainage channels, etc. Thus, Jaga Mission made slum upgrading a model for employment generation through public works for disaster recovery.¹²

¹²Chakraborty, "COVID-19."

Take away lessons

Odisha's innovative approach to improving living conditions of the urban poor through the Jaga Mission shows how a diverse set of developmental objectives can be dovetailed into an integrated city-based planning strategy and implemented through a multi-level governance framework. The programme offers several lessons in slum upgrading that reflect the impact of a collaborative, people-centric and data-driven approach toward urban governance.

1. **Collaborative planning.** The New Urban Agenda has placed significant importance on multi-level collaboration to address pressing urban challenges as city governments in many developing countries lack capacities. The innovative institutional mechanism of the Jaga Mission can show a way forward on how to implement collaborative planning in a multi-level, multi-stakeholder environment. The Jaga Mission put in place a collaborative decision-making mechanism, which on the one hand helped facilitate policy co-ordination across both different levels of government and between government and non-profit organisations. Small and medium-sized towns of Odisha, as is often the case in the Global South, have poor fiscal conditions and face acute capacity deficits. In the case of the Jaga Mission, the state government's Housing and Urban Development Department provided centralised leadership and simultaneously rolled the scheme out in 109 cities. Financial constraints were overcome by leveraging funds from different welfare programmes run by the national government and the state government ministries. Local-level policy integration was carried out by the municipal governments. Human resource capacity deficiencies were overcome by building partnerships with NGOs and community-based organisations.
2. **People-centric approach.** Whereas many cities in the Global South have undertaken ambitious slum redevelopment projects to free up prime urban land for high-value real estate investment, the Jaga Mission has taken a strong pro-poor, welfare-driven approach. The key components of the Mission, security of land tenure and in-situ basic infrastructure upgrades, are designed for the socio-economic upliftment of people, not commercial gain. Moreover, the Mission was a step in the direction of improving the

livelihoods of people on the margins by engaging the SDAs and the SHGs in construction activities. This initiative was expanded later to provide jobs to people in distress during the Covid-19 pandemic. The Jaga Mission has significantly empowered the urban poor by institutionalising the roles of SDAs in the local governance frameworks. Thus, the Jaga Mission is not just a one-time slum upgrading activity, but a long-term commitment toward inclusive urbanisation and empowerment.

3. **Data-driven governance.** Developmental schemes for targeting slums and informal settlements frequently face operational challenges due to data inadequacies. From the beginning, the Jaga Mission emphasised building a robust data infrastructure for objective decision-making. While the application of drone technology made it possible to quickly obtain high-quality geospatial data for all slum areas of the state, subsequent ground-level data validation exercises involving local people and community-based organisations helped achieve a high degree of transparency in determining property boundaries. At a later stage, detailed slum-level base maps became effective tools for communication with the local communities for the transparent planning of public spaces and infrastructure networks. The innovative data management protocol of the Jaga Mission can be helpful for other cities in planning infrastructure upgrades in informal settlements.

In conclusion, the Jaga Mission shows how a relatively underdeveloped state can undertake significant slum uplifting initiatives through innovative urban governance and resource mobilization strategies. Participatory slum upgrading is a key target under the SDG framework (SDG 11.1.1), while the New Urban Agenda emphasises a multi-level approach to meeting core urban challenges through the National Urban Policy framework. Thus, the key takeaways from the Mission regarding data-driven, people-centric, and collaborative governance can be useful for developing Asian, African, and Latin American countries to achieve progress towards SDG targets.

Governance Innovation in Bamberg: Reconciling Conflicts of Mixed Uses in the Old Town

LI FAN AND PATRICIA ALBERTH

Introduction

Managing historic districts comes with its own complexities. Living heritage features mixed-use structures that equally serve residential, commercial, and touristic purposes. The variety of uses of a space characterises a liveable neighbourhood and indicates sustainability. At the same time, it can lead to conflicts. Accordingly, the challenge of effective district management is to enable mixed residential, commercial, and tourism use while mediating possible conflicts of interest. To do so, various stakeholders should be involved in the relevant decision-making processes as early as possible.

Bamberg's Sand District

In the Sand District, the oldest neighbourhood in Bamberg, at the foot of Cathedral Hill (Figure 1a,b), conflicts of mixed use have been present for decades. From the 1980s to the 1990s, the narrow Sandstrasse was dominated by go-through car traffic. Ground-floor shops and restaurants remained empty, with only a few open at night. Living in Sandstrasse was rather unattractive. People who rented flats there tended to move out again after a short while. Hence, investors had little interest in spending money to renovate historical houses, which further led to the deterioration of the buildings.

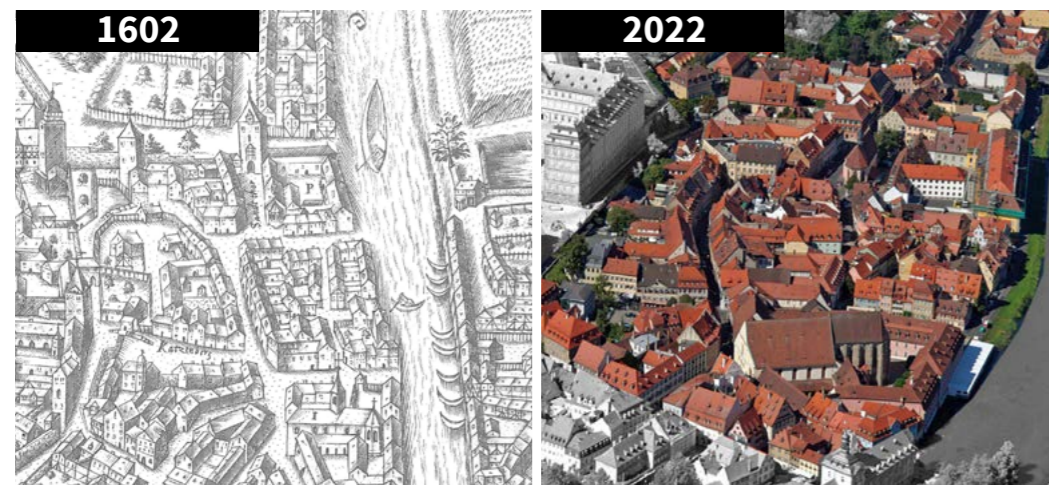


Figure 1a : Sand District on the city's oldest map by Petrus Zweidler from 1602. © Domberg Bamberg

Figure 1b : Sand District today. © Hajo Dietz Luftbild Nürnberg

The city government thus took action to reduce car traffic and renovate the historic houses in order to revitalise the neighbourhood. In 2007, Sandstrasse was newly paved and go-through car traffic was banned. This enormously increased local quality of life. However, new problems emerged. The neighbourhood, with its high concentration of bars and restaurants, has turned into a party hotspot for local students and visitors alike. So, while car noise has disappeared, rampant partying is now causing a noise nuisance, combined with dirty walkways and regular overcrowding. Ineffective response from both developers and city authorities called for different approaches led by the civil sector and aimed at involving a broader range of stakeholders in making Bamberg's city centre an inclusive and resilient place (Figure 2). The key innovative mechanisms of such an approach are described below.



Figure 2 : The traffic-free Sandstrasse is a tourist magnet.

Innovation 1: Civic association to promote civic participation

The 4. Distrikt (Sand District) association is Bamberg's oldest civic group. It was founded in 1891 and advocates the interests of the district's residents. Together with other citizens' associations in Bamberg, the association meets twice a year with Bamberg's Lord Mayor to discuss current issues. In addition, the association organises round tables with the restaurateurs of Sandstrasse to exchange views on specific problems. Simone Franke, Board Member of 4. Distrikt, summarizes the dilemma: 'If we have a nicely developed district, it attracts the crowds. Yet, what kind of alternative is it not to develop our district properly?'

In 2006, the *Leben findet Innenstadt* funding programme led to the creation of the advocacy group IG interesSAND,¹ a spin-off from the Sand District civic association. The name is a pun on the German word *interessant*, which means

¹Stadt Bamberg, *Stadtsanierung "Sand"*.

‘interesting’, and Sand, the name of the neighbourhood. The advocacy group works closely with the local government and even organises joint events such as the annual *Sandkirchweih*, a highly popular church fair. The group maintains good connections with local actors such as Stadtmarketing Bamberg e.V., banks, and the hotel and restaurant association.

The original government funding for IG interesSAND aimed at revitalising the inner city through the active participation of local stakeholders in public-private partnerships. Accordingly, funds were applied to promote intra-district communication and marketing measures. They were used to implement innovative ideas in culture and real estate management, as well as for investments to improve the quality of public spaces (Figure 3). The advocacy group was responsible for allocating the funds and managing projects. Between 2008 and 2018, the advocacy group received funding in the mid-four-digit range. This support proved more than successful for revitalising the Sand district, including through:

- Investments: art in public spaces, Christmas lighting, Christmas market huts
- Concepts: design consultations, implementation of a lighting master plan for private properties, construction site banners for educational purposes, district newspaper *Sandblatt*, homepage, modified office hours, ideas workshop
- Activities: flea market, Christmas market, antiques days, gourmet market, fashion show, open monument day

Currently, the interest group mainly relies on donations and membership fees amounting to EUR 360 per business annually.



Figure 3 : Street musicians as a tool to improve quality of public spaces.

Innovation 2: Stakeholder roundtable for reconciliation of mixed uses

²H. Spitzner, “Civic association in Bamberg”, interview by P. Alberth, March 4, 2022.

³S. Franke, “InteresSAND in Bamberg”, interview by P. Alberth, March 4, 2022.

One of the major achievements of interesSAND has been the mediation of conflicts between catering establishments and residential users in busy Sandstrasse (Figure 4).² Excessive alcohol consumption and noise by partygoers have been leading to ongoing complaints from local residents. The legal framework at local, state, and federal level does not regulate the concentration of bars and restaurants in inner-city residential areas. To help address the problem, interesSAND, conservator and founding member of the advocacy group, has been organising regular roundtables and visits that bring restaurant and bar owners and residents, as well as representatives of the city administration, together to discuss solutions. Only during the Covid-19 pandemic were those meetings interrupted. Although no written agreement has come out of this exchange, a security firm was hired to calm the situation.



Figure 4 : Roundtables with interesSAND as a mediator.

In addition to night-time noise, the residents have also been disturbed by issues with garbage disposal. In the morning, local homeowners often have to navigate empty beer bottles, broken glass, and cigarette stubs in front of their houses. They suffer from littering associated with party activities in their street. Tenant turnover has remained an issue, and holiday rental flats, not all of them legally registered, continue to be prevalent.

While roundtables are an inevitable approach to tackling mixed use issues, they have their limitations. Any agreements are not legally binding, but rather depend on the good will of everyone involved. The city administration cannot assign staff to monitor compliance with those agreements. In general, local bar and restaurant owners are more committed to contributing to a peaceful neighbourhood than outside investors. Local entrepreneurs are more likely to identify with their neighbourhood. Bar and restaurant owners who live on Sandstrasse are obviously more sensitive to the disturbances caused by their customers and thus more likely to contribute to a solution. The successful work of interesSAND has affected other districts in Bamberg. An ongoing exchange has been taking place with the neighbouring district of Mitte and its civic association.³

Innovation 3: Digital tools for civic participation

With activities reduced due to the Covid-19 pandemic and public funding set to expire, the future of interesSAND is uncertain. Yet, the City of Bamberg receives more than EUR 15 million from the German Smart Cities Funding Programme. This opens new possibilities for civic dialogue.

Bambergers are to be given a greater say in shaping their city (Figure 5). Proven structures, such as civic dialogue and citizen information events, are already making a contribution. Additional digital options for civic participation are to be introduced as part of the Smart City programme. The Covid-19 pandemic has shown that conversation needs to continue even at times of enforced social distancing. Therefore, the online services of the city administration are to be expanded. Many administrative services are to be offered online as much as possible. Internally, too, processes will be improved and accelerated so that more end-to-end digital processes are available to provide residents with better and faster service.



Figure 5 : Bambergers in shaping their city.

For Sandstrasse, opportunities offered by the Smart City programme include technical means of reducing overcrowding. The narrow alleys of Bamberg's old town are often highly frequented by tourists and locals alike. To monitor people movements, the local administration is planning to install a system featuring a network of small sensors at strategic locations throughout the city. The system uses these sensors to capture anonymous, freely available data sent via a wide range of user devices via the Internet of Things (IoT). Personal data remains anonymous. Crowd frequencies as measured and extrapolated using these data are displayed in a web app and used for route guidance and linked to the data platform for points of interest (POIs) in the background. Guests can thus benefit from smart trip planning that allows them to avoid hotspots, shows alternatives if necessary and, ideally, is able to guide a visit in advance to relieve pressure on public spaces. The underlying technology is based on open-source software and builds on content with universal data standards. This ensures that, once the project is fundamentally set up, it will not lead to in high subsequent costs or permanent licensing fees.

A centrally maintained database of POIs – sights, museums, leisure facilities, paths, and attractions – in the city will be combined with real-time information on the current pedestrian frequency in central areas. This web app not only provides

users with an overview of attractions in and around Bamberg that may be of interest, but simultaneously shows the routes that can be used to avoid overcrowded areas, thereby lessening strain on these spaces. In addition, the web app offers alternative visiting times and places that relieve pressure on the old town. Furthermore, clever links with public transport, park and ride facilities, and event information add value to this application. The project is set to begin with a pilot in late 2022.

Conclusion

The case study explores how the engagement of civic societies contributes to solving land use conflicts in historical districts through civic associations, stakeholder roundtables, and digital participation. It reflects governance innovation from three aspects.

1. **A fixed community governance institution.** Rooted in local residents, a civic association provides timely expertise to help solve problems in the neighbourhood.
2. **A flexible form of self-governance.** Stakeholder roundtable is an effective mode of governance for co-ordinating interests between local residents, entrepreneurs, and the city administration in order to cope with the challenges of a mixed-use neighbourhood.
3. **Integration of new technology with civic participation.** In the era of digitalisation, the harnessing of digital tools and civic participation consolidates heritage management.

The example of Sandstrasse in Bamberg demonstrates commitment to the historic building fabric based on participatory, integrated, and sustainable human settlement planning and management. The community pursues a two-stage approach: collaboration is used to mediate conflicts based on a mixed use of urban space, while technology serves to reduce overcrowding.

The lessons that can be learned from this case are threefold. Firstly, public funding is key for launching community projects, such as Bamberg's interesSAND. However, sustainable funding strategies are required to ensure the continuity of multi-stakeholder-initiatives. Secondly, the involvement of stakeholders can differ in dimension and scale and therefore needs to be organised flexibly depending on the topic involved. Thirdly, digital technologies can offer solutions to common challenges like overcrowding in historic cities. Maintaining a regular exchange with local government representatives helps to tap into the latest funding programmes for joint projects.

Historically, the City of Bamberg has had a particularly strong body of civic associations dedicated to heritage conservation. Still, in many cities and regions throughout the world, a top-down approach to decision-making in urban governance is more prevalent. The case of interesSAND provides inspiration of how stakeholders with different interests can be co-ordinated by a civic association to solve issues of land use and heritage management where legal frameworks of urban planning laws or regulations are missing.

Strategies to Mitigate Urban Flooding and Build Climate Resilience: Lessons for Indian Cities

INDUMATHI BALASUBRAMANIAN

Introduction

One of the recent Intergovernmental Panel on Climate Change (IPCC) reports cautions that India will see increased heat waves and heavy rainfall, while glaciers will melt further, along with more compound events from rising sea-levels like flooding; furthermore, South Asia and India will experience increases in flood frequency or magnitude, and coastal floods that happened once in 50 years are projected to occur around 3 times a year by the end of the century.¹ Indian cities are already prone to floods, and this has become a recurrent phenomenon. On average, every year 7.5 million ha of land are affected, 1,600 lives are lost and the flood damage caused to crops, houses, and public utilities amounts to INR 18,050 million. Major floods occur in India more than once every five years.²

In 2005, a cloudburst that gushed 944 mm of rain on the suburbs of Mumbai, the financial capital of India, brought the city to a standstill. The casualty list also included 24,000 animals, with 20,000 cars, 2,500 buses, and more than 100,000 ha of inhabited land suffering damage. The incessant rains lashed the entire state of Maharashtra in 2021 as well. When the coastal city of Chennai was struck by torrential rains in 2015, the death toll exceeded 280. The city battled huge economic losses.³ Chennai also witnessed a cloud burst and very intense rains in 2021. The unprecedented extremely heavy rainfall of over 200 mm within a span of seven hours paralysed the city on December 30, 2021.⁴

Many of the underlying issues for urban floods in India are emerging due to conversion of water bodies and wetlands to the concrete jungle. The reasons for such conversion are numerous: urbanisation, a poorly managed stormwater drainage network, encroachments on catchment areas, poor or lost interconnectivity between lakes, occupation of low-lying areas, and, most importantly, constantly changing climate. Hence, the key question is: What can be done effectively yet innovatively to manage abovementioned concerns? This study identifies suitable strategies for Indian cities to handle urban floods and battle climate change.

¹Pörtner et al. eds., *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*.

²National Disaster Management Authority, Government of India, "Floods."

³Nai and Janardhanan, "A tale of two cities."

⁴ABP New Bureau, "Chennai Rains 2021."

⁵World Future Council, "Sponge Cities: What is it all about?"

⁶Tomorrow's build, "China is Building Sponge Cities to Fix Its Flood Problem."

⁷Turenscape Landscape Architecture, "Yanweizhou Park in Jinhua City."

Sponge City: An innovative concept for water management

Many global cities have adopted innovative initiatives to mitigate climate change and manage urban floods, including wetland restoration in the American Midwest, flushing systems using collected rooftop water in Oregon USA, bioswales in Singapore, and public spaces as flexible water retention facilities in the Netherlands. Most recently, the concept of 'sponge city' has gained much importance. As the word implies, a 'sponge' absorbs rainwater and releases it as and when required instead of draining it away. The stored water is then naturally filtered by the soil and allowed to reach urban aquifers. This concept aims to reuse about 70 percent of the rainwater. This is a nature-based solution that solves the woes of urban flooding and can store water during the dry season. A sponge city needs to be amply provided with spaces that allow water to seep through them. Instead of only impermeable concrete and asphalt, the city needs more contiguous open green spaces, interconnected waterways, channels and ponds, green roofs and porous design interventions across the city.⁵ To mitigate urban floods, the Chinese Government has chosen thirty urban areas as pilots for the implementation of innovative water management strategies that would gradually transform them into 'sponge cities'.⁶

- In Lingang, the largest planned sponge park in Shanghai's Pudong district, many roads have been renovated and concrete sidewalks replaced with water-absorbent bricks allowing water to drain into the soil, while central reservations have been filled with soil and water for use as rain gardens.
- Wuhan, a city on the Yangtze River, experienced massive flooding in 2016, so the city took several measures to improve its design including the improvement of Xinyuexie Park, which has been extensively transformed from a drainage ditch to a green space with rain gardens, permeable pavements, and storage ponds for stormwater drainage.
- Chongqing, one of the first sponge cities, has an embedded stormwater control system to allow officials to monitor their sewer and stormwater drainage networks and help authorities mitigate the risk of flooding in the future.
- A new park in the Tongan district developed in 2020 would help recover from floods/storms for the next hundred years as it has been constructed on wetlands built over 99 hectares that boast an impressive network of native plants, trees, ponds, islands, and elevated walkways, making the park more than a place to drain away excessive waters.
- To mitigate flooding, the Yanweizhou project used a cut-and-fill strategy to balance earthwork by creating a water-resilient terraced river embankment covered with flood-adapted native vegetation, hence showcasing a replicable and resilient ecological solution to large-scale flood management.⁷

Chennai: Towards nature-based interventions?

One of the largest metropolises in India has traditionally numerous water bodies (Figure 1). According to a recent study by the Greater Chennai Corporation, the area covered by water bodies in the city and its suburbs had shrunk from nearly

12.6 sqkm in 1893 to about 3.2 sqkm in 2017, mainly due to urbanisation. The 1893 map indicates the presence of a crescent-shaped body of water stretching from present-day CIT Nagar to Teynampet and the Gemini Flyover, on to Nungambakkam, and along what was then Mount Road. The water bodies, namely Mylapore and Nungambakkam Tanks, covered a distance of nearly 7 km. Lake Vysarpadi, Perambur Tank, Medavakkam Tank, and Spur Tank, were some of the large water bodies replaced by buildings after the 1950s. While Nandanam was along the lakefront, the site of the present-day CIT Colony was occupied by a body of water in the 1950s. Kilpauk also had large water bodies.⁸ The development of several residential neighbourhoods surrounding the lake has curtailed the natural hydrological flow of water over the past decades. Most of these locations were identified as flooding zones in the recent floods of 2015 and 2021.

⁸ Chennai Smart City Limited, "Chennai: good old days."

⁹ Chennai Smart City Limited, "Restoration of Water Bodies – Transforming Chennai."

¹⁰ Ibid.

Smart City Mission in Chennai

Through nationally funded schemes, Indian cities have taken up several initiatives to mitigate flooding. One such initiative is restoration of water bodies. Through its Smart City Mission, the urban local body Greater Chennai Corporation has identified 210 water bodies across 15 zones in its jurisdiction for rejuvenation. Of these, 32 have been restored and 57 more are expected to be rehabilitated.⁹ The devastating floods that struck the City of Chennai in 2015, followed by severe drought in 2017, have brought together the public in a collective effort to help restore and rehabilitate the city's water bodies. Restoration works have already been initiated in many of the lakes and ponds and many have been successfully implemented in 2018 and 2019. These water bodies range from 0.1 to 19 ha in area. The restoration plan broadly includes:

- In-situ cleaning measures such as desilting and weed clearance
- Increasing overall storage capacity and thereby improving ground water recharge
- Strengthening of embankment, lake fencing, and shoreline development
- Public awareness and active public participation through focused events
- Prevention of pollution from non-point sources by providing low-cost sanitation
- Development of walking trails with native plantations on both sides has been proposed around ponds to improve connection between nature and human beings

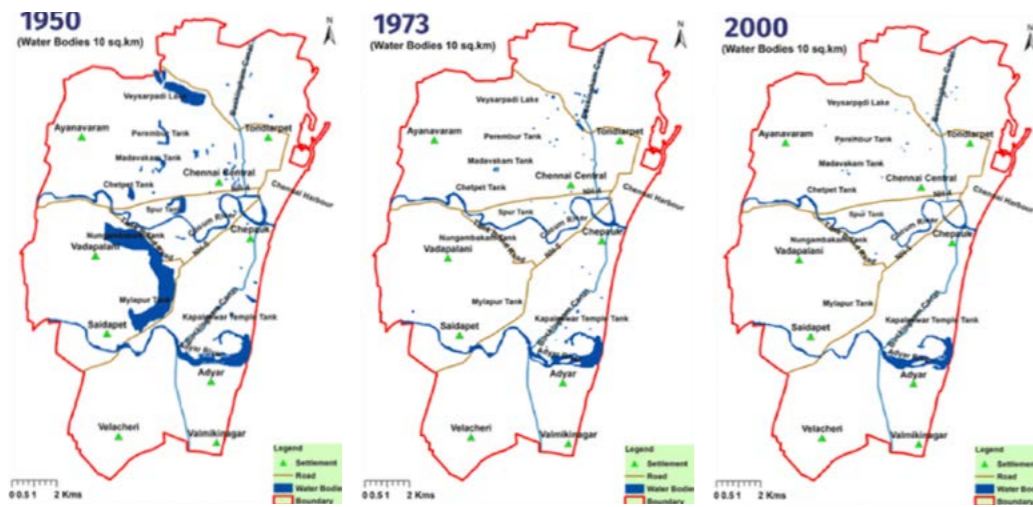


Figure 1 : Disappearance of water bodies in Chennai over the decades. © Chennai Smart City Limited

Another challenging part of the city is its topography (Figure 2). Chennai has a flat terrain and is very close to sea level. Being completely urbanised and located on this flat site, it is very vulnerable to floods, whilst growing urbanisation in the southern suburbs of the city worsens the initial conditions.

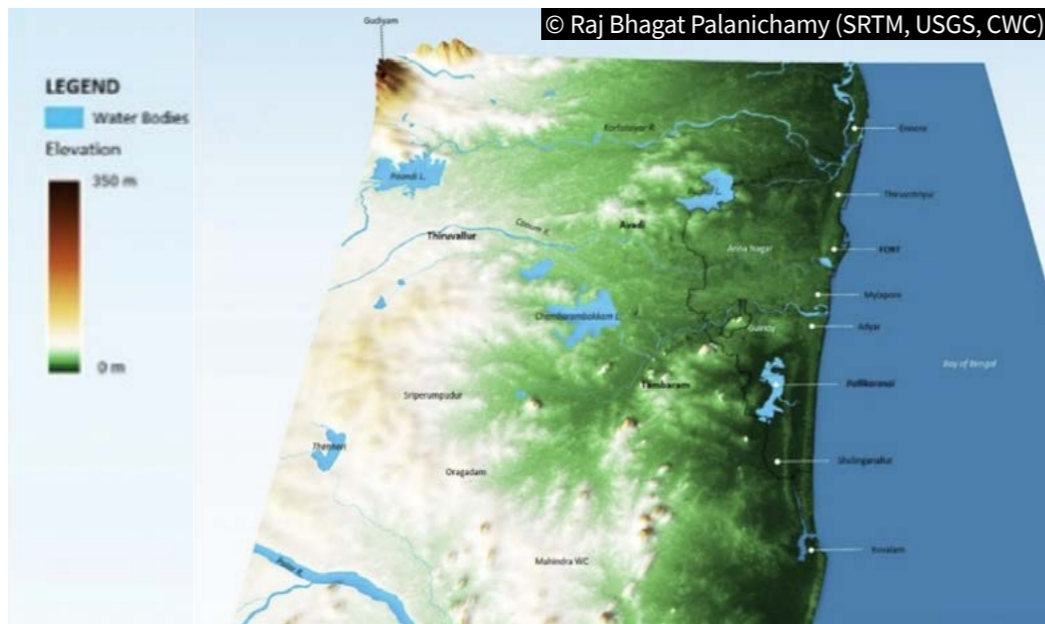


Figure 2 : Topography of Chennai.

Madipakkam Lake

Madipakkam Lake (Figure 3) is surrounded by residential suburbs of the Chennai Metropolitan Area (CMA), such as Puzhuthivakkam, Kilkattalai, Ram Nagar, and Velachery, and is well connected with transportation facilities.¹⁰ Madipakkam Lake is surrounded by residential areas. Numerous settlements have sprouted along the northern, southern and eastern shores of the lake. The area of the lake is around 45 acres. The Lake View Road on the western side has been provided with a walker's pathway along the lake boundary, creating a beautiful stretch of recreational grounds along the western side. Besides walking paths, supply and surplus channels have been strengthened to prevent any further flooding.



Figure 3 : Madipakkam Lake, before and after restoration. © Google Earth Pro

Puduchery Keni

Puduchery Keni (Figure 4) is located in Sholinganallur, a predominantly residential area in South Chennai surrounded by mixed-use and primarily residential areas. Puduchery Keni is both a local catchment and an intercepted catchment area. The main source of water supply to the reservoir is from its own catchment. At present, water flows through a culvert constructed across the embankment in the western side of the lake. The pond has been restored using Chennai Smart City project funds, and works have included desilting, provision of walkways along the embankment construction of a supply channel for letting water from nearby residential areas, etc.



¹¹ Chennai Rivers Restoration Trust, “Cooum River Restoration.”

Figure 4 : Puduchery Keni, before and after restoration. © Google Earth Pro

Cooum River

The Government of Tamil Nādu began integrated restoration of Cooum River after the devastating floods of 2015. The river runs east for about 65 km and flows into the Bay of Bengal downstream of Napier Bridge, traversing 20 km within Chennai city limits.¹¹ Being one of the city’s major rivers, it acts as the major flood carrier for Chennai City. When it enters the city, the river is essentially an urban sewer receiving municipal and industrial wastewater and solid waste (especially near bridges) and refuse from slums. Multiple stakeholders are involved in this project, mainly to improve the flood carrying capacity of the river and prevent further pollution. Many stretches of the river in the Cooum basin have undergone interventions, such as removal of encroachments, canal widening, strengthening of embankment, solid waste removal, fencing, and desilting (Figure 5). This alone has largely prevented residential areas from being inundated during the recent floods of 2021.

Coimbatore: Smart City

In Smart City flagship lake-restoration project (Figure 6), Coimbatore, the second-largest metropolis in Tamil Nadu after Chennai, aims at the regeneration of lakes. The goal of the eight-lake project, which covers Kurichi, Krishnampathi, Valankulam, Selvampathy, Kumaraswamy, Selva Chinthamanikulam, and Periyakulam under

¹² Natarajan et al., “Case Study and Analysis.”

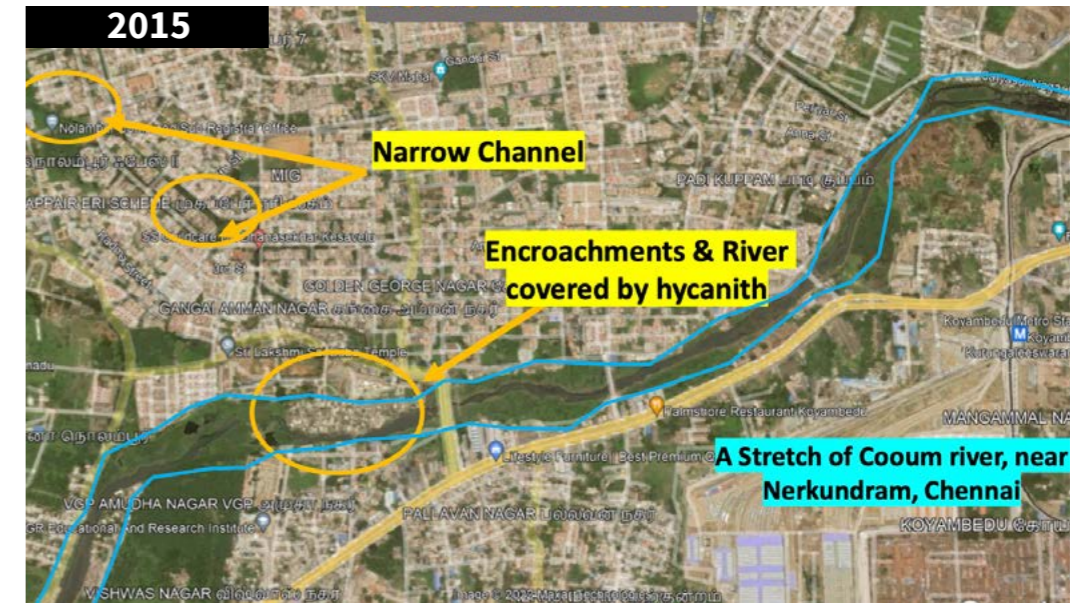


Figure 5 : Cooum River, before and after restoration. © Google Earth Pro

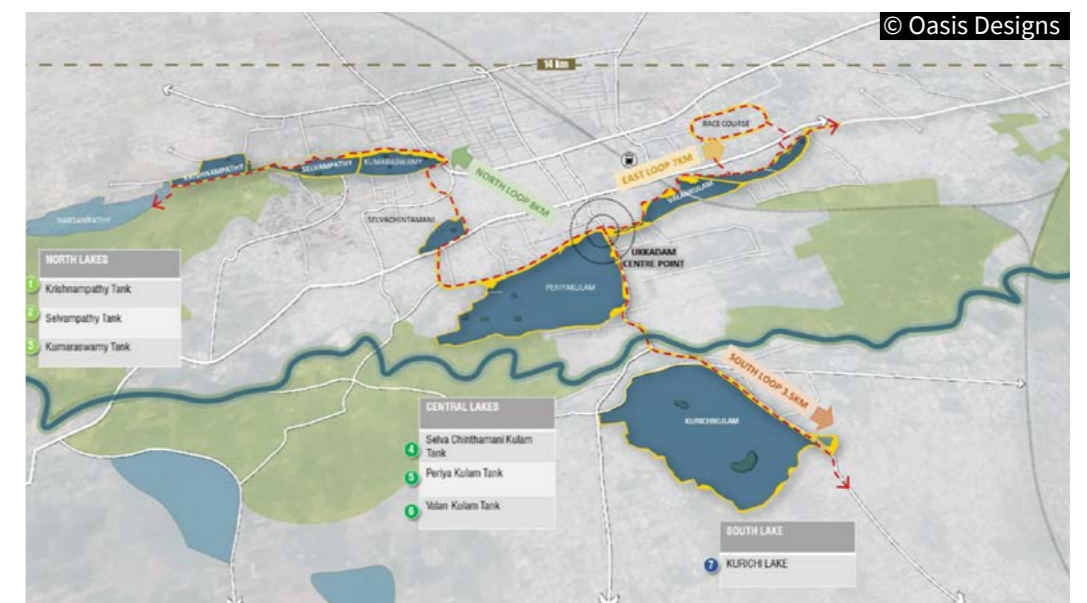
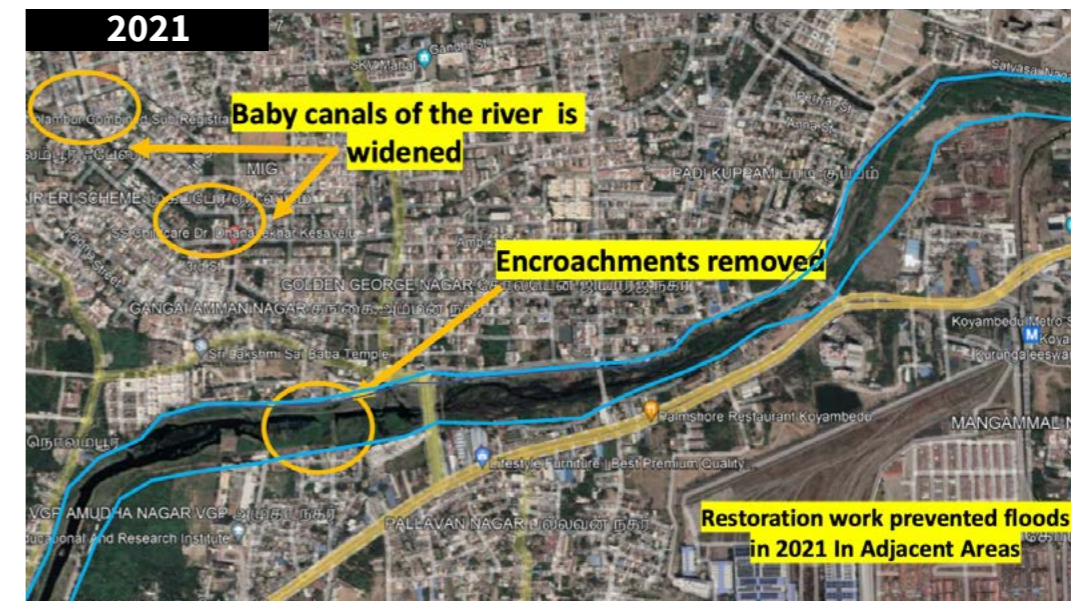


Figure 6 : Plan of eight lakes and its interconnectivity.

as part of the Smart City Mission, is to bring about social change by creating environmental awareness, skill development, and better quality of life in the city. The city is located in the Noyyal river basin and has an extensive lake system fed by the river and rainwater runoff.¹² These eight lakes are the largest reservoir areas of Coimbatore. These lakes have served as agriculture irrigation channels to the city and have been restored.

The city has cleared all the encroachments from all the lakefronts, reclaiming the space to create a new visible and accessible lakefront for people to connect with. All lakes now store more water than they did historically, with the additional depth helping to increase the total water volume of each lake. As part of a decentralised waste-water treatment approach, all lake inlets are planned to be equipped with suitable treatment facilities, which will ensure that all non-monsoon flows into the lake pass through a series of screen chambers that ensure all floating debris is captured before it enters the lake. Non-monsoon waste will subsequently go through a diversion chamber into the treatment facility, and then the treated water will be brought back into the lake.

All the stormwater is also designed to enter a green buffer area, filtered, and sent to a stormwater swale or raingarden, and the overflow directed back to the lake. This will ensure that all the rainwater falling on land around the lakes can also soak into the ground, as the lakes, once full, will maintain full reservoir level regardless, while all excess water will flow out and finally be taken away into the river.

The overflow weirs, sluice gates, and other installations at all lakes, which were old a have been repaired to receive a new lease of life. The new embankment slopes have been designed as 'green infrastructure' with natural rocks and plants, in sharp contrast with 'grey infrastructure' arrangements previously used to stabilise the slopes. The green slopes with natural rocks provide habitat for native biodiversity, which in turn helps regenerate the lake ecosystem. Several wet floating wetlands are provided in each lake to ensure consistent quality of water.

With the use of floating pontoon structures for all jetties and walking platforms in the water, the design attempts to avoid the use of concrete inside the water area of each lake. Only hydraulic structures such as sluice gates or overflow weirs are constructed in concrete as part of lake infrastructure requirements.

Lake lagoons and vegetated islands have been restored and will be kept intact to attract birds. To ensure that the lakebeds that typically dry up during summer also manage to retain some level of water, water from the inlets is routed through a specially terraced lakebed. This technique works as a stepped flow-through wetland and provides shallow depths of smaller ponds that first fill up and then overflow into the deeper areas of the lake.

A 20-km long cycle-walk connector greenway is being developed to connect all lakes with Ukkadam junction as the centre point (Figure 7 a,b,c). The East Loop

¹³Oasis Designs, "Eco Restoration of 8 lakes, Coimbatore City."

connects to Valankulam and Sungam Junction, then continues eastwards towards Singanallur, along Trichy Road. The South Loop goes along the eastern bund of Periyakulam to cross the River Noyall and join the Eastern Esplanade at Kurichikulam. The Northwest Loop goes westbound along the Periyakulam North Promenade from Ukkadam, then connects to Selvachintamani along the road, and then, after going around, heads further north to connect to the North Lakes of Kumaraswamy, Selvampathy, and Krishnampathy, and, finally, reaches Narsampathy.¹³



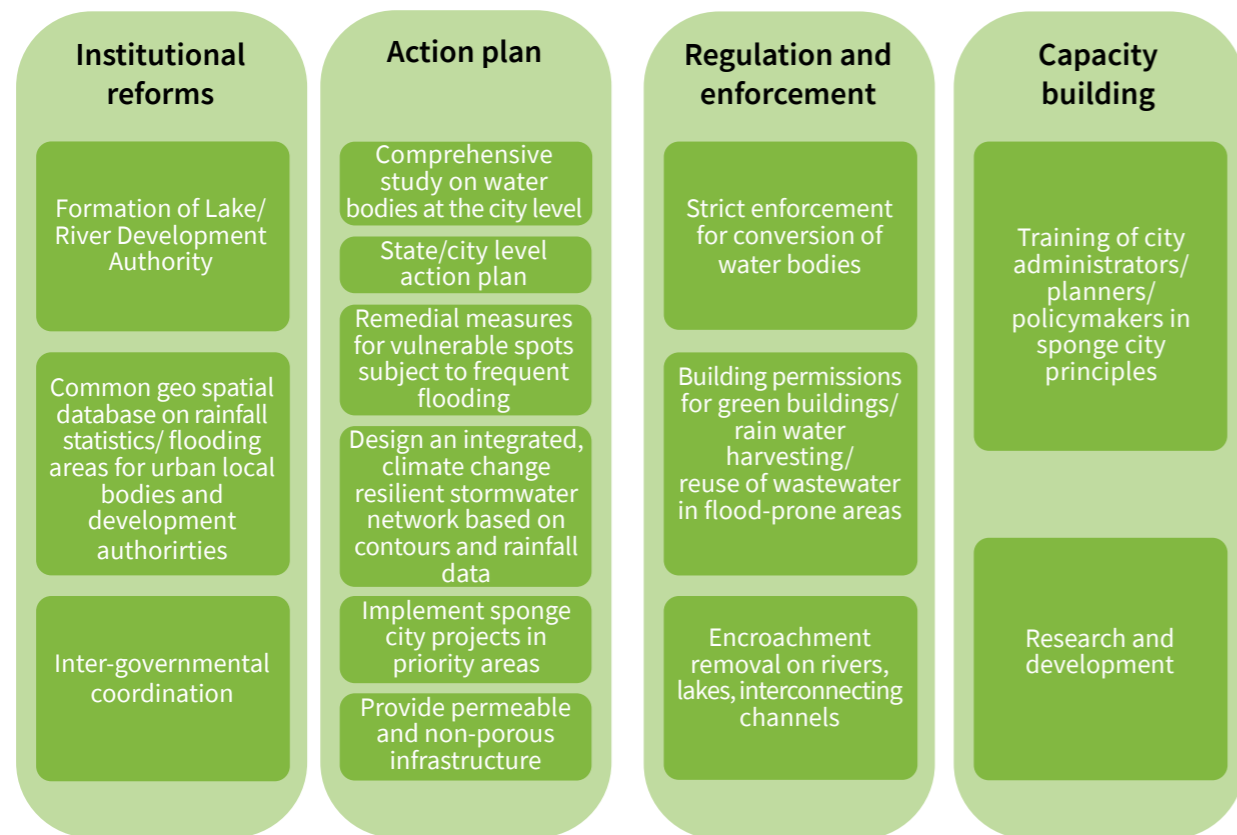
Figure 7 a,b,c : Views of a restored lake.

Upcoming actions

To improve the groundwater table and prevent flooding, the Greater Chennai Corporation has proposed setting up a sponge park with an artificial pond and rain gardens at the Kargil Nagar flood water pumping station in the Manali zone. The project is part of the integrated stormwater drain network in the Kosathilaiyar basin. This will act as a park during dry seasons, and wetland, rain gardens, and storage ponds during rainy seasons.¹⁴ Similarly, in a new proposed inter-city bus terminal for Chennai, the development authority is planning to create a sponge park consisting of blue-green infrastructure to collect, filter, and store the runoff on a pilot basis at Kilambakkam. Following suit, Mumbai City has also initiated to employ the sponge city principle to address the distressing floods the city has been experiencing in last two decades. The Brihanmumbai Municipal Corporation (BMC) development plan is focused on regulations for new buildings, including green rooftops and vertical gardens. Other measures include permeable footpaths that store excess runoff water, water-absorbing concrete, wetland restoration, and rainwater harvesting.¹⁵

¹⁴ TNN, "Greater Chennai Corporation plans to set up sponge park."

¹⁵ Bhalerao, "BMC to adopt 'sponge city' initiative to tackle urban flooding during extreme rainfall."



How can Indian cities mitigate climate change and become resilient?

The sponge city concept holds more promise in coastal cities like Chennai and Mumbai. The key factor here is going back to nature and creating more porous permeable surfaces in the city that can absorb excess water and facilitate its use when required. The Smart Cities Mission has set up many micro and pilot projects. The impact of flooding is yet to be fully addressed.

Figure 8 : Guidelines for Indian cities to mitigate climate change and handle urban floods. © Author

Warnings of climate change crises and emergencies call for immediate action to find possible solutions. Open Space Reservations could be utilised as sponge parks, especially near areas vulnerable to flooding. Restoring water bodies, green building, rainwater harvesting, artificial rain gardens, wetlands, and storage reservoirs will be ideal solutions against floods. Permeable pavements will be a readily implementable solution for recharging groundwater along massive road networks in metro cities. Some broad guidelines for Indian cities to mitigate climate change and handle urban floods are given in (Figure 8).

Nature-based solutions like those employed in the Sponge City Programme are cost-effective and sustainable alternatives to conventional carbon-intensive urban development. And, aside from their contribution to sustainable water management, they generate a host of social and environmental co-benefits, including improved mental and physical health linked to public green spaces, biodiversity conservation and natural cooling, and helping cities move towards more holistic, transformative, and climate-proof urban water management.

Chennai and Coimbatore are two major cities in the state of Tamil Nadu which have deployed the sponge city concept under the national Smart Cities Mission scheme. While there has been initial success in implementing this concept, its efficacy in combating floods and droughts can only be assessed in the coming years. Rainwater harvesting structures must form part of any building plan that is part of development regulation in metropolises such as Chennai. Open Space Reservation is mandatory for large-scale development. All such parcels of land across the urban area could be potential sites for deploying the sponge city concept. Apart from constructing stormwater drain networks conforming to the contours of the urban area, which is not the case now in most cities, the drains can carry excess floodwater to sites identified for sponge parks along its network.

The range of measures to combat the climate emergency can include development of sponge parks for purposes such as rainwater harvesting, vertical farming, urban-farming, reforestation, green mobility, and the like. Scaling up of these arrangements in accordance with rainfall patterns and floods in urban areas is now essential. Urban planners, policymakers, and administrators must switch to nature-based solutions for any urban problem to make cities sustainable and achieve SDG 11.

Innovating for Digital Inclusion in Cities: Planning Guidance to Implement People-centred Approach to Smart Cities*

MELISSA PERMEZEL, PONTUS WESTERBERG AND EMILY ROYALL

Introduction

Much of contemporary planning in cities urges us to understand how cities can be technologically responsive to urban challenges while being more efficient and inclusive. Between the climate and pandemic crisis and the ongoing threats of war and natural disasters, cities continue to reckon with a pace of change and unpredictability across all dimensions of the social, economic and environmental spectrum.

At the same time, the world is both urbanising and digitising at a rapid pace. Digital technologies have great potential to assist many stakeholders in their efforts to achieve sustainable urban development and help deliver the widespread prosperity envisaged by the United Nations' Sustainable Development Goals. The 'smart city' approach is considered key to connecting not only these two global mega-trends but also as providing an entry point for planners and other urban practitioners to imagine the promise of technologies and innovation in cities for development. The smart city approach is seen to foster positive transformative change by harnessing information and communication technologies (ICTs) and digital technologies to improve urban efficiency, quality of life and, ultimately, sustainability.

Whilst digital technology can have enormous transformative potential for positive change, it can also perpetuate existing social and economic inequalities. In recent years, research suggests that for all the change and hype about technology, there are significant spatial, global and city-level inequalities in terms of who can access the transformative digital infrastructure and who cannot. In addition, technology has been applied uncritically in many smart city projects. The focus has been on supply rather than demand, what the private and tech entrepreneurs can deliver and what tech alone can be harnessed for a significant impact. As a result, smart city planning often fails to fully consider stakeholders with diverse needs and interests in cities, including the different governance arrangements and roles of local authorities. In addition, the importance of place is often not considered sufficiently. Where people live in cities impacts their capacity to make use of the technology and innovation promised by a smart city approach. In some cities, the smart cities approach

* Note that this paper re-purposes much of the material published in the following references: UN-Habitat, *Centering People in Smart Cities*; UN-Habitat, "People-Centered Smart Cities."

¹UN, *Road map for digital cooperation*, 14.

²UN-Habitat, *Centering People in Smart Cities*.

appears stuck in a semi-permanent pilot project mode, where few innovations scale or effectively engage and benefit the poorest and vulnerable.

At the same time, many national and local governments lack the capacity and knowledge to identify and procure appropriate technologies that meet their needs. While Covid-19 has shown that digital technologies are an even more fundamental pre-condition to accessing services such as health and education, many governments have struggled to re-purpose their skills and resources for the smart city approach, address the digital divide in their towns and cities, and manage any strategic digital transformation.

The United Nations' Secretary General has made a strong case for human rights in digital spaces in his 2020 *Road map for digital cooperation*.¹ The document lays out critical areas for action, including universal connectivity, promoting digital public goods, and ensuring trust and security in the digital environment. However, the key questions are: What does an inclusive and people-centred approach look like in practice? How do planners and other urban practitioners grapple with the digital divide, the capacity gaps around tech and the aspiration of the smart city to ensure it works for more? How can the aspiration of a people-centred approach to smart city development be delivered?

Drawing on the most recent work of UN-Habitat on the topic of people-centred smart cities,² this paper explores the key ingredients, as proposed by UN-Habitat to ensuring smart city approaches are also people-centred. Three innovative approaches are suggested:

- Re-framing smart city to be people-focused, including driving the tech from a human perspective
- Adopting a multi-dimensional approach to the human-centred focus
- Adopting an integrated and holistic approach to ensure that all facets of the smart city approach are connected

These are different to conventional approaches to smart city development, but form part of the fundamental building blocks for an inclusive smart city, one that considers both people and places. Their starting points and underlying features are briefly elucidated below.

Putting people at the centre of smart city practices

Currently, smart city development is increasingly recognising the importance of processes to engage local and national governments and foster their role in a more proactive approach to shaping the digital transformation, rather than considering them simply users of technologies. Such a proactive approach includes ensuring a comprehensive and functioning regulatory environment that builds the trust of investors and citizens, using procurement to steer technological innovation and providing enabling environments for technological development. Simply put, cities themselves are slowly starting to take back the control of the smart city vision.³

To realise this, governments need to put in place regulations and policies that govern smart city development, including on issues such as equality and inclusion, interoperability, procurement, public-private partnerships, and issues to do with privacy and security raising from the use of digital platforms and data collection. To build trust, governments need to enact privacy laws that respond to the concerns of citizens and investors in relation to security breaches, the handling of personal data and surveillance. Clear frameworks and institutional arrangements for data collection and data sharing should be put in place, especially in relation to data collected from different sources. These governance frameworks need to set out ethical standards, including who has the right to data access and ownership and who should benefit from the profits generated by data. Here it is important that the public sector, as the custodian of citizens' rights, assumes its full governance responsibility. For many local governments, this is a completely new area, and digital policy and governance capacity needs to be significantly strengthened or built from scratch.

For UN-Habitat, the use of digital technologies in cities and by cities must be appropriate to ensure that the prosperity they bring is shared among urban residents, cities and regions. Ultimately, the deployment of technology needs to be grounded in the real needs of people and in fact, driven by the human dimension of cities. It should pay particular attention to underserved populations to address inequalities and bridge social and spatial divides.

Local governments and communities faced with disruptive digital transition will benefit greatly by having a plan or strategy in place and specific guidance on how to negotiate digital rights. An effective smart cities or digital transformation strategy will enable local governments to take control of the digitalisation process and ensure that they are proactively engaging with new technologies and establishing the right data governance frameworks.

Connected to the strategy work, it is crucial that cities understand where they are in the digital transformation process. UN-Habitat is therefore developing a smart city readiness assessment process that builds on many years' experience of city assessments through the City Prosperity Initiative and Key Performance Indicators for Smart and Sustainable Cities.⁴ UN-Habitat promotes an approach that starts with identifying the challenges, aspirations and priorities as identified by a range of urban residents, communities and urban residents, considering inclusion, the challenge of places (where one lives in a city) and respecting human rights. In addition, it is become more evident that smart city planning focuses on solving specific sustainability problems and key missions such as climate change, reducing poverty, while at the same time engaging with a strong inclusion agenda. A sectoral, industry or technology driven, approach would not be appropriate.

What does people-centred smart city approach look like?

To generate a more people-centred approach to smart city development requires a fundamental commitment to people and how governments use innovation

³UN-Habitat, "People-Centered Smart Cities."

⁴United 4 Smart Sustainable Cities, *Collection Methodology for Key Performance Indicators for Smart Sustainable Cities.*

⁵UN-Habitat, *Centering People in Smart Cities.*

and technology to improve their quality of life. This requires orientating the new ideas, new partnerships and testing tech, and not just adopting it without a rigorous set of questions asked from the people's perspectives – their aspirations, challenges and needs. It requires re-framing the notion of a smart city to be people-focused, including driving the tech from a human perspective. Practitioners wanting to innovate on a people-centred smart cities approach need to adopt a multi-dimensional people-centred framework that puts the following practices at the heart of the planning work:

- **Empowering people:** Centering smart city activities on people's needs by grounding smart city infrastructure and services in a commitment to human rights, and maximising community participation, representation, transparency and control. Smart cities should provide digital public goods that are open, transparent, accessible and interoperable.
- **Making access to technology equitable:** Building a foundation of universal access to affordable internet, digital skills and digital devices.
- **Responsibly managing data & digital infrastructure:** Improving the convenience and accessibility of services through digitalisation and by creating a framework that sets standards and responsibilities for effectiveness, accountability and inclusivity.
- **Building trust by securing digital assets:** Safeguard public trust by putting cybersecurity measures in place that protect data and infrastructure.
- **Building multi-stakeholder capacity:** Collaborate with diverse stakeholders to build smart city projects, infrastructure and services. Expand the capacity of city staff for digital transformation. Evaluate the need for technology and address equity, environmental justice and social justice in smart city initiatives.

Innovative ways to approach integration

A people-centred approach also requires adopting an integrated and holistic approach to ensure that all facets of the smart city approach are connected and that the approach considers key aspects like space, place, different sectors and groups of people. Taking a people-centred smart city approach requires coordinating with multiple levels of government and integrating across multiple stakeholders including social entrepreneurs, community advocacy groups, local activists, communities and the private sector. It also recognises the different governance configurations in different parts of the world acknowledging that some local authorities have more responsibilities, decision-making capacity, and power than others. Finally, this approach embraces the role each stakeholder plays in the development of smart city technologies, initiatives and policies.⁵ In its essence, a people-centred approach demands the public sector to be active in pursuing multi-level governance. More precisely, instead of the public sector's traditional role of the customer, regulator and 'market fixer', mostly intervening to correct the shortcomings of the market when it fails to provide equitable services, in a people-centred smart city approach, the public sector triggers innovation by

identifying participatory models that allow greater stewardship of outcomes benefiting the public.

National and local governments can provide overarching leadership and key messages on the value of people-centred smart cities to include prosperity and growth, and finance major infrastructure that provides critical funding to support local governments in smart city endeavours. Local governments should be the primary stewards of community engagement that drives improved services and connectivity for residents. They can also leverage procurement standards, local ordinances, municipal codes and policy for people-centred outcomes and make important local by-laws and develop strategies that support the transformative potential of a smart city strategy. First nations and tribal groups also have an important role to play in smart cities. The digital sovereignty of these groups is important for maintaining and growing culture connections, promoting educational attainment, achieving economic development goals and enacting sovereignty.

Community groups are also important stakeholders in a people-centred smart city. Often these groups provide important contextual information and galvanise public support for smart city initiatives and approaches. In addition, civil society plays multiple roles in smart city development. Non-profit and non-governmental organisations are critical partners for local governments seeking to develop a localised plan for building people-centred approaches to smart cities, as they have intimate knowledge of the communities they serve. For example, civil society typically works to improve access to ICTs, or advocate for critical issues in equitable smart city development within their communities.

In a traditional smart city approach, the private sector is seen as the primary driver of innovation, technology development and delivery. A people-centred smart city approach emphasises the collaborative role private sector actors can play as partners with governments and communities. The private sector can provide substantial investment in infrastructure and services, often through a public-private partnership (P3).⁶ They can also provide consulting services to support the development of digital infrastructure, and develop innovative solutions and approaches to problems articulated in participatory processes. Small businesses, local companies and startups can support local innovative approaches to using emerging technology.

Finally, academic community (schools, universities, colleges, and research organisations) can offer facilities, personnel and technical expertise about the digital divide to local governments. Research organisations and institutions are instrumental partners for local governments that seek scientific expertise, advice and support in the technology and urban planning domains. Local governments can work with academic institutions to establish smart city research centres, devoted to studying urban dynamics, digital human rights or developing new participatory approaches.

⁶UNDP, “Singapore Global Centre: Smart Cities.”

Planning approach to the people-centred smart city: Innovative practices

In reviewing smart city models around the world, UN-Habitat notes that five pillars underpin a people-centred approach to smart cities. These provide practical entry points for planners to adopt in order to achieve smart city.

The Community Pillar

This pillar addresses how local governments can work to place people and their needs at the centre of smart city development.

Activity 1: Focus any smart city conversations and actions towards a strategy on people’s needs and future aspirations.

Activity 2: Ground smart city infrastructure and services in Digital Human Rights by maximising community participation, representation, transparency, and control.

Activity 3: Provide digital public goods that are open, transparent, accessible, and interoperable.

The Digital Equity Pillar

This pillar addresses how to build equitable access to ICTs with a focus on internet connectivity, digital skills, and digital devices.

Activity 4: Build a foundation of universal access to affordable internet, digital skills and digital devices.

The Infrastructure Pillar

This pillar addresses how to create a framework that sets standards and responsibilities for effectiveness, accountability and inclusivity.

Activity 5: Improve the convenience and accessibility of services by digitising them.

The Security Pillar

This pillar addresses how local governments and national governments can work in unison to achieve secure smart city assets including data and infrastructure in order to improve public trust.

Activity 6: Safeguard public trust by protecting smart city assets.

The Capacity Pillar

This pillar addresses how to develop multi-stakeholder partnerships and build organisational capacity that better facilitates people-centred smart cities.

Activity 7: Collaborate with diverse stakeholders to build smart city projects, infrastructure and services.

Activity 8: Expand the capacity of city staff for digital transformation.

Activity 9: Evaluate the need for technology and address equity, environmental justice and social justice in smart city initiatives.

Key steps to developing people-centred strategy of urban development

Some practical guidance for the local officers on the components that are more likely to produce a people-centred strategy for smart cities includes the following.⁷

⁷UN, *Road map for digital cooperation*; UN-Habitat, *Centering People in Smart Cities*.

1. **Identifying a leadership structure.** Obtain leadership support and buy-in for digital transformation. Establish key roles such as a Chief Technology Officer or Chief Digital Officer, that are endowed with leadership capability needed for successful digital transformation at the organisational level. Align the efforts with an independent certification process, an executive order, or through the mayor, city manager or city council members depending on the form of local government.
2. **Building the capacity to deliver the plan.** Determine what financial, staffing, or infrastructural resources are required to be successful. Identify opportunities for existing staff to build the necessary digital literacy or technology skills. Show how the people-centred strategy is connected to other key local plans (such as economic development, education, community development plans) and relevant national policies and initiatives.
3. **Creating standards for inclusive participation.** Establish standards for public participation processes that are transparent, inclusive, respect privacy, and demonstrate the results of participating. Make sure that diverse categories (based on education, gender, age, nationality) of public are involved and equally treated during the participatory process.
4. **Identifying key partners from a range of sectors.** Identify what national and local organisations can support the people-centred strategy including community organisations, local advocacy groups, potential P3 opportunities, NGOs, regional or national government programmes and offices. Also, identify the missing but critical stakeholders to be involved.
5. **Building a digital equity framework within the strategy.** Early in the strategy, work towards establishing a digital inclusion plan for inclusive access to connectivity, digital skills and devices.
6. **Building a management and operations ecosystem.** Establish how the people-centred programmes will be managed and supported especially through digital infrastructure. This includes identifying finance strategies, building Information technology systems including data platforms and cybersecurity architecture, identifying supportive legal frameworks at the regional and national level and identifying opportunities to operationalise human rights through municipal code, ordinances, policies and procurement.
7. **Creating a plan for data.** Data is a critical asset in a people-centred smart city, that should be owned and accessible by the public. Establish an IT

plan for data, complemented by an interoperable smart city platform, in addition to a Data Governance Policy, Open Data Policy, Privacy Policy or a Digital Bill of Rights.

8. **Building a programme design and implementation plan.** Begin to identify key programme offerings, pilot projects and other initiatives that will be supported by all the items identified in previous steps. These offerings should directly address needs expressed by communities as identified through public participatory processes.
9. **Creating an evaluation framework.** Decide how to measure success using Key Performance Indicators and create a strategy for collecting data about progress. If using surveys, be sure to include a representative sample of the population, use inclusive survey language, and take steps to address the digital divide by surveying people in person.
10. **Piloting and adjusting.** Test smart city technologies. Begin with deployments or programming at a small scale or with focus groups, identify lessons learned and refine your approach before scaling. If the approach was not successful, identify the reasons why and make the necessary adjustments.

Conclusion

It is critical to remember that technology is not a solution in and of itself. Rather, it can be a powerful tool if it responds to the lived experiences of the people it serves. Under the people-centred smart city approach, technology is evaluated for its ability to address the needs determined by the people it serves and in the space and places where they live. In this approach, people are empowered to intervene and shape interventions in collaboration with the government, and human rights are at the core of all activities.

Finally, taking a people-centred smart city approach requires a conscious and consistent shift in culture within a local government on several issues. Culture change may include shifts in how city staff understand, use and manage data, how they think about their roles in technology and process development, raising awareness about human rights and privacy issues and changing how they perceive the role of residents in strategic planning and policymaking.



4

REFLECTIONS

Towards Innovative Urban Planning and Governance

Over the last several decades, urban planning and urban governance have significantly evolved, almost in a constant quest for innovations. Spurred on by global circumstances, including an increasing urgency to address climate change, calls for fundamental designs of cities in response to the ongoing disruptive nature of pandemics, digital transformation and local pilots and initiatives, a range of deep questions about the future of cities emerge. Most significantly: How do we innovate to keep the cities inclusive and sustainable? What role does planning play in this dynamic?

At the beginning of the century, many changes occurred in cities worldwide that signalled to change and the need for innovation, particularly in the partnerships to forge sustainability and plan for it. On the one hand, some cities have become affected by the loosening of the national borders to improve cross-border and supranational networks of various kinds (physical, digital, and institutional), particularly in Europe, and the emergence of multi-national corporations as the leading players in the real estate domain. In contrast, in other cities, urban dwellers continue to struggle with whoever they can to secure affordable housing in informal settlements and slums. The rise and repurposing of technology, the ongoing tensions around identity and the strengthened financial tools as opposed to established economic mechanisms have been amongst the drivers of increased interactions among numerous stakeholders – from individuals to international consortia and across various scales – from local to global. Individuals and groups continue to use urban spaces to seek justice, change and a sense of belonging or, more ruthlessly, to seize opportunities for influence and financial gain.

With ongoing migration, military conflicts, and refugee movements as well as pandemics, it seems that transnational urbanism and multi-level governance are facing challenges as the focus of countries and cities moves towards strengthening national outlooks. This has seen some countries and cities take an inward, traditional approaches to policy and planning, however, it has also opened an arena for the more situated, bottom-up activities. Renewed efforts are being made to engage local residents actively in decision-making processes, and in addressing local needs and responding in a more nuanced contextually sympathetic manner. Ultimately, such a place-based approach triggers a shift

from multi-level governance towards adaptive governance. As the latter assumes inclusive, localised, and community-informed approach that allows wider outreach to the people for getting feedback, requests sophisticated policies tackling the problems at hand, and incentivizes the statutory and jurisdictional shifts, innovations seem to be at the centre of this shift. This is a welcome shift if it continues to put people and sustainability at the heart of the planning process.

The case studies elaborated in this publication highlight this dynamic trend whereby planning and innovation intersect, and creative adaptive solutions are developed in order to successfully address contemporary urban planning and governance challenges: urban drought, food security, urban poor, preservation of historical urban areas, flooding, pandemics and lockdowns, social exclusion due to digital divide, etc. While the spatial problems may be of different origin and exist in unique cultural, economic and social contexts, all the cases provide useful general lessons that are relevant for planning practitioners and urban managers to learn from, particularly those working within local authorities. Moreover, the case studies underscore the importance of innovation and access to digital infrastructure as tools to ask questions about the status quo and if future planning efforts are inclusive and sustainable. Finally, at the heart of many of these papers is the call for people-centred approaches within the innovation and digital technologies adopted and used.

Local governments are recognised as the crucial decision-making bodies that closely interact with citizens and local stakeholders to create and maintain the conditions for innovative, context-specific, inclusive and resilient urban development to thrive. Moreover, local governments, in particular, can take a more poignant leadership role in forging the necessary innovative partnerships that bring the usual but also the less usual suspects around the table. Finally, the results of such interactions open room for more proactive and receptive planning policies that target the real challenges of a place. With this in mind, some of the key reflections on the contributions included in this publication are given in the following paragraphs.

Technology and innovation must be used to secure functional activities already in place and new ways of planning differently. Eric Yankson captures this in the idea of digital technologies bouncing back and forward to build long-term adaptive capacity as a strategy for resilient communities to manage water resources. Such an approach considers significant efforts of local authorities, industry, and citizens, among others, with a joint aim to innovate planning policies, i.e., to promote proactive planning mechanisms that are responsive to the ever-changing needs of natural resource governance.

At the same time, Tathagata Chatterji's piece on slum upgrading reminds us of the adaptive capacity of multi-level partnerships that truly seeks a range of perspectives in solving challenges. Upgrading slums in Odisha, India during the Covid-19 pandemic, was supported by a commitment to re-thinking and repurposing work for migrant workers, engaging their skills for local development



projects and a commitment to data and information to build knowledge and a need for a different approach.

Furthermore, Li Fan's and Patricia Alberth's discussion on governance innovation in Bamberg highlights the use of technologies for engagement, and the use of smart city strategies, in particular, as a policy platform to leverage greater citizen participation. This is underscored in the work that UN-Habitat is undertaking in its people-centred approach to smart cities and what this means for practitioners in cities as they grapple with both the potential of digital technologies and their capacity to reinforce exclusion or generate new challenges.

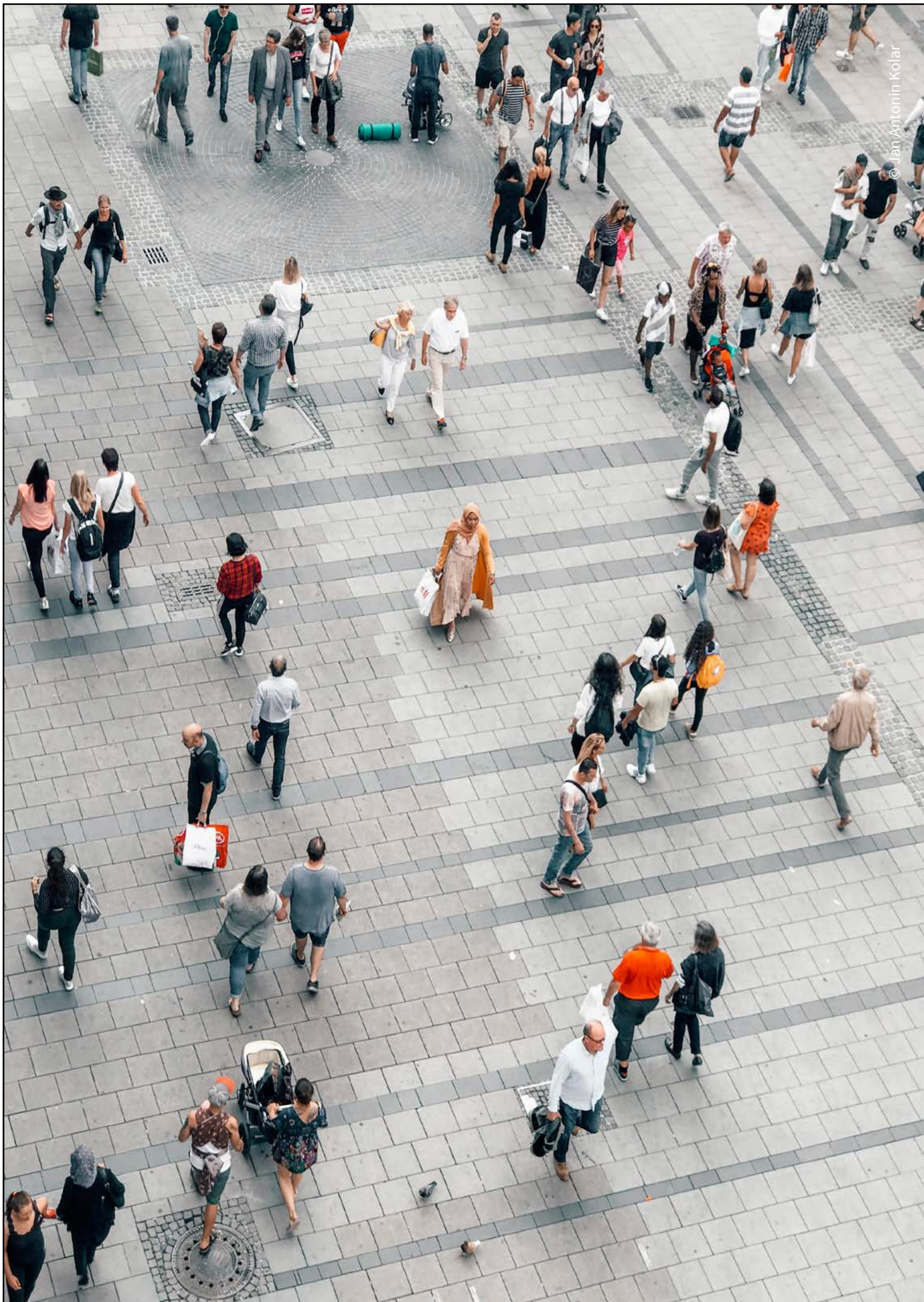
Indumathi Balasubramanian's article focusing on nature-based solutions remind us that participation and adaptation must go beyond consideration of just human engagement. Indeed, they must reconsider our relationship to nature and within the urban context, align participation with that of the natural environment for truly innovative solutions.

Finally, as Tjark Gall and Zaher Allam remind us in their reflection on inclusive planning for tomorrow, nothing is guaranteed by innovation or digital technology. Indeed, the sustainability potential of innovation in planning practice is not secured alone by its creative potential but as much by the political will for change and the genuine leadership and support to plan and engage differently.

Considering the lessons from the authors' work in this publication, future cities have an opportunity to truly leverage the power of partnerships and inclusion processes for the ideas and solutions to the adaptive and sustainable city. Looking at these ideas and solutions through the lens of their mutual consistency and coherence, we come to the core three features that attribute adaptive governance, each ingraining diverse innovations:

- **Inclusive planning process:** Synergy between various voices and values and different types of knowledge (expert and experiential knowledge)
- **Reflexive and networked planners:** Proactive planners capable of imaginative responses to changing circumstances and ready to accept solutions created outside the technical domain of instrumental rationality
- **Flexible and agile institutional frameworks:** Creativity and self-organisation in dynamic environments supportive of various types of urban planning instruments (not only official tools, but also informal mechanisms)

Briefly put, adaptive governance promotes a place-based approach to urban development: a territorially sensitive approach, acknowledging the constantly changing circumstances and contexts (social, political, economic, cultural) and building upon territorial specificities for sustainable cities of the future. Ultimately, such a flexible form of governance demands a specific planning approach: transformative planning – planning *for* and *with* people.



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REFERENCES

- ABP News Bureau. "Chennai Rains 2021: Torrential Downpour Brings City to A Standstill, 3 Dead Due to Electrocutation", ABP Live, December 31, 2021. <https://news.abplive.com/tamil-nadu/chennai-rains-2021-torrential-downpour-brings-city-to-a-standstill-leaves-3-dead-due-to-electrocutation-1503239>.
- Anenberg, S., J. Miller, D. Henze, and R. Minjares. *Global Snapshot of the Air Pollution-related Health Impacts of Transportation Sector Emissions in 2010 and 2015*. Washington, DC: International Council on Clean Transportation, 2019.
- Arup International Development. *City resilience framework*. New York: The Rockefeller Foundation, 2015.
- Bhalerao, S. "BMC to adopt 'sponge city' initiative to tackle urban flooding during extreme rainfall." *The Indian Express*, February 24, 2021.
- Candy, S. "The Futures of Everyday Life: Politics and the Design of Experiential Scenarios." PhD. diss., University of Hawai'i, 2010.
- Chakraborty, A. "Building resilience to climate change through slum upgrading – the case of Jaga Mission in Odisha, India." International Institute of Environment and Development, February 7, 2022. <https://www.iied.org/building-resilience-climate-change-through-slum-upgrading-case-Jaga-mission-odisha-india>.
- Chakraborty, A. "COVID-19, JAGA Mission and the value of already existing solutions." International Institute of Environment and Development, June 4, 2020. <https://www.iied.org/covid-19-jaga-mission-value-already-existing-solutions>.
- Chennai Rivers Restoration Trust. "Cooum River Restoration." Accessed April 30, 2022. https://www.chennai-rivers.gov.in/about_cooum_river.html.
- Chennai Smart City Limited. "Chennai: good old days." Accessed April 30, 2022. <https://waterbodies.cscl.co.in/chennai-good-old-days.html>.
- Chennai Smart City Limited. "Restoration of Water Bodies – Transforming Chennai." Accessed April 30, 2022. <https://waterbodies.cscl.co.in>.
- Cooper, A. *The inmates are running the asylum*. London: Macmillan, 1999.
- Crawford, M. M. "A comprehensive scenario intervention typology." *Technological Forecasting & Societal Change* 149 (2019): 119748.
- Department of Housing and Urban Development, Government of Odisha. "The Jaga Mission." Accessed February 10, 2022. <http://Jagamission.in/index.html>.
- Department of Infrastructure, Water and Technical Services. *Water management plan. Version 1*. Windhoek: Department of Infrastructure, Water and Technical Services, 2015.
- Department of Infrastructure, Water and Technical Services. *Water management plan. Version 2*. Windhoek: Department of Infrastructure, Water and Technical Services, 2017.
- Du, K., and J. Li. "Towards a green world: how do green technology innovations affect total-factor carbon productivity?" *Energy Policy* 131 (2019): 240–50.
- Fergnani, A. "The future persona: a futures method to let your scenarios come to life." *Foresight* 21, no. 4 (2019): 445–66.
- Fergnani, A., and M. Jackson. "Extracting scenario archetypes: A quantitative text analysis of documents about the future." *Future & Foresight Science* 1, no. 2 (2019): 1–14.
- Friend, R., and M. Moench. "What is the purpose of urban climate resilience? Implications for addressing poverty and vulnerability." *Urban Climate* 6 (2013): 98–113.
- Fuglerud, K. S., T. Schulz, A. L. Janson, and A. Moen. "Co-creating Persona Scenarios with Diverse Users Enriching Inclusive Design." In *Universal Access in Human-Computer Interaction. Design Approaches and Supporting Technologies*, edited by M. Antona, and C. Stephanidis, 48–59. Cham: Springer, 2020.
- Gall, T., F. Vallet, and B. Yannou. "How to visualise futures studies concepts: A revision of the futures cone." *Futures* 143 (2022): 103024.
- Gall, T., F. Vallet, S. Douzou, and B. Yannou. "Re-defining the System Boundaries of Human-Centered Design." In *Proceedings of the 23rd International Conference on Engineering Design (ICED)*. Gothenburg, 2021.
- Godet, M., and P. Durance. *La prospective stratégique pour les entreprises et les territoires*. Paris: Dunod, 2008.
- Goodspeed, R. *Scenario Planning for Cities and Regions: Managing and Envisioning uncertain Futures*. Cambridge, Massachusetts: Lincoln Institute of Land Policy, 2020.
- Haarhoff, J., and B. Van Der Merwe. "Twenty-five years of wastewater reclamation in Windhoek, Namibia." *Water Science Technology* 33, no. 10-11 (1996): 25–35.
- Hildén, M., A. Jordan, and T. Rayner. "Climate policy innovation: developing an evaluation perspective." *Environmental Politics* 23, no. 5 (2014): 884–905.
- Huang, Z., G. Liao, and Z. Li. "Loaning scale and government subsidy for promoting green innovation." *Technological Forecasting and Social Change* 144 (2019): 148–56.
- Inayatullah, S. "Future Studies: Theories and Methods." In *There's a future: Visions for a better world*, edited by N. Al-Fodhan, 36–66. Madrid: BBVA, 2013.
- International Transport Forum. *Travel Transitions: How Transport Planners and Policy Makers Can Respond to Shifting Mobility Trends. Research report*. Paris: OECD Publishing, 2021.
- IUCN (International Union for the Conservation of Nature). "Natural resource governance framework." Accessed June 24, 2022. <https://www.iucn.org/commissions/commission-environmental-economic-and-social-policy/our-work/knowledge-baskets/natural-resource-governance>.
- Jordan, A., and D. Huitema. "Innovations in climate policy: the politics of invention, diffusion and evaluation." *Environmental Politics* 23, no. 5 (2014): 715–34.
- Keck, M., and P. Sakdapolrak. "What is social resilience? Lessons learned and ways forward." *Erdkunde* 67, no. 1 (2013): 5–19.
- Lahnsteiner, J., and G. Lempert. "Water management in Windhoek, Namibia." *Water Science Technology* 55 (2007): 441–48.
- Lecroart, P. "From Expressways to Boulevards: Converting Highways, Rethinking Cities." L'Institut Paris Region, April 14, 2022. <https://en.institutparisregion.fr/know-how/international/from-expressways-to-boulevards/>.
- Lee, J. H., and J. Woo. "Green new deal policy of South Korea: policy innovation for a sustainability transition." *Sustainability* 12, no. 23 (2020): 10191.
- Lewis, E. W., C. Staddon, and J. Sirunda. "Urban water management challenges and achievements in Windhoek, Namibia." *Water Practice Technology* 14 (2019): 703–13.
- Mayor, M., and R. Ramos. "Regions and economic resilience: new perspectives." *Sustainability* 12, no. 11 (2020): 4693.
- Meerow, S., and M. Stults. "Comparing conceptualizations of urban climate resilience in theory and practice." *Sustainability* 8, no. 7 (2016): 701.
- Ministry of Housing and Urban Affairs, Government of India. "Pradhan Mantri Awas Yojana – Housing for All Mission." Accessed December 19, 2021. <https://www.pmay-urban.gov.in/uploads/guidelines/62381c744c188-Updated-guidelines-of-PMAY-U.pdf>.
- Moyo, L. J. *Wastewater production, treatment and use in Namibia*. Windhoek: Polytechnic of Namibia, 2012.
- Murray, R., B. Van der Merwe, D. Louw, and J. Menge. "The Windhoek managed aquifer recharge scheme: conception, implementation, operation and expansion." In *9th IWA Water Reuse Conference*. Windhoek, 2013.
- N. A. "Windhoek plans to tap into aquifer." *Namibian Economist*, February 26, 2016.
- Nai, S., and A. Janardhanan. "A tale of two cities: The similar story of Mumbai and Chennai flood." *The Indian Express*, December 6, 2015.
- Nakagawa, Y., and T. Saijo. "Future Design as a Metacognitive Intervention for Presentism." *Sustainability* 12, no. 18 (2020): 7552.
- Natarajan, M., V. Johnpaul, R. Sindhu, and K. Jayalakshmi. "Case Study and Analysis of Ecological Restoration Plan of Lakes in Coimbatore." *IOP Conference Series: Materials Science and Engineering* 1006 (2020): 012006.
- National Disaster Management Authority, Government of India. "Floods." Accessed April 30, 2022. <https://ndma.gov.in/Natural-Hazards/Floods>.
- Ndebele-Murisa, M. R., C. P. Mubaya, L. Pretorius, R. Mamombe, K. lipinge, W. Nchito, J. K. Mfune, G. Siame, and B. Mwalukanga. "City to city learning and knowledge exchange for climate resilience in Southern Africa." *PLoS ONE* 15, no. 1 (2020): e0227915.
- Nhamo, L., T. Mabhaudhi, and A. T. Modi. "Preparedness or repeated short-term relief aid? Building drought resilience through early warning in Southern Africa." *Water SA* 45, no. 1 (2019): 75–85.
- Oasis Designs. "Eco Restoration of 8 lakes, Coimbatore City." Accessed April 30, 2022. <https://oasisdesigns.org/cecocoimbatore.asp>.
- Olivieri, F., S. H. A. Koop, K. Van Leeuwen, and J. Hofman. "Enhancing governance capacity to ensure a long-term water supply: the case of Windhoek, Namibia." *Sustainability* 14, no. 4 (2022): 2387.
- Parson, E. A., V. Burkett, K. Fisher-Vanden, D. Keith, L. Mearns, H. Pitcher, and M. Webster. *Global-Change Scenarios: Their Development and Use*. Washington, DC: US Department of Energy Publications, 2007.
- Pörtner, H. O., D. C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, and N. M. Weyer, eds. *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*. Cambridge: Cambridge University Press, 2019.
- "Positive City Exchange." Accessed March 1, 2022. www.cityxchange.eu.
- PRS Legislative Research. "Odisha Budget Analysis 2020-21." Accessed February 20, 2022. <https://prsindia.org/budgets/states/odisha-budget-analysis-2020-21>.
- Pruitt, J., and J. Grudin. "Personas: Practice and Theory." In *Proceedings of the 2003 Conference on Designing for User Experiences*. San Francisco, 2003.
- Rashidi, K., and A. Patt. "Subsistence over symbolism: the role of transnational municipal networks on cities' climate policy innovation and adoption." *Mitigation and Adaptation Strategies for Global Change* 23 (2018): 507–23.
- Rennings, K., A. Ziegler, K. Ankele, and E. Hoffmann. "The influence of different characteristics of the Rennings, K., A. Ziegler, K. Ankele, and E. Hoffmann. "The influence of different characteristics of the EU environmental

- management and auditing scheme on technical environmental innovations and economic performance.” *Ecological Economics* 57, no. 1 (2006): 45–59.
- Republic of Namibia: Ministry of Agriculture, Water and Forestry. *Technical summary of water accounts*. Windhoek: Ministry of Agriculture, Water and Forestry, 2006.
- Republic of Namibia: Ministry of Environment and Tourism. *National policy on climate change for Namibia*. Windhoek: Ministry of Environment and Tourism, 2010.
- Republic of Namibia: National Drought Task Force. *National drought policy and strategy*. Windhoek: National Drought Task Force, 1997.
- Rey, D., I. P. Holman, and J. W. Knox. “Developing drought resilience in irrigated agriculture in the face of increasing water scarcity.” *Regional Environmental Change* 17, no. 5 (2017): 1527–40.
- Rohr, C., L. Ecola, J. Zmud, F. Dunkerly, J. Black, and E. Baker. *Travel in Britain in 2035: Future scenarios and implications for technology innovation*. Cambridge: RAND Corporation, 2016.
- Salingros, N. A. *Anti-Architecture and Deconstruction*. Solingen: Umbau-Verlag, 2004.
- Salminen, J., J. M. Santos, and S. G. Jung. “Persona Transparency: Analyzing the Impact of Explanations on Perceptions of Data-Driven Personas.” *International Journal of Human-Computer Interaction* 36, no. 8 (2020): 788–800.
- Scanlon, B. R., R. C. Reedy, C. C. Faunt, D. Pool, and K. Uhlman. “Enhancing drought resilience with conjunctive use and managed aquifer recharge in California and Arizona.” *Environmental Research Letters* 11, no. 3 (2016): 035013.
- Schäfer, K., P. Rasche, C. Bröhl, S. Theis, L. Barton, C. Brandl, M. Wille, V. Nitsch, and A. Mertens. “Survey-based personas for a target-group-specific consideration of elderly end users of information and communication systems in the German healthcare sector.” *International Journal of Medical Informatics* 132 (2019): 103924.
- Scott, D., K. N. Ipinge, J. K. E. Mfuno, D. Muchadenyika, O. V. Makuti, and G. Ziervogel. “The story of water in Windhoek: a narrative approach to interpreting a transdisciplinary process.” *Water* 10, no. 10 (2018): 1366.
- SEMPPLAN. “Agenda 2030.” Accessed March 1, 2022. <https://semplan.pmt.pi.gov.br/agenda-2030-lancamento/>.
- Spears, B. M., S. C. Ives, D. G. Angeler, C. R. Allen, S. Birk, L. Carvalho, S. Cavers, F. Daunt, R. D. Morton, M. J. O. Pocock, G. Rhodes, and S. J. Thackeray. “Effective management of ecological resilience: are we there yet?” *Journal of Applied Ecology* 52, no. 5 (2015): 1311–15.
- Stadt Bamberg. *Stadtsanierung “Sand” – Vorbereitende Untersuchungen und Entwicklungskonzept*. Bamberg: Stadt Bamberg, 2006.
- Stephenson, N. *Snow crash*. London: Penguin Books, 1992.
- Stevenson, P., and C. Mattson. “The Personification of Big Data.” *Proceedings of the Design Society: International Conference on Engineering Design* 1, no. 1 (2019): 4019–28.
- Tata Trusts. “Government of Odisha and Tata Trusts awarded the Geospatial Excellence Awards 2019.” Accessed January 15, 2022. <https://www.tatatrusters.org/media/events/geospatial-excellenceawards-2019>.
- TNN. “Greater Chennai Corporation plans to set up ‘sponge park.’” *The Times of India*, September 2, 2021.
- Tomorrow’s build. “China is Building Sponge Cities to Fix Its Flood Problem.” Youtube, August 17, 2021. <https://www.youtube.com/watch?v=jursRm7mnQk>.
- “Transforming Urban Curacao: Community and Expert Visioning for Localizing the New Urban Agenda.” Copenhagen: United Nations Office for Project Services, 2019.
- Turenscape Landscape Architecture. “Yanweizhou Park in Jinhua City.” Accessed March 2, 2022. <https://landezine.com/a-resilient-landscape-yanweizhou-park-in-jinhua-city-by-turenscape/>.
- UN (United Nations). *Road map for digital cooperation: implementation of the recommendations of the High-level Panel on Digital Cooperation. Report of the Secretary-General*. New York: United Nations, 2020.
- UNCTAD (United Nations Conference on Trade and Development). *Technology and innovation report 2018: harnessing frontier technologies for sustainable development*. New York and Geneva: United Nations, 2018.
- UN DESA (Department of Economic and Social Affairs) Population Division. *World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420)*. New York: United Nations, 2019.
- UNDP (United Nations Development Programme). “Singapore Global Centre: Smart Cities.” Accessed June 22, 2022. <https://www.undp.org/sgtechcentre/smart-cities>.
- UNECE (United Nations Economic Commission for Europe). “UNECE and City of Trondheim, Norway, join forces for smart and sustainable urban development with new Geneva UN Charter Centre of Excellence”. UNECE, October 2, 2019. <https://unece.org/housing-and-land-management/press/unece-and-city-trondheim-norway-join-forces-smart-and-sustainable>.
- UNEP (United Nations Environment Programme). “Why does resource efficiency matter?” Accessed June 24, 2022. <https://www.unep.org/explore-topics/resource-efficiency/why-does-resource-efficiency-matter>.
- UNESCO (United Nations Educational, Scientific and Cultural Organization). “Futures Literacy.” Accessed March 1, 2022. <https://en.unesco.org/futuresliteracy>.
- UN-Habitat. “People-Centered Smart Cities.” Accessed June 24, 2022. <https://unhabitat.org/programme/people-centered-smart-cities>.
- UN-Habitat (United Nations Human Settlements Programme). *Centering People in Smart Cities. A playbook for local and regional governments*. Nairobi: UN-Habitat, 2021.
- UN-Habitat (United Nations Human Settlements Programme). *Guidance note: fostering innovation in urban programmes and projects*. Nairobi: UN-Habitat Innovation Unit: External Relations, Strategy, Knowledge and Innovation Branch, 2021.
- UN-Habitat (United Nations Human Settlements Programme). *The Urban SDG Monitoring Series: Monitoring SDG 11.1.1*. Nairobi: UN-Habitat., 2019.
- UN-Habitat (United Nations Human Settlements Programme). *Key Slum Upgrading Messages*. Nairobi: UN-Habitat Slum Upgrading Unit, 2017.
- UN-Habitat (United Nations Human Settlements Programme). *State of the World’s Cities 2012/2013. Prosperity of Cities*. Nairobi: UN-Habitat, 2012.
- United 4 Smart Sustainable Cities. *Collection Methodology for Key Performance Indicators for Smart Sustainable Cities*. Accessed June 24, 2022. <https://unece.org/DAM/hlm/documents/Publications/U4SSC-CollectionMethodologyforKPIfoSSC-2017.pdf>.
- Uwasu, M., Y. Kishita, K. Hara, and Y. Nomaguchi. “Citizen-Participatory Scenario Design Methodology with Future Design Approach: A Case Study of Visioning of a Low-Carbon Society in Suita City, Japan.” *Sustainability* 12, no. 11 (2020): 4746.
- Vallet, F., S. Hörl, and T. Gall. “Matching Synthetic Populations with Personas: A Test Application for Urban Mobility.” In *Proceedings of the International Design Conference – Design 2022*. Cavtat, Croatia, 2022.
- Vallet, F., J. Puchinger, A. Millonig, and G. Lamé. “Tangible futures: Combining scenario thinking and personas - A pilot study on urban mobility.” *Futures* 117 (2020): 102513.
- Van Der Merwe, B. “Integrated water resource management in Windhoek, Namibia.” *Water Supply* 18 (2000): 376–81.
- van Rensburg, P., and C. Tortajada. “An assessment of the 2015–2017 drought in Windhoek.” *Frontiers in Climate* 3 (2021): 602962.
- Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. “Resilience, adaptability and transformability in social-ecological systems.” *Ecology and Society* 9, no. 2 (2004): 5.
- Wang, Q., J. Qu, B. Wang, P. Wang, and T. Yang. “Green technology innovation development in China in 1990–2015.” *Science of the Total Environment* 696 (2019): 134008.
- Wardekker, A. “Contrasting the framing of urban climate resilience.” *Sustainable Cities and Society* 75 (2021): 103258.
- WCED (World Commission on Environment and Development). *Our Common Future*. New York: United Nations, 1987.
- Weidema, B. P., T. Ekvall, H. L. Pesonen, G. Rebitzer, G. W. Sonnemann, and M. Spielmann. *Scenarios in life cycle assessment*. Brussels: Pensacola, 2004.
- Weidlich, B. “N\$73m to ‘Bank’ Windhoek water.” *The Namibian*, September 9, 2008.
- WHO (World Health Organization). *Global status report on road safety 2018*. Geneva: World Health Organization, 2018.
- Wilkinson, A., and E. Eidinow. “Evolving practices in environmental scenarios: a new scenario typology.” *Environmental Research Letters* 3, no. 4 (2008): 045017.
- World Future Council. “Sponge Cities: What is it all about?” Accessed January 20, 2022. <https://www.worldfuturecouncil.org/sponge-cities-what-is-it-all-about/>.
- World Habitat Awards. “Odisha Liveable Habitat Mission.” Accessed January 27, 2022. <https://world-habitat.org/world-habitat-awards/winners-and-finalists/odisha-liveable-habitat-mission/>.



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Dr. Ana Perić, an architect with a PhD in Urban Planning, is Assistant Professor in the School of Architecture, Planning and Environmental Policy, University College Dublin, and is also currently appointed as Senior Researcher at the Institute for Spatial and Landscape Development of the Swiss Federal Institute of Technology (ETH Zurich) and Senior Research Associate at the Faculty of Architecture, University of Belgrade. Her research revolves around urban governance mechanisms in complex spatial phenomena observed through the lens of planning culture. Financed by ETH Zurich, ARL (Academy for Spatial Development, Hannover), Future Cities Lab (Singapore ETH Zurich Centre), Swiss Government and Fulbright Foundation, she has participated in ten research projects on various topics and scales: from spatial development in European macro-regions to green and dense neighbourhoods. Dedicated to combining research with practical assignments, she has been active in several policy and professional working groups, including the European Commission Corridor Coordinators, the Western Balkan Network on Territorial Governance, and ISOCARP, serving as a Board Member (2016-2022).



Dr. Melissa Permezel, a human geographer, is Coordinator at the Innovation Unit of UN-Habitat, HQ Nairobi. As an urban specialist with over twenty years of combined partnership, research, and development experience, she has a firm overview of sustainable urbanisation issues, such as land governance, urban planning, slum upgrading, urban legislation, policy and tool development, project management, and stakeholder engagement. She has also worked at the country level, in intermediary cities, and with various stakeholders from ministers to local chiefs. At the UN-Habitat's Innovation Unit, Melissa leads an agenda to approach innovation holistically, incorporating both digital and non-digital innovations and strengthening the capacity of UN-Habitat and partners to use innovation as a tool for fostering sustainable urban development.



Michael Stott, an urban designer, planner and strategist, is Head of Cites and Places at Brisbane-based DBI. Michael's diverse professional experience, obtained through work on projects around the world for more than twenty years now, includes working for several leading, globally recognised consultancies and government entities at the forefront of changing how cities are designed and planned. In his practice, Michael focuses on creating compelling, place-led design solutions and delivering projects that work to increase the quality of life of community residents, whether through strategic planning and policy development, individual site design or large-scale master plans, urban design for new transportation corridors, or the design of a community park or intimate urban plaza. As an accomplished facilitator and speaker, Michael regularly presents and consults internationally on issues related to placemaking, urban renewal and creating healthy cities. He has also contributed to numerous publications, summer schools, urban design master classes, and placemaking seminars.



Dr. Annie Woo, a real estate advisor and economist, is Director at CISTRI, Singapore. Joining CISTRI in 2019, Annie brings a wealth of extensive global real estate consulting experience in a career spanning over twenty-five years. Previously, she was Head of Consulting at CBRE Singapore and took the lead in complex consulting and research work such as business strategy and project delivery, development programming and land use optimisation and financial feasibility for all property classes and large-scale master plans in Southeast Asia. In addition to the private sector, Annie has assisted government bodies and agencies in evaluating their real estate portfolio and recommended industry best practices concerning asset management, place management, project positioning and marketing. She will continue to provide evidence-based advisory and socio-economic perspectives on urban planning.



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