PLANNING TOOLS FOR URBAN SUSTAINABILITY:

Mapping of Initiatives & Methodologies
Our Struggle for Global Sustainability Will Be Won or Lost in Cities.

Former UN Secretary-General
Ban Ki-moon
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>7</td>
</tr>
<tr>
<td>OBJECTIVE</td>
<td>9</td>
</tr>
<tr>
<td>SCOPE AND METHODOLOGY</td>
<td>11</td>
</tr>
<tr>
<td>TYPOLOGY OF TOOLS</td>
<td>13</td>
</tr>
<tr>
<td>URBAN MEASUREMENT TOOLS AND INDICES</td>
<td>13</td>
</tr>
<tr>
<td>INDICATOR FRAMEWORKS</td>
<td>15</td>
</tr>
<tr>
<td>CERTIFICATIONS AND POLITICAL COMPACTS</td>
<td>18</td>
</tr>
<tr>
<td>FORECASTING AND MODELING TOOLS</td>
<td>20</td>
</tr>
<tr>
<td>PARTICIPATORY PLANNING APPROACHES AND GUIDES</td>
<td>22</td>
</tr>
</tbody>
</table>
PLANNING TOOLS FOR URBAN SUSTAINABILITY: MAPPING OF INITIATIVES AND METHODOLOGIES

Christine Zenino [CC BY 2.0]
INTRODUCTION

Throughout history, cities have been the engines of economic growth, innovation, cultural expansion and social reform. Today around 80% of global Gross Domestic Product (GDP) is generated in cities and each year millions of migrants flock to cities seeking new opportunities for education, jobs and a higher quality of life. While this demographic shift is consolidating economic activity it is also putting unprecedented pressures on resources such as land, water, clean air, energy, and food resources. Urban areas now account for more than half of all global greenhouse gas emissions and 75 per cent of global energy consumption. Rapid urbanization is also a recipe for the overstretching of public services such as transportation, education, security, and health. Despite the opportunities they provide, many cities are places of squalor, inequality, smog, crime, and deprivation. Close to one billion of the world’s urban dwellers live in slum conditions — and this figure is projected to rise to 1.6 billion by 20301.

When the population grows more rapidly than municipal plans and services can provide for, urban development advances in an unplanned manner, with informal settlements becoming entrenched, transit lines congested and overlapping, water reserves and air quality compromised and insufficient space reserved for parks and essential infrastructure, etc, all of which disproportionately affect the poor and excluded. Urbanization is reaching a crisis point in many cities, with mounting pressures on natural resources and economic costs. In Rio de Janeiro commuters are losing an average of 2.3 hours daily due to traffic congestion, costing an estimated of 5.9% of the urban GDP in lost productivity2. In Sao Paolo and other Brazilian cities millions of people experienced power cuts and water rationing in the country’s biggest water crisis3. Toxic smog in Beijing and New Delhi has forced residents to stay home from work and school, losing days of economic activity and with untold health effects4. The lack of security, jobs and opportunity in the Middle East has led to an unprecedented global refugee crisis and cities are struggling to cope.

The need to strike a better balance between economic growth, social development and environmental sustainability in cities is clear. It is both essential and possible to reverse this trend but cities are tremendously complex and dynamic. Planners are faced with the challenge of reconciling multiple sets of information from across sectors, geographies, and disciplines with the interests and perspectives

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Sophisticated planning tools and processes are necessary to tackle the complexity of cities towards integrated master plans that balance interests across economic, social and environmental costs, tradeoffs and benefits over the short and long term.

1 - UN Deputy Secretary-General, speech to Mayor’s Forum, 9 June 2015
2 - O Custo dos Deslocamentos nas Principais Áreas Urbanas do Brasil, Publicações Sistem FIRJAN, Pesquisas e estudos socioeconômicos, 2015
of government, private sector, civil society, political parties, and academia. Within this context it is a difficult balancing exercise of interests to determine who should benefit, where, when, and in which ways. Local governments often have fragmented information and statistics, and traditional cost-benefit analyses may not sufficiently intersect with the considerations provided by environmental and social impact assessments. Perhaps even more challenging for city administrations is to commit to a longer term perspective that far exceeds the political term of office and to predict and invest in the services and resources that will be needed to accommodate an ever-growing future population. Sophisticated planning tools and processes are necessary to tackle the complexity of cities towards integrated master plans that balance interests across economic, social and environmental costs, tradeoffs and benefits over the short and long term.

These urban planning challenges are well recognized and a great body of work has been underway for at least three decades, aiming to improve sustainable urban development planning around the world. A vast number of tools and approaches have emerged to support decision makers in their endeavors to manage this complexity. One single source by ICLEI Europe on tools for local climate and energy actions, has compiled a toolbox of 1342 methodologies. Governments, academia, non-governmental organizations, the UN, and private sector have all contributed to this body of work to support municipal officials to structure planning processes, motivate action, benchmark their progress, and to assess potential impacts of various courses of action against other options.
OBJECTIVE

This study explores the growing range of existing tools and initiatives that aim to support integrated sustainable development planning at the municipal level. The objective is to identify the characteristics of the range of tools and the areas they cover, as well as to explore the degree to which they are supporting cities to manage complexity and to integrate across the three dimensions of sustainable development. The purpose is to understand the approaches to date in order to identify gaps, new advances and to inform policy and practice related to sustainable urban development, as a contribution to the UNDP World Centre for Sustainable Development (RIO+ Centre)’s work on localizing the SDGs and the Agenda 2030.

The study will focus on tools and approaches that aim to cover urban sustainable development and the integration of the three pillars of sustainable development. The study will consider and assess tools according to the following questions:

1. What are the primary types of tools and approaches currently in use? What are the strengths and weaknesses of each approach?
2. Are the tools applicable to municipalities of all different sizes?
3. Who is leading the production of the tools/approaches? -ie- CSOs, governments, private sector.

The study raises the following questions for additional consideration:

4. What can be learned in terms of tools and methodologies for urban sustainable development planning?
5. Have urban planning tools successfully balanced social, environmental and economic costs, tradeoffs and benefits?
6. To what degree are tools and approaches helping to bridge scales of government and stakeholder groups to support integrated planning and action across multiple levels?
SCOPE AND METHODOLOGY

There are a plethora of tools and approaches that have been developed and used within the urban sustainable development practice to support planning and assessment. This study aims to provide a mapping of the various broader methodologies and approaches in use. While it would be impossible to capture and review all such tools, the study offers a broad capture of existing initiatives/tools within the urban sustainable development field to provide an overview of the objectives, scope and basic characteristics of the tools. In addition, for each of the categories of tools or methodologies, a summary analysis is provided of the contributions, strengths and weaknesses of the various approaches.

Step 1 - Capturing and Mapping the tools

The objective in the first phase was to identify and catalogue a broad cross-section of tools for sustainable urban planning. Tools for consideration were those that: 1) Aim to enhance sustainable development (preferably integrating all 3 dimensions – social, environmental and economic) and 2) Seek to improve information and/or processes for decision making and planning at urban or sub-national level.

This open search for relevant tools involved three main approaches. The first set of tools were identified through a review of products developed by active organizations and institutions working within the areas of urban sustainable development. Secondly were planning tools that had been highlighted as good practices in third party research papers or blogs in the area of sustainable urban development (ex. IISD5, Smart Cities Council6, Nordregio7 and others). This search was complemented by a broad online query of urban planning tools using search terms associated with local sustainability, urban development, integrated planning, etc.

Recognizing the limitations of this study, conducted primarily in English, to capture the range of existing urban sustainable development planning tools, the objective is to identify a number of leading tools currently in practice and using different approaches. In total over 50 tools were catalogued and reviewed. A comprehensive summary table is provided in Annex 1 that captures the results of this review and maps each tool identifying: producer(s) of the tool -ie- institutions, partners or networks, type of tool with a brief description, as well as the thematic focus of the tool/approach.

Step 2 - Comparison and Assessment

Having reviewed and compiled a broad range of tools, the second step was to group and compare tools within the same category (i.e., indicator frameworks, certification schemes, modeling tools, etc.), with similar objectives. In this phase, the objective was to identify strengths and weaknesses of various approaches, to draw out conclusions and good practices, and to assess applicability of various tools within different urban contexts. For instance, does it require special training? Is it applicable to cities in developing countries? What are the key successes? Have the tools focused on the poor and/or addressed growing inequalities?
TYPOLOGY OF TOOLS

The following provides an overview of the main types of tools and approaches applied to support urban sustainable development planning. It is important to note that few of the initiatives discussed fall solely within one single typology and the majority of these incorporate several elements from across the typology of tools to offer a more comprehensive package of support.

URBAN MEASUREMENT TOOLS AND INDICES

Capturing and measuring the complexity of cities is a key factor in successful urban sustainable development processes and planning. However, many of the concepts and ideals that are encompassed within sustainable development are complex, broad or abstract, creating a challenge for municipal officials to plan for, monitor and report on progress. For instance, it is critical to strive towards a better ecological balance, social equality, a high quality of life, a vibrant culture, a diversified economy, etc, and yet these are concepts that are difficult to capture by tracking single variables.

Composite indices are a commonly used solution, offering a proxy to provide a framework for quantifying complex components of urban sustainable development. UN-Habitat’s City Prosperity Initiative, for instance, is a composite index that quantifies the notion of urban prosperity using measures within the six dimensions of productivity, infrastructure, quality of life, equity and inclusion, environmental sustainability and governance and legislation. Indices are composed of a selection of variables for each dimension, and some may provide a weighting of some variables over others towards an overall score. As such indices offer a powerful mechanism for tracking progress on key urban objectives and providing a measure of city capacities and outcomes in areas such as: Resilience Capacity, Ecological Footprint, City Biodiversity or inequalities in Urban Health.

They can offer municipal officials, development professionals or stakeholders with a mechanism for establishing clear measurable goals for monitoring and accountability and also for setting benchmarks and making comparisons across cities. Within Brazil, for instance, UNDP’s Human Development Index, while normally a global index, is used to provide a national database and atlas ranking all municipalities against the proxy measures for human development: life expectancy, education and per capita income. With clear rankings in place these tools can provide a public platform around which to build awareness raising and campaigning efforts.

Indices

- Quantify abstract sustainability goals and concepts
- Enable ranking/comparisons between cities or regions
- Build political will around sustainability concepts
However there are also potential pitfalls of using composite measures. The design, selection and weighting of composite variables is a value-driven process that can favor some measures over others. This can lead to a perception that a given index is not “fair” or is inaccurately representative of the concept it purports to measure. For example, in Brazil there has been much debate around the global UN-Habitat definition of what constitutes a slum, which is based on 5 variables: inadequate access to safe water, inadequate access to sanitation, poor structural quality of housing, overcrowding and insecure tenure. While living conditions and services in favelas have improved considerably over the past decades, this definition essentially places them on an equal basis with the most basic of shantytowns.

While most indices are constructed upon hard data and official statistics, some innovative measurement tools also rely upon knowledge or perceptions to tackle the problem of capturing complex concepts. For example, the Community Capital Scan tool, developed by Simon Fraser University (Canada) and Tilburg University (Netherlands), maps the opinions of representatives of a broad range of stakeholders regarding the degree to which a project or programme contributes to six areas of natural, physical, economic, human, social, and cultural “capital” of the city. This provides a more nuanced and participatory way to understand and conceptualize community, with each of these capitals representing a collection of local assets and community resources.

Composite indices offer tremendous advantages with respect to producing recognizable, comparable global rankings of complex concepts and they are widely used by international development institutions and the public and private sector alike. Nonetheless, they may often also be the source of some controversy. For instance, even minor changes in the way in which a single variable is defined within the index can significantly change the ranking of a city. This creates the perception that the performance of the given city has fallen, when the reality may even be the opposite. Circumstances such as these can lead to governments officially rejecting some indices or publications, and with some legitimate justification. It is nearly inevitable that composite indices favour some indicators over others and that the results can produce political tensions. Some global indices, such as the Green City Index produced by the Economist Intelligence Unit and sponsored by Siemens, partially address this problem by making adjustments to the selection of measures at a regional level respectively. Although this approach reduces the overall global comparability of the index, it can also increase both the relevance and the political acceptance of the tool.
INDICATOR FRAMEWORKS

Measurement is a critical component of planning. Evidence-based decision-making is dependent upon access to reliable and clear statistics to track trends in social, environmental and economic variables and to measure levels of service delivery in various parts of a city over time. Without access to such data it is difficult for city managers to make rational and balanced decisions regarding priority areas and budget allocations. As it is commonly said, “what gets measured gets managed”.

As a result, indicator frameworks, databases, and benchmarking tools are among the most commonly used tools to support planning at the municipal level. They are an effective means to successfully track progress across targeted areas of sustainable development. The purpose of the indicator framework is to bring together a set of disparate measures, within a single framework to provide a comprehensive overview, with the objective to ensure that no critical area gets left behind.

Once a set of indicators is standardized with a clear and common methodology for measurement, it becomes possible to benchmark, track progress and compare across neighbourhoods, successive municipal government administrations and policies. For city planners, this a highly powerful tool and a basic minimum needed to enable them to determine where needs are greatest, to target progress and to balance across a broad range of priorities from commuting times, to employment, to green space, air quality, solid waste, and GHG emissions, to incidence of illness, school attendance, real estate pricing, and more.

While at first it may appear to be a technocratic endeavor, the selection of a representative set of indicators can be a highly political and contested exercise. An indicator framework is ideally closely complementary to a set of explicit goals and targets to accompany a city’s vision for sustainable development. However, it should also be sufficiently standardized so as to be applicable and relevant year after year, regardless of the political leanings of the city administration in power, to enable continuous reporting and accountability.

A strong focus of most indicator frameworks is to enable transparency. This triggers the capacity for the public to hold municipal leaders to account for levels of service delivery and for their compliance with legal obligations, city visions and electoral campaign promises. Indicator frameworks provide a structure around which to design broader campaigns across cities for mayors to sign up to a baseline of commitments or for the design of a set of criteria for programme outcomes at a regional or national level. The Sustainable Cities Program (Programa Cidades Sustentaveis) in Brazil is an example of an indicator framework, with the objective of enhancing the integration and sustainability of long-term planning in cities.

**Indicator Frameworks**

- Facilitate data analysis and integrated planning
- Organize and convene data sources and measures
- Enhance transparency and accountability for plans and outcomes
A comprehensive indicator framework sets the foundation for data-driven integrated planning. The data contained in urban sustainable development indicator frameworks reflect the outputs of multiple sectors of a city. This often implies that the reporting on the various services—water, waste management, air quality, traffic, security, etc.—is undertaken separately by each unit and the information may seldom be compiled into a single resource. Therefore, even in its simplest form, a list of urban sustainable development indicators can be a valuable exercise for city planners to organize and convene data to compile a fuller picture of social, environmental and economic conditions to be considered in long-term planning.

In the majority of tools and initiatives reviewed in this study, a key feature of the indicator frameworks was the provision of fully accessible and searchable online platforms to host the data. In the past, access to data, particularly government data, tended to be regulated and closed to internal users, individual units or departments. Access to data has traditionally been a source of heavily guarded power for technocrats. It is difficult to overstate the importance of this new trend for open access to official data. Open online technologies, increased processing power and simplified interfaces of platforms have generated the opportunities and the demand for the creation of online data reporting tools of all kinds. Even the more rudimentary of the online indicator databases are usually accompanied by basic data analysis tools. Graphics can be generated from selected indicators, with trends analyses over time when available. Other tools offer geometrical representation of the data, to demonstrate variation across neighbourhoods or regions. New research opportunities are readily available to anyone with a question about urban development issues. Analysts, activists, journalists or students can have access to information without the concern of bureaucratic hurdles, delays or outright denials of requests.

At a municipal-planning level this new openness of data is particularly important for a number of reasons. First, at the level of government closest to the people, stakeholders are especially able to participate in the validation of the data, having the best understanding of the ‘reality on the ground.’ Data gaps and weaknesses can be identified by stakeholders, with potential improvements in methodologies for gathering the core data. Secondly, many municipalities, particularly the smaller ones, do not have the capacity or budgets to develop online data tools but they can benefit from the growing number of tools available. Thirdly, and perhaps most importantly, the more government commitments are quantified and people have open access to the data on local service delivery, the more local governments can be held to account by citizens and other stakeholders.

In order to capture the breadth of urban sustainable development issues, most indicator frameworks attempt to provide a comprehensive set of representative measures. For instance, the Sustainable Cities Programme in Brazil brings together more than 300 indicators under 12 thematic axes of sustainable development chosen through a participatory process, and larger cities are required to report on a subset of at least 100 indicators.

One common challenge of indicator frameworks is that the data ambitions they represent may exceed the capacity to capture the data for each of the indicators over time and across neighborhoods/cities/regions. This has been an important criticism of the global Sustainable Development Goals, with 17 goals, 169 targets, and 230 indicators. As a result many of these frameworks are considered somewhat aspirational. In practice this means that cities struggle to fulfill data commitments and many of the online data tools exhibit data gaps for a significant proportion of their indicators. This raises the risk of
generating frustration and rendering certain lines of research within the system weak or impossible.

Data availability is a major constraint for many municipalities and a great many of the data points in the indicators databases reviewed were missing. Therefore, the ambitions of the model should be relatively well matched with the capacity to measure and report on the indicators. With large data gaps, the capacity for comparative analysis is weakened. Data gaps may also be perceived as deliberate or intentional omissions on the more poorly performing variables, which will considerably weaken claims for openness and transparency. There is a tradeoff between the comprehensiveness of the agenda/model and the capacity to realistically measure all requested data points. One of the tools reviewed placed a particular emphasis on this challenge. The Indicators for Sustainable Development framework by Sustainable Cities International, aims to provide a more practical, realistic set of indicators for its member cities by drawing selected measures from those that are in actual practice, including in both small and large cities and in developing countries around the world.

In the spirit of the SDG principle to leave no one behind, there is an emphasis on the disaggregation of all measures by demographic groups and by neighbourhood. While this increases the challenge of data collection it is also an essential component of ensuring that all groups are included in the planning and service delivery at the city level. In practice a smaller number of reliable and disaggregated measures may produce stronger outcomes in terms of public trust and accountability, than a comprehensive set of hundreds of indicators. For instance the Urban Centres Platform of UNICEF Brazil, requires municipalities to track a selection of 10 or more available social indicators with a focus on understanding the inequalities in service delivery in different neighbourhoods across major urban centres in Brazil.
CERTIFICATIONS AND POLITICAL COMPACTS

Sustainable development certifications allow cities to publicly demonstrate that they have reached (and maintained) a particular standard across the economic, social and environmental dimensions of municipal development. These programmes are typically based upon the comprehensive indicator frameworks discussed above, requiring data collection and reporting on a breadth of indicators to assess performance on economic, social, environmental, and in some cases, governance variables.

They are mechanisms for cities to commit to a set of sustainability actions and to report on their progress on a regular basis in order to qualify for formal recognition, such as a certification, seal or a political compact made between municipalities. Usually undertaken on a voluntary basis, certifications or political compacts’ methodologies provide a successful model for encouraging the use of baselines, measurement, and monitoring of comprehensive sets of indicators for urban sustainability. Some examples include certification schemes developed by ISO international standards, ICLEI’s STAR rating systems, and the European equivalent: the Reference Framework for European Sustainable Cities. They offer mayors or city management the opportunity to associate their city or their performance with a recognized high standard for urban sustainable development. Other initiatives combine a focus on tracking measures with the consolidation of political commitments, such as the Global Covenant of Mayors for Climate & Energy (the merged version of the Compact of Mayors and the Covenant of Mayors) which commits cities to reporting on climate targets, or the Municipal Seal of Approval by UNICEF Brazil, which tracks living conditions and public services for children in cities in Semiarid and Amazon Regions. In these cases the indicator framework belongs to an external body which defines and sets the standard and which requires external third-party verification of the data collected in order for the city to attain the certification.

There are several advantages for cities to become involved in certification and political compacts for sustainable development. First, they can help to strengthen levels of commitment and political will across the municipal government to a set of sustainable development objectives. Comparability across cities on the same criteria can stimulate healthy competition and consolidate municipal commitments on a shared set of principles or targets. It also enables strengthened analysis, data-driven benchmarking and decision-making based on successes and good practices. Secondly, there is a high level of credibility for the sustainable development efforts of city administrators and mayors when they participate in these programmes. They gain political capital, visibility and enhanced capacity when they attain an established certification status. With results evaluated by a trusted source of third party knowledge and objective verification, this visibility and credibility for sustainable urban development efforts can also lead to new opportunities for mobilizing resources or new partnerships for the municipality.

At a regional or global level, an advantage of certification and political compacts is the capacity to measure the combined impact of sustainable development efforts underway in multiple cities. For initiatives that require rigorous and consistent reporting, it becomes possible to report on the impact of the programme on a much larger scale. For instance, it was estimated that the 400 city commitments under the Compact of Mayors can deliver up to half of the global urban potential
Certifications or political compacts may not be a good fit for all cities. By their nature, standardized frameworks can be somewhat inflexible and do not necessarily adapt well to domestic or local contexts – i.e., some indicators may not provide a good reflection of the most relevant challenges or progress. Similarly, data collection and reporting can be an onerous process and may not be in line with or tied to other important ongoing municipal planning or priorities. Hence these initiatives might be criticized at a local level as a burdensome, expensive, ‘extra’ with unclear direct benefits to the city. This is particularly the case if there is a lack of visibility and ownership, such as if the certification process takes place between the third-party verifier and the data supplier (typically the municipality). Without a complementary campaign, high-level commitment or awareness-raising effort, the results may have a limited impact. As a means to address these criticisms, several of the initiatives are designed to allow for differing reporting commitments, depending on the size/capacity of the city or the desired levels of certification.

**Certification and Political Compacts**

- Consolidate political will
- Enhance credibility and accountability
- Strengthen comparability across regions or cities
- Enable aggregated measures of impact across cities

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8 - Climate Leadership at the Local Level: Global Impact of the Compact of Mayors, World Resources Institute, December 2015
A wide range of tools have been developed to map, model and forecast interactions across environmental, social and economic or financial domains. These tools provide geographic mapping and mathematical modeling using city data to produce forecasts of multiple predicted impacts of a given policy option/technology, such as forecasting the impacts of a new planned transit line in a major city on the economy and on the demands for real estate and various public services. The tools are most often applied in the areas of urban transit, land use, and infrastructure planning. Urban Sim and Urban Canvas are two such examples, developed by a UC Berkeley startup, that provide a visual approach to planning.

Geographic Information Systems (GIS) provide a geographical mapping of urban data which can be applied to all domains, from crime, to waste management, land use, transit, water, inequality, air quality, etc. Local governments rely heavily upon GIS to improve service delivery and for more sophisticated planning. GIS tools were formerly expensive, proprietary, requiring specialized aerial photography and skilled technicians to link the data to the mapping. In the past decade GIS tools have been developed to enable users to work with more user-friendly interfaces and today there are a number of open source tools and still many private companies offering GIS services to municipalities.

These are powerful tools to address the complexity of decision-making at a municipal level, that can model interactions of multiple variables and provide a prediction of future outcomes. Forecasting models assist with quantifying impacts and thereby enable greater objectivity in assessing policy options. This appearance of objectivity can be an important factor for selling the concept of a proposed project, particularly in the face of political resistance. By engaging stakeholders and providing all parties with information on key variables and potential impacts of proposed options, the use of modeling tools can offer planning exercises with a level of discussion that is better informed and less politicized.

Several modelling tools provide possibilities to predict and compare impacts of options and outcomes over time. This can encourage a longer-term planning perspective, balancing short terms savings or perceived benefits with desired longer term gains. This approach can be especially helpful to assess impacts of investments in areas such as sewage treatment, renewable energy or energy efficiency which require significant upfront investment and are quite commonly neglected by city administrations with short time horizons.

Forecasting and mapping tools are beyond the reach of many cities. In order to be robust and accurate, forecasting tools depend upon the availability of quality data of multiple indicators over a minimum period of time. Many cities, particularly smaller cities or those in developing countries, may not have the necessary

Forecasting and Modeling Tools

- Powerful data-driven analysis and forecasting across multiple sectors
- Predict and compare impacts of policy options
- Enhance informed debate and decision making
- Can encourage longer-term planning
indicators tracked or the historical data available. Seeking this data may, in itself, be an expensive and demanding task for a municipality. Therefore, where the data exists, it is most likely to be in the areas that are top, well-funded city priorities, such as mapping groundwater in arid regions or land use planning for real estate. Other sustainable development concerns, such as social inequalities may be less likely to be mapped and attended to within these models.

Furthermore, it is difficult for models to sufficiently consider the political viability of options. Therefore, if they are used in the absence of public dialogue or stakeholder consultation, this can lead to controversial projects being supported by politicians or technocrats on the basis of what appears to be an objective model. Despite the potential for objective modelling, the questions that are asked and the indicators that are fed into models are not neutral and they are likely to reflect the interests of those involved. These modelling tools are typically used to focus on major infrastructure needs and financial interests. Special efforts may be necessary to ensure that they do not lead to the neglect of other key social issues or considerations. In addition, forecasting and modelling tools are expensive and complex such that many of these tools require the procurement of expensive private service providers or consultancy firms, who may also have little stake or even their own interests in the outcomes.
PARTICIPATORY PLANNING APPROACHES AND GUIDES

The above tools have been heavily focused on quantifying, tracking, measuring and modelling. These tools are necessary for data-driven, evidence-based decision making that aims to enable a high degree of objectivity in strategic planning. However, the most technically sound urban plans may fall short or be met with intense resistance if they do not have the buy-in of the community and relevant stakeholders. As such, data-dependent tools are best combined with additional tools and methodologies for assessing the political or social viability of options.

The citizens that live and work together in a city have a diversity of needs, desires and incentives that drive their behavior. Understanding and incorporating viewpoints of stakeholders is at the heart of a successful and sustainable urban plan. Planning processes require knowledge and expertise from each municipal department to address the diversity of urban issues – i.e.- land use, water, waste, transit, health, education, energy, economic development, etc. Yet for each of these areas there is a plethora of competing interests, values and needs. Economic, social and environmental outcomes of policy choices create winners and losers across different actors in the private sector, public sector and community.

A sustainable urban plan reflects a vision of a city’s long-term goals and values. For instance, to ensure a plan that captures the interests of the community and that leaves no one behind, participatory planning efforts should aim to include women, youth, elderly, disabled, racial, sexual or religious minorities, informal sector, immigrants, and any other relevant local group. Methodologies and approaches have been developed to assist municipal planners to identify and consider the full range of stakeholders in a community and to develop strategies and processes for inclusion in the phases of planning, implementation and monitoring, such as the Participatory Urban Planning program developed by Montreal Urban Ecology Center and the Project for Public Spaces. The Participatory Methods Toolkit designed by the United Nations University, King Baudouin Foundation and the Flemish Institute for Science and Technology Assessment, offers a practical guide for facilitators and cities to start and implement ten different participatory approaches.

Participatory processes offer many advantages toward the development of integrated urban sustainable development plans. First, they provide the process with the contextualized knowledge of all stakeholders capturing more complete data, potential sensitivities and information for a more comprehensive assessment of challenges and opportunities. A second key benefit is that by engaging stakeholders

**Participatory Planning**

- Provides more complete, contextualized knowledge of challenges and opportunities
- Enhances political buy-in, accountability, public trust
- Increases engagement of stakeholders and potential partnerships for implementation
Throughout a planning process, from the outset there is shared knowledge/understanding of the plan and therefore there is also considerably greater potential for reconciling differences and higher levels of support during and throughout the implementation of a plan. If conducted in good faith, within meaningful, impactful opportunities to influence the process, participatory processes also lead to greater openness and transparency, which in turn, builds trust and engagement between sectors (private, public and civil society/public).

Despite a number of clear advantages, many municipalities choose to limit the extent to which they engage in participatory processes. The processes are often perceived as expensive to deliver and that they may cause delays in planning. Nevertheless, it is often the case that both time and money can be saved in the implementation period if stakeholders and the general public have had the opportunity to engage and they have an understanding of municipal plans. Private sector, civil society groups, academia and the general public can be brought in as implementation partners, volunteering time, donating financial or human resources, or offering technological innovations in support of the municipal plan.

Yet some municipal governments are opposed to the levels of political exposure and risks involved in opening themselves up to the public. Planning process and the performance of municipality become open to public criticism. Although this is the objective of a participatory approach and has many benefits, this may be beyond the comfort zone of some municipal administrations/organizational cultural contexts. Along the same lines, it can be difficult to reconcile differences of disparate groups, and the wealthiest industrialists or most highly organized unions or activist groups can overshadow other interests, effectively leading to unequal voice of participants.
SMART PARTICIPATION AND ACCOUNTABILITY TOOLS

With the rapid rise of smart phones and open data there has been an explosion of existing tools and applications for cities to interact with citizens over the past several years. These tools are changing the relationships between local governments and citizens. Municipalities are grasping the potential benefits of increased transparency, communications and accountability and engaging with citizens in new ways.

Practical bottom-up tools enable citizens to participate in informing city officials about their priorities and in signaling what needs to get done. I Change My City allows people to take pictures on their phones and report complaints in real time in Bangalore, India. This has resulted in over 187,000 complaints or suggestions for city repairs/improvements, 137,000 of which have been resolved. New York City’s 311 phone line and mobile application allow residents to access information on city services, pay fees and make complaints and suggestions to city officials.

Top down tools are also improving opportunities for engagement in the planning process. The city of Seattle, for instance has developed an online tool, Seattle in Progress, to support citizens to participate in zoning and development decisions. The application allows citizens to open and view a map of the ongoing construction projects across the city, with options to view the full project details and receive email updates. This is a level of participation which has long been mandated in many cities, but which often requires a more bureaucratic process for the public to access sufficient information to engage. Similarly, SmartParticipation.com is an online platform developed by Cornell University for hosting public consultations on government proposals. It provides background information and hosted dialogue streams to promote informed public participation in government decision making. For instance, in late 2015/early 2016, the platform hosted a discussion on New York City transit congestion, which led to hundreds of responses from participants.

With the opening of municipal and government data for public use and the increase in crowd-sourced data, private application developers have quickly identified and filled niches, delivering key information services which were formerly improbable. For instance, by opening up city transit data, New York City residents soon had a series of applications to access real-time information about their next available subway train and suggested routes. Waze has transformed private transit by identifying low-traffic routes, cheap gas stations, road blocks, and more, by linking traffic information with crowd-sourced updates. SafeEats provides up-to-date information on health inspection results of New York City restaurants.

NeighborhoodScore provides a health and sustainability score for every block in every neighborhood of San Francisco, based on national, local and private data, which identifies assets and risks in the physical and social environment in each area.

Metropolitan regions are becoming ever more connected and smart infrastructure increasingly links data sources across elements of the urban metabolism. This trend will continue to open up and expand the capacity for municipal planners and citizens alike to access tools and real-time data for more integrated and efficient decision-making. While this trend is expanding the capacity for new markets it is also altering some traditional municipal services with more mixed results. Uber and AirBnB, for instance, have transformed ride hailing and accommodation rentals respectively but both have increasingly come into conflict with registered taxis and hotels for operating outside of tax and other municipal laws. Proponents of these services argue that they offer a freer market with superior quality services for lower prices, however this opening up of an informal sector also comes with its own development challenges (such as weaker public health, security, and labour protections).
CONCLUSION

This study has provided a series of examples from across the growing spectrum of tools and approaches for integrated sustainable development planning. The majority of tools reviewed here recommend and provide guidance for including a participatory consultation alongside the analysis/process provided by the tool. Despite the power of data, the data do not make the plan. They are the essential first ingredients towards comprehensive rational decision-making and planning. They inform, but they are not a sufficient tool to manage the complexity of information or to prioritize across the many competing urban development sectors and needs. Even with access to all relevant data, the most crucial policy concerns can be overlooked and the key questions may not be asked.

Engaging the public in a participatory process is a helpful approach to understanding the possible financial, technical or social barriers to equitable service delivery. It is also essential as a means to assess priority areas of intervention and to increase accountability to different stakeholder groups. Public engagement can lay the foundation for potential partnership arrangements for managing urban development in a more equitable and sustainable manner. This entails fostering discussion, dialogue and analysis between stakeholders who do not usually interact or share information in an effort to build consensus around the root causes of and solutions to key urban problems, wherever possible.

Therefore, the data-driven indicator frameworks and modelling tools for urban sustainable development should be accompanied by the more qualitative and political approaches to assist in developing successfully integrated urban sustainable development plans. Political compacts are an effective way to rally political will and mobilize action, and participatory processes help pave the way for ongoing citizen engagement in long-term plans.
Nonetheless, as data on municipal services are becoming more readily available and open, there has been a transformation in the potential for more evidence-based urban planning. Quality and transparent data are making the difference between a comprehensive, rational strategy and policies and plans based on ideology, corruption and political interest. In complex systems like cities, comprehensive indicator frameworks, certification schemes, geographic information systems and modelling are important elements for data-driven integrated planning approaches. They add rigour, transparency, measurability and accountability around each element of a plan.

It is important to note that even the best strategic urban sustainable development plans may fail some parts of the population. Gaps and inequalities in service delivery are an unfortunate reality for most cities. Slum dwellers, ethnic minorities, women and girls, people with disabilities, the informal labour sector and others are often, if unintentionally, excluded from the economic benefits and services of life in the city. The capacity to integrate disaggregated population data into selected tools is key towards developing inclusive and integrated response strategies that improve delivery to leave no one behind.

A few of the more comprehensive initiatives reviewed within this study recognize the value of each of the approaches and incorporate the various tools within their programmes by including indicator frameworks, political commitments, and multi-stakeholder dialogues within their structure. The IADB’s Emerging and Sustainable Cities Initiative, for instance, includes a rapid diagnostic data benchmarking process within a standardized indicator framework which ranks the participating cities on each measure. This is followed by a prioritization and integrated planning process that includes citizen participation, including in the monitoring stages.

Balancing priorities in municipal governance is a major challenge and some key areas of intervention can go underserved for decades if there is not a sufficient movement to back them. Sewage treatment and sanitation, for instance, are a notoriously neglected area for politicians, despite considerable returns in terms of public health. Projects can take decades to complete and local politicians do not see a sufficient benefit within their terms of office. Forecasting and measurement tools can provide compelling numbers, but may need to be complemented by other approaches that further consolidate political will.

It is difficult to overstate the potential impact of improvements in the tools and data available for urban sustainable development planning. With rapid urbanization in some parts of the world, much of the area of global cities is still to be built. In India alone, it is projected that the urban population will increase to 814 million by 2050. Indian cities will have to accommodate the housing, infrastructure and basic services needs for an additional 385 million people, which is roughly equivalent to the largest 18 cities in the world today. As such, urbanization provides an unparalleled opportunity to transform development towards more sustainable, equitable and resilient pathways. However strong leadership and political will be needed at both national and subnational levels to direct this transformation. The tools and methodologies reviewed in this study can contribute towards ensuring that a more balanced approach to sustainable development is taken to tackle persistent inequalities and social inclusion alongside the challenges of climate resilience and preservation of natural ecosystem services.

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A Framework for Integrated Urban Metabolism Analysis Tool (IUMAT), University of Massachusetts. Amherst, 2014.
Indicators for Sustainability: How cities are monitoring and evaluating their success, Sustainable Cities International, November 2012.
Indicator frameworks: Helping planners monitor urban sustainability, Nordregio Policy Brief 2015:1
Latin American Green City Index: Assessing the environmental performance of Latin America’s major cities, Siemens and Economist Intelligence Unit, 2012.
Open Data for Sustainable Development, World Bank Group, Policy Note ICT 01, August 2015.
Participatory Urban Planning: Planning the city with and for its citizens, Montréal Urban Ecology Centre (MUEC), December 2015.
Siemens CyPT City Performance Tool, Siemens, 2014.
The Social Tenure Domain Model A Pro-Poor Land Tool, Christiaan Lemmen, International Federation of Surveyors (FIG), Global Land Tool Network (GLTN), UN-Habitat, 2013.
# ANNEX 1: SUMMARY TABLE

<table>
<thead>
<tr>
<th>Name of Tool</th>
<th>Producers</th>
<th>Type of Tool</th>
<th>Description of Tool</th>
<th>Thematic Areas of Focus</th>
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</thead>
<tbody>
<tr>
<td><strong>Programa Cidades Sustentáveis</strong></td>
<td>Instituto Ethos, Rede Nossa Sao Paulo, Rede Social Brasileira por Cidades Justas e Sustentáveis (Brazil)</td>
<td>Platform, comprehensive indicators, case studies</td>
<td>Benchmarking across multiple axes and indicators, assist with integrated planning, promote participatory approach</td>
<td>12 thematic axes to integrate - governance, natural resources, education, culture, inequality/justice/peace, sustainable consumption, planning</td>
</tr>
<tr>
<td><strong>Emerging and Sustainable Cities Initiative</strong></td>
<td>IADB</td>
<td>Indicators and rigorous participatory process to accompany development projects</td>
<td>Comprehensive set of indicators with simple traffic light analysis (red, yellow, green), followed by structured participatory process to identify priority areas</td>
<td>Education, health, land use, transit, security, employment, noise, public spending, transparency, taxes, debt, energy, solid waste, water, sewage treatment, climate emissions, air quality, connectivity, and more</td>
</tr>
<tr>
<td><strong>Indicators for Sustainability</strong></td>
<td>Sustainable Cities International</td>
<td>List of indicators, case studies</td>
<td>Supports municipalities and regional governments in planning processes and to prepare an integrated set of indicators for monitoring</td>
<td>Environment, social, health, economic</td>
</tr>
<tr>
<td><strong>Urban Centres Platform</strong></td>
<td>UNICEF Brazil</td>
<td>Political commitment and Indicator framework</td>
<td>Participating municipalities commit to reducing inequalities related to at least 10 social indicators</td>
<td>Social inequality</td>
</tr>
<tr>
<td><strong>Urban Data Portal</strong></td>
<td>UN-Habitat Global Urban Observatory</td>
<td>Platform of global indicators</td>
<td>Interactive platform includes data on 103 indicators from 220 countries and 741 cities</td>
<td>Slum dwellers, health, education, crime, prosperity, resilience, streets, transit, education, planning</td>
</tr>
<tr>
<td>CAT-MED (The Platform for sustainable urban models)</td>
<td>CAT-MED project European Territorial Cooperation, 20+ cities</td>
<td>Platform, common indicators</td>
<td>Database of shared indicators plus free online GIS tools for sustainable urban projects in traditional, compact Mediterranean cities</td>
<td>Emissions, natural and social environments</td>
</tr>
<tr>
<td><strong>Local Government Citizen Insight - ESD toolkit</strong></td>
<td>CEMSDI and Smart Cities</td>
<td>Data and geographic mapping of indicators</td>
<td>Demographic profiling to predict expected demand for the range of urban services in different locales</td>
<td>Demographics, income, gov’t services (education, safety, health, housing, transport, etc)</td>
</tr>
<tr>
<td><strong>JCCI Community Snapshot mapping tool</strong></td>
<td>Jacksonville, Florida</td>
<td>Maps and time series charts to track progress on indicators</td>
<td>Community indicators for envisioning and tracking progress on quality of life</td>
<td>Population demographics, education, economy, natural environment, social well-being/harmony, arts and culture, health, responsive government, transit, safety</td>
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</tbody>
</table>

*Indicator Frameworks*
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>9 City Prosperity Initiative</td>
<td>UN-Habitat</td>
<td>Composite index made of six dimensions of prosperity - includes metrics and a policy dialogue, offers cities the possibility to create indicators and baseline information</td>
<td>Productivity, infrastructure, quality of life, equity and inclusion, environmental sustainability, and governance and legislation</td>
<td></td>
</tr>
<tr>
<td>10 Platform for Urban Centres</td>
<td>UNICEF Brazil</td>
<td>City commitment, disaggregated indicators</td>
<td>Cities in Brazil commit to report and deliver on 10 indicators on inequalities affecting youth. An indicator framework is developed in consultation with the city</td>
<td>Inequality, prenatal health, education, adolescent pregnancy and violence</td>
</tr>
<tr>
<td>11 Community Capital Scan (CCS)</td>
<td>Simon Fraser University (Canada) and Tilburg University (Netherlands)</td>
<td>Structured questionnaire, graphical results</td>
<td>Structured questionnaire to measure stakeholder perception on to what extent a proposed programme contributes to areas of sustainable development</td>
<td>Six ‘capitals’ of sustainable community development: natural capital, physical capital, economic capital, social capital, human capital and cultural capital</td>
</tr>
<tr>
<td>12 Urban Health Index</td>
<td>WHO</td>
<td>Index to compare health outcomes across urban neighbourhoods</td>
<td>Index composed of selection of relevant indicators customized for different urban areas around the world</td>
<td>Health, inequalities</td>
</tr>
<tr>
<td>13 Ecological Footprint Calculator for Cities</td>
<td>Global Footprint Network</td>
<td>Calculation tool</td>
<td>Ecological accounting of urban impact on natural environment</td>
<td>Environment, natural resource management</td>
</tr>
<tr>
<td>14 Green City Index</td>
<td>Siemens</td>
<td>Index to compare city performance (varies by region)</td>
<td>Assesses and compares cities on their environmental performance</td>
<td>Energy and CO2, land use and buildings, transport, waste, water, sanitation, environmental governance</td>
</tr>
<tr>
<td>15 Resilience Capacity Index</td>
<td>BRR research network, University at Buffalo Regional Institute</td>
<td>Index for measurement</td>
<td>Single statistic summarizing a region’s score on 12 equally weighted indicators—four indicators in each of three dimensions encompassing Regional Economic, Socio-Demographic, and Community Connectivity</td>
<td>Urban resilience (economic, social, demographic)</td>
</tr>
<tr>
<td>16 City Biodiversity Index</td>
<td>Singapore National Parks Department, supported by ICLEI, CBD</td>
<td>Self-assessment tool</td>
<td>Biodiversity index designed for monitoring and evaluating biodiversity in cities</td>
<td>Animal species, urban biodiversity</td>
</tr>
<tr>
<td>17 ISO 37120:2014 - Sustainable development of communities - Indicators for city services and quality of life</td>
<td>International Organization for Standardization (ISO)</td>
<td>Indicators for certification</td>
<td>Measures performance management of city services and quality of life over time; Lessons learned</td>
<td>Economy, employment, education, energy, environment, finance, fire and emergency response, governance, health, recreation, safety, solid waste, telecommunications, transit, urban planning, wastewater, water and sanitation</td>
</tr>
<tr>
<td>18 Municipal Seal of Approval</td>
<td>UNICEF Brazil</td>
<td>Set of indicators linked to commitments</td>
<td>Through voluntary enrolment, municipality commits to actions to achieve objectives related to child and adolescent services and quality of life in Brazil</td>
<td>Education, health, protection (including environmental)</td>
</tr>
<tr>
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<tr>
<td><strong>19</strong> Sustainability Tools for Assessing and Rating (STAR) Communities</td>
<td>ICLEI-USA, U.S. Green Building Council, National League of Cities, Center for American Progress</td>
<td>Rating system/sustainability framework and certification program</td>
<td>44 objectives that contain evaluation measures and metrics - measured on community outcomes (measurable indicators) and actions put in place to improve - used by over 100 towns, cities in US and Canada</td>
<td>Built environment, climate and energy, economy and jobs, education, arts and community, equity and empowerment, health and safety, and natural systems</td>
</tr>
<tr>
<td><strong>20</strong> Reference Framework for European Sustainable Cities</td>
<td>EU – Member States, the European Commission and European organizations of local governments</td>
<td>Evaluation tools (checklist, quantitative, qualitative)</td>
<td>Online toolkit to help cities promote and enhance their work on integrated sustainable urban development for integrating sustainability principles into local policies and actions</td>
<td>Practical support in integrating sustainability principles into local policies and actions</td>
</tr>
<tr>
<td><strong>21</strong> Envision</td>
<td>Harvard University and the Institute for Sustainable Infrastructure</td>
<td>Participatory assessment framework, rating system</td>
<td>Participatory framework and rating system for evaluating and rating the community, environmental, and economic benefits of infrastructure projects on 60 sustainability criteria. The tool is widely used particularly in the engineering sector, with around 180 ‘envisio-qualified’ companies applying the system</td>
<td>Quality of life, leadership, resource allocation, natural world, and climate risk</td>
</tr>
<tr>
<td><strong>22</strong> UNISDR Local Government Self-Assessment Tool (LGSAT)</td>
<td>UNISDR, with partners, ICLEI, Global Network of Civil Society Organizations for Disaster Reduction (GNDR)</td>
<td>Structured questionnaire (available online and offline)</td>
<td>Structure questions to address all areas of disaster risk reduction, ideally in open stakeholder discussion. Aims to assess and benchmark disaster preparedness</td>
<td>Infrastructure, health and education systems, early warning, public awareness, planning, coordination</td>
</tr>
<tr>
<td><strong>23</strong> Champion Mayors for Inclusive Growth</td>
<td>OECD and Ford Foundation</td>
<td>Commitment of Mayors</td>
<td>Campaign, knowledge sharing network</td>
<td>Inclusive growth, social inclusion</td>
</tr>
<tr>
<td><strong>24</strong> Disaster Resilience Scorecard</td>
<td>IBM and UNISDR</td>
<td>Scorecard</td>
<td>Structure questions, visualization of numerical results to benchmark disaster preparedness</td>
<td>Infrastructure, health and education systems, early warning, public awareness, planning, coordination</td>
</tr>
<tr>
<td><strong>25</strong> Compact of Mayors</td>
<td>C-40, ICLEI, UCLG and UN-Habitat</td>
<td>Commitment campaign, measurement &amp; action plans</td>
<td>Voluntary commitment requires cities to report regularly on their climate actions, emissions and risk through a shared platform; 450 cities globally</td>
<td>Climate mitigation and adaptation</td>
</tr>
<tr>
<td><strong>26</strong> Covenant of Mayors</td>
<td>EU</td>
<td>Commitment campaign, measurement &amp; action plans</td>
<td>Voluntary commitment for mayors to meet EU climate and energy targets, with required reporting on benchmarking and action plans; 6700 cities in Europe</td>
<td>Climate mitigation and adaptation</td>
</tr>
<tr>
<td><strong>27</strong> CDP cities programme</td>
<td>CDP (London non-profit) C-40 &amp; Bloomberg as sponsors</td>
<td>Global reporting registry</td>
<td>Official global reporting registry for Compact of Mayors, C-40 and other initiatives, city reporting indicators framework and questionnaire to track climate emissions and adaptation efforts</td>
<td>Climate mitigation and adaptation (emissions, water and other climate risks)</td>
</tr>
<tr>
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<tr>
<td>28 Carbonn Climate Registry (ct CCR)</td>
<td>ICLEI, Cities of Copenhagen, Mexico, based at Bonn Center for Local Climate Action and Reporting – carbonn®</td>
<td>Global Reporting registry</td>
<td>Official global reporting registry for Compact of Mayors, C-40 and other initiatives for measurable and verifiable climate action</td>
<td>Climate mitigation and adaptation (emissions, water and other climate risks)</td>
</tr>
<tr>
<td>Forecasting and Modeling Tools</td>
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<tr>
<td>29 Urban Sim and Urban Canvas</td>
<td>Synthicity, a UC Berkeley-based start-up acquired by Autodesk in 2015</td>
<td>Desktop software and cloud-based modelling tool; Visualization and analysis tool</td>
<td>Urban Sim – Open source and modular software system, using highly disaggregated data for dynamic simulation; Multivariate impact modeling for urban data, especially in transit and land use Urban Canvas - 3D visualizations of impacts of proposed and alternative projects/plans</td>
<td>Transit, land use, demographics</td>
</tr>
<tr>
<td>30 CityPerformance Tool</td>
<td>Siemens USA</td>
<td>Dynamic simulation tool model</td>
<td>Studies a series of more than 70 technologies from Building, Transport and Energy Technologies to predict impacts on environment and economy. Model calculates the environmental and economic impacts of individual technologies at different implementation levels</td>
<td>GHG emissions from buildings and transport, PM and NOx air pollutants, job creation</td>
</tr>
<tr>
<td>31 TRANUS</td>
<td>Modelista (Venezuelan consulting firm)</td>
<td>Software based modelling tool</td>
<td>Integrated land use and transportation modeling, online, free to use and in use by consulting firms in Latin America and Europe and in academic training for urban planning</td>
<td>Transit, land use, environmental protection</td>
</tr>
<tr>
<td>32 Sustainable urban planning decision support accounting for urban metabolism (BRIDGE)</td>
<td>Earth System Science and Climate Change Group, and multiple European universities (EU-funded)</td>
<td>Science-based planning</td>
<td>Accounting for the urban metabolism of planning actions - integrates biophysical observations and simulation techniques with socio-economic aspects in five European cities, selected as case studies for the pilot application of the tool. Builds on ideas from industrial ecology, energy and material flows, hydrology, CO2 and other emissions (study closed in 2011)</td>
<td>Urban planning, sustainability indicators, urban metabolism of cities, biophysical sciences, water and carbon exchanges between the urban surface and the atmosphere</td>
</tr>
<tr>
<td>33 MARS (Metropolitan Activity Relocation Simulator)</td>
<td>University of Leeds</td>
<td>Software based modelling tool</td>
<td>MARS is a dynamic Land Use and Transport Integrated (LUTI) model to simulate the travel behaviour of the population related to their housing and workplace location</td>
<td>Land use, transport, fuel consumption, housing, emissions</td>
</tr>
<tr>
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<tr>
<td>Integrated Urban Metabolism Analysis Tool (IUMAT)</td>
<td>University of Massachusetts</td>
<td>Simulation tools to assess indicators</td>
<td>Quantifies and aggregates the social, economic and environmental capitals of urban activity in an integrated framework focusing on the metabolic flows of urban development (theoretical tool)</td>
<td>Urban metabolism, urban planning</td>
</tr>
<tr>
<td>Tools to Support Participatory Urban Decision Making</td>
<td>UN-Habitat</td>
<td>Guidebook, listing and outline of tools available</td>
<td>The guidebook provides a rationale for and experiences of participatory urban planning as well as an overview/ references of tools available for participatory planning from international organizations</td>
<td>Participation, urban planning</td>
</tr>
<tr>
<td>Urban Planning and Design LAB</td>
<td>UN-Habitat</td>
<td>Approach for participatory planning processes</td>
<td>Recruitment of teams composed of architects, urban planners and landscape architects; LAB proposes and implements urban planning projects from neighborhood to city-wide scale worldwide</td>
<td>Three-pronged approach (legal, economic, design), planning and design, legal and financial</td>
</tr>
<tr>
<td>Participatory Urban Planning: Planning the city with and for its citizens</td>
<td>Montréal Urban Ecology Centre (MUEC), Project for Public Spaces</td>
<td>Guidebook, good practices, steps to follow</td>
<td>Supports design and implementation of participatory processes at the local level, encouraging community engagement from inception to implementation</td>
<td>Land use, engagement</td>
</tr>
<tr>
<td>Visioning as Participatory Planning Tool</td>
<td>UN-Habitat, Kosovo</td>
<td>Sourcebook, examples of engaging civil society in the visioning exercise</td>
<td>Analysis of spatial and urban planning, lessons learned from workshops in municipalities, and a collection of planning tools, exercises</td>
<td>Land use, engagement</td>
</tr>
<tr>
<td>DYNe@MO</td>
<td>Civitas Initiative, co-financed by EU</td>
<td>Approach for Participatory Sustainable Urban Mobility Planning</td>
<td>Support sustainable urban mobility plans incorporating web 2.0 interactivity tools for stakeholder engagement</td>
<td>Transit, mobility, clean energy, public participation</td>
</tr>
<tr>
<td>Communication, Education, Public Awareness (CEPA) Evaluation Toolkit</td>
<td>ICLEI and Local Action on Biodiversity (LAB) Pioneer Cities</td>
<td>Online resources, indicators, alternative logframe</td>
<td>Tool enables cities to evaluate, track and measure the effectiveness and impacts of their communication, education and public awareness campaigns on local natural resource management</td>
<td>Biodiversity, environment</td>
</tr>
<tr>
<td>Name of Tool</td>
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<tr>
<td>42 UN-Habitat International Guidelines on Urban and Territorial Planning</td>
<td>UN-Habitat</td>
<td>Normative Framework – guidelines and recommendations</td>
<td>Resulting from expert group process, as per governing council resolution 24/3. Includes twelve key principles and a series of action-oriented recommendations that are based on strong evidence, inspiring practices and lessons learnt from various regions and contexts.</td>
<td>Social, environmental, economic, inter-sectoral and multi-level approach</td>
</tr>
<tr>
<td>43 Local Authorities Self-Assessment of Local Agenda 21 (discontinued)</td>
<td>ICLÉI</td>
<td>Self-assessment questionnaire plus database</td>
<td>Tele-guided, concerted self-assessment of their process and progress for Local Agenda 21</td>
<td>Political participation, resources, integrated approach, awareness raising, local action plan</td>
</tr>
<tr>
<td>44 Adaptation Database and Planning Tool (ADAPT)</td>
<td>ICLÉI –USA (International Council for Local Environmental Initiatives)</td>
<td>Cloud-based software application</td>
<td>Guides cities through ICLEI’s five milestones for climate adaptation to organize preparedness efforts, to scope out a process, identify and manage stakeholders, and conduct vulnerability and risk assessments, facilitate interdepartmental collaboration and data to be accessed by multiple users over time</td>
<td>Climate adaptation, preparedness, water, transport, health, business, energy, recreation, biodiversity, forests, agriculture, infrastructure</td>
</tr>
<tr>
<td>45 Building Adaptive &amp; Resilient Communities Tool – (BARC)</td>
<td>ICLÉI-Canada</td>
<td>Interactive web-based tool</td>
<td>Series of exercises designed to assist communities in adapting to the impacts of climate change through the development of a municipal climate change adaptation plan, takes users through the Five Milestone (initiate, research, plan, implement, monitor) process to assist communities in adaptation and resilience</td>
<td>Climate adaptation and resilience</td>
</tr>
<tr>
<td>46 Covenant Capacity Training Platform, includes: Local Energy Action Plan (LEAP) Wizard tool</td>
<td>ICLÉI-Europe</td>
<td>Training platform and online toolkits</td>
<td>Assists Sustainable Energy Action Plan (SEAP) development in Europe - from motivation, planning, implementation, to monitoring and evaluating</td>
<td>GHG inventories, SEAP development, stakeholder involvement, procurement, four sectors: buildings, transport, waste, water</td>
</tr>
<tr>
<td>47 Greenhouse Gas Protocols</td>
<td>ICLÉI</td>
<td>National or global standards for local-scale accounting of GHG emissions</td>
<td>Local-scale accounting of emissions, protocols used for other ICLÉI accounting tools</td>
<td>GHGs emissions</td>
</tr>
<tr>
<td>48 Clear Path Platform</td>
<td>ICLÉI-USA</td>
<td>Interactive cloud-based tool</td>
<td>Community-scale inventory module based on ICLÉI’s Five Milestones Framework (Analyse baseline GHG emissions, develop an emissions reduction target, develop and implement a climate action plan, monitor emissions reduction progress)</td>
<td>GHG emissions</td>
</tr>
<tr>
<td>49 HEAT+ (Harmonized Emissions Analysis Tool)</td>
<td>ICLÉI</td>
<td>Web-based software tool for accounting/database</td>
<td>Multilingual tool that helps cities to account and report GHG emissions</td>
<td>GHG emissions, Common air pollutants (CAP) and other Volatile Organic Compounds (VOC)</td>
</tr>
<tr>
<td>Name of Tool</td>
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<tr>
<td><strong>50</strong> Greenhouse Gas Protocol</td>
<td>WRI and World Business Council for Sustainable Development (WBCSD)</td>
<td>Calculation tool for GHG emissions, training manual</td>
<td>The “gold standard” for GHG accounting also used by International Standards Organization and The Climate Registry, an international accounting tool for government and business leaders to understand, quantify, and manage GHG emissions</td>
<td>GHG emissions, climate change mitigation</td>
</tr>
<tr>
<td><strong>51</strong> Energy Atlas</td>
<td>Los Angeles County</td>
<td>Online, open, searchable mapping database</td>
<td>Interactive site with largest dataset of disaggregated energy data in US</td>
<td>Demographics, regions, building type</td>
</tr>
<tr>
<td><strong>52</strong> Clean Power Plan Energy Code Emissions Calculator: Energy calculator for building efficiency</td>
<td>Alliance to Save Energy and the Energy Efficient Codes Coalition</td>
<td>Excel-based calculator and visualizations</td>
<td>Calculator tool to estimate carbon emission reductions possible through adoption and enforcement of new energy codes, using data visualizations to identify possible energy savings</td>
<td>Energy saving, GHG emissions reduction</td>
</tr>
<tr>
<td><strong>53</strong> Aqueduct – water risk assessment</td>
<td>Measuring and mapping tool for water risk</td>
<td>WRI, General Electric, Goldman Sachs, and the Aqueduct Alliance</td>
<td>Open-source, high-resolution, customizable global maps of water risk</td>
<td>Water stress/overuse, flooding, shale gas exploitation</td>
</tr>
<tr>
<td><strong>54</strong> Secure Tenure Domain Model (STDM)</td>
<td>UN-Habitat -Global Land Tool Network-</td>
<td>GIS mapping complemented with land-tenure frameworks</td>
<td>Pro-poor land info-management tool to support tenure rights for informal settlements both in rural and urban settings</td>
<td>Land reform/tenure, poverty, gender</td>
</tr>
<tr>
<td><strong>55</strong> Smart City Logistics</td>
<td>Luxembourg Institute for Science and Technology (LIST) and Last Mile Logistics (LaMiLo) project led by the Institute for Sustainability</td>
<td>Decision support mapping software tool for sustainable urban freight planning</td>
<td>Open source platform mapping data on transportation networks, access restrictions, traffic, delivery and transport facilities, districts, population, land use and carbon emissions in European cities</td>
<td>Transportation (congestion)</td>
</tr>
<tr>
<td><strong>56</strong> ECOBUDGET®</td>
<td>ICLEI</td>
<td>Framework tool/budget for environmental management</td>
<td>Environmental Management System developed by ICLEI especially for local governments, in order to plan, monitor, and report the consumption of natural resources within the municipal territory</td>
<td>Environment</td>
</tr>
<tr>
<td><strong>57</strong> Sentiment Mapping</td>
<td>Catapult, Commonplace, Royal College of Art, UK</td>
<td>Demo tracker of user location and social media data about transit</td>
<td>Supports transit operators and passengers to improve efficiency of commuting</td>
<td>Transit</td>
</tr>
<tr>
<td><strong>58</strong> UrbanData2Decide</td>
<td>European Union – Joint Programme Initiative, Urban Europe</td>
<td>Visualization tool complemented by expert network support</td>
<td>Extract data from social media and open data sets, aims to aggregate, structure and visualize – using sentiment analysis and visualization techniques to create intuitive dashboards for decision making</td>
<td>Urban renewal, urban safety and security</td>
</tr>
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</table>
ANNEX 2: DESCRIPTION OF INITIATIVES

SUSTAINABLE CITIES PROGRAMME - BRAZIL
(Programa Cidades Sustentáveis)

The Sustainable Cities Programme in Brazil (Programa Cidades Sustentáveis) is a partnership of the Instituto Ethos, and two NGO networks - Nossa Sao Paulo and the Brazilian Social Network for Just and Sustainable Cities. It invites city administrations and candidates running for municipal office to commit to a set of sustainable development actions and to track progress through a comprehensive voluntary indicator framework covering 12 key thematic axes of sustainability: governance, natural common goods, equality/social justice and peace, local management for sustainable development, responsible consumption, mobility and traffic reduction, health, urban planning, culture, education, dynamic/creative economy, local to global action. The Sustainable Cities Programme brings together more than 300 indicators under these axes, chosen through a participatory process.

Municipalities that elect to commit to the programme are required to report on a subset of 100 basic indicators (or less for cities with fewer than 50,000 inhabitants). As a national programme the indicators are representative of issues of particular concern to Brazilians and include: percentages of favela dwellers, numbers of traffic deaths, number of books per child in public libraries, protected areas and many more. The results are available online in a searchable database which allows users to select individual indicators and generate data tables, summary maps and graphics to visualize the data. The methodological notes or formula is provided for each indicator, along with a reference target for comparison. For example, the rate of motorcycle deaths/10,000 people is found to be around 10 times higher in Sao Paulo than in the reference city of Auckland, New Zealand. The data are not only accessible for viewing, but can also be downloaded freely for research and advocacy purposes. In addition, the site shares several stories of best practices from cities around the world.

Source: http://indicadores.cidadessustentaveis.org.br/
EMERGING AND SUSTAINABLE CITIES INITIATIVE

The Inter-American Development Bank’s Emerging and Sustainable Cities Initiative is a regional programme to define, track, prioritize and implement sustainable development projects in Latin American cities. As a first phase of a city’s participation in this initiative, a rapid assessment is conducted using a comprehensive indicator framework to benchmark sustainable development across three dimensions (fiscal sustainability and governability; urban sustainability, and climate change and environment). Each dimension has several pillars, topics and indicators. The diagnostic analysis is conducted to establish municipal baselines for each of the indicator areas. This indicator framework is then used to inform subsequent stages of the process: prioritization, action plan, pre-investment, monitoring and investment.

To facilitate comparison and rapid assessments across the multiple data fields, the indicators are grouped within an Urban Dashboard under a smaller number of areas and assigned a simplified traffic light score (red, yellow and green), depending upon the performance of the city within that domain. The indicators cover areas as diverse as noise, taxes, economic competitiveness, connectivity, sewage treatment, land use, air quality, inequality, etc. and each of these is a rating based upon a composite score derived from a number of indicators. Benchmarks for each indicator are provided to determine levels of performance. The Urban Dashboard platform allows users to rapidly review and compare the status of the participating intermediate cities in Latin America and the Caribbean on 150 indicators. For a given area of interest, the user can click on a scored topic – ex. water, to get the underlying indicator data points, graphed against the city’s performance on that indicator and relative to the other cities. A guide to the Emerging and Sustainable Cities Initiative also includes methodologies used, rationale for the indicators, and lists of other organizations or agencies that also use the indicator.


Source: http://www.urbandashboard.org/isd/index_city.html?id=PAC&lang=ES
INDICATORS FOR SUSTAINABILITY

Developed by the non-profit Sustainable Cities International (now a partnership with the Centre for Sustainable Community Development at Simon Fraser University, Vancouver, Canada), Indicators for Sustainability provides a toolkit as well as an overview of urban indicator frameworks. The guide identifies the common key indicators being used by the cities within the Sustainable Cities International network, with the objective of offering a simple, comparable list of indicators for cities aiming to improve their tracking and monitoring of urban sustainable development. The guide also identifies which methodologies cities are using to track sustainability indicators that accurately reflect the progress of their sustainability plans. The indicators included in the toolkit measure economic growth, employment, transit/mobility, water and air quality, waste, green space and emissions/energy. The tool is accompanied by a knowledge sharing network of 40 participating cities and municipal leadership training.

The toolkit is complemented with case studies of the indicators in practice in cities in Africa, Americas, Asia, Australia, Europe and the Middle East. These case studies conclude that environmental issues were more common in the urban sustainability plans than social or socio-economic issues, and that largely missing from the plans were aspects related to food security. In addition, the guide notes that based on the cases studied, institutionalization of sustainability is more likely to lead to change.

SOCIAL

- Complete neighbourhood / Compact city
  - Access to local/ neighbourhood services within a short distance
  - Crime rates
  - Measures of income distribution and inequality
- Housing
  - Percentage of social / affordable / minority housing
  - Breakdown of housing sector by owner occupied / rented, single occupant/ couple/family/multi-family etc.
- Quality Public Space
  - Percentage of roadways in good conditions
  - Percentage of green space / public parks coverage in relation to city area and/or population size
- Education
  - Number of schools with environmental education programs
  - Attendance rate
- Sanitation
  - Percentage of population with access to water born or alternative (and effective) sanitary sewage infrastructure
- Health
  - Mortality rate / life expectancy
  - Percentage of population with access to health care services

UN-HABITAT - URBAN DATA PORTAL

Launched in April 2015, this tool is a global urban indicator database, and is a product of UN-Habitat’s Global Urban Observatory, which works to help governments to develop urban indicators, statistics and data. Compiled and published by the Global Urban Observatory, the data provided are sourced from official household and census surveys from national statistics agencies. The database includes data on 103 indicators from 220 countries and 741 cities. The indicators outline demographic trends, city resilience to natural disasters, population details (i.e. slum prevalence, urban, rural population), as well as crime, education, health, and transport.

The Urban Data Portal was created to provide free and open access to this global database for research and accountability purposes. The online tool allows users to select the indicators, regions/city of interest and generate graphic results of the data with the potential to compare cities or countries along the various indicators. The datasets are also available for free download.

PLATFORM FOR URBAN CENTRES – UNICEF BRAZIL

The Urban Centres Platform is a UNICEF Brazil programme to create a model of inclusive development for major cities in Brazil to reduce inequalities that affect the lives of children and adolescents. Initiated in 2008, the programme now operates in 8 cities. Participating municipalities sign a partnership agreement to commit to the reduction of inequalities, then prepare and analyze available baseline indicators related to at least ten social measures in terms of prenatal health, education, adolescent pregnancy and violence. With measuring inequalities as a primary focus, the programme places great importance on the disaggregation of data based on demographic groups and neighbourhoods. Each city develops an action plan and must undertake evaluation and publication of the results.

CITY PROSPERITY INDEX (CPI) – UN-HABITAT

The CPI is UN-Habitat’s urban development indicator. It is an index that brings together six dimensions of urban prosperity: productivity, infrastructure, quality of life, equity and social inclusion, environmental sustainability and governance. Currently applied in over 500 cities around the world, the CPI is a tool that provides metrics and data to evaluate urban development. It provides a baseline of the current urban situation and the capacity to track progress.

The City Prosperity Initiative combines policy support and a measurement tool to offer cities from developed and developing countries the possibility to create indicators and baseline information, often for the first time. It is also a global monitoring mechanism, adaptable to national and local levels that can provide a general framework that allows cities, countries, and the international community to measure progress and identify possible constraints. The CPI aims to provide an instrument to guide cities in their urban development decisions, helping to confirm or adjust current policies and to redirect the resources where needed most. The aim of the CPI is to enable city authorities to identify opportunities and potential areas of intervention for their cities to become more prosperous.

COMMUNITY CAPITAL SCAN (CCS)

The Community Capital Scan, a tool developed by the Centre for Sustainable Community Development of Simon Fraser University in Vancouver, Canada and Telos, the Brabant Center for Sustainable Development of Tilburg University in the Netherlands, provides an innovative solution to the problem of capturing complex concepts. It defines the “capital” of a city into six areas of natural, physical, economic, human, social, and cultural, as a way to understand and conceptualize community, with each of these capitals representing a collection of local assets and community resources.

The tool aims to map the degree to which individual projects or programmes are expected to contribute to the sustainable development of a community and it relies upon the perceptions and knowledge of all relevant stakeholders to provide the data. The inputs are compiled through a detailed questionnaire asking respondents to indicate a rating of the degree to which a project/programme will impact the six capitals of sustainable urban development. The concept of the community capital framework is a normative one. It
aims for balance across all of the capitals and that each should be valued equally. For ease of comparison across all six the results are presented in the format of a spider diagram which shows whether the impact is expected to be positive or negative on each of the axes and a 1-5 rating as to what extent. The format can be used to compare programme or projects and to assess changes over time, as to whether the hexagon is growing or if it is becoming more asymmetrical. The tool also provides the possibility to generate scatter plots of the results and to demonstrate the dispersion –i.e. - level of (dis)agreement- across the ratings.

URBAN HEALTH INDEX

The WHO Urban Health Index is used to assess disparities and inequalities in health indicators and outcomes, across different parts of a city as well as for inter-city comparisons. Most other available urban health metrics focus primarily on large area rankings. This index provides information about level of health and health disparities for small areas within cities, and as such, is a valuable tool in assessing focused populations to be targeted by the SDG agenda to leave no one behind.

The Urban Health Index (UHI) Tool Kit consists of a technical Handbook and a Microsoft Excel-based tool for calculating the UHI. In addition, sample data are provided which can be used for trying out the calculation tool or GIS mapping exercises.

The Handbook guides the reader through the step-by-step calculation of the UHI, from choosing health indicators and determinants, to communicating with decision makers and others about the UHI results. It includes guidance on using GIS tools to map and analyze the UHI, and on communicating about the UHI results with decision makers. The sample GIS files can be used to practice the steps for mapping the UHI results explained in Appendix D of the Handbook.

Source: [http://www.ccscan.ca/ccsd.sfu.ca/community-capital-scan/](http://www.ccscan.ca/ccsd.sfu.ca/community-capital-scan/)
ECOLOGICAL FOOTPRINT CALCULATOR FOR CITIES

The Ecological Footprint is a tool used to quantify human impact on natural capital. It is an accounting approach that measures the degree to which a person or place is acting within the available ‘ecological budget’ or whether urban resources are being consumed faster than the planet can renew them. Developed by the Global Footprint Network, the Ecological Footprint Calculator for Cities is a tool to help to track environmental impact of cities (including how much land and water a population uses), using measures that are often beyond the scope of typical public data tracking. The calculator tool has been designed to strengthen the environmental pillar in sustainable urban management, by building a more comprehensive view of the actual impacts and demands on the natural environment (for instance the areas needed for producing the resources that a city consumes, the space needed for accommodating its buildings and roads, and the ecosystems’ impacts from absorbing the waste the city consumes). It gives policy makers more information about their region’s ‘resource metabolism’ and aims to support them to manage both current and future environmental resources. For instance the city of Calgary’s ecological footprint analysis found that the per capita footprint exceeded the Canadian average (which is already the 4th highest in the world) by more than 30 percent, at 9.8 global hectares per person. This prompted the city to redesign land-use and to invest in emissions-free light rail public transit, and to set a target to reduce their footprint to the national average by 2036.

Source: http://www.footprintnetwork.org/2015/04/10/calgary/
**GREEN CITY INDEX**

Developed by the Economist Intelligence Unit (EIU) and sponsored by Siemens, the Green City Index provides a comparative analysis and sustainability benchmark tool for more than 120 major cities around the world. The tool focuses attention on urban environmental sustainability as a way to help cities learn from each other, rank cities’ intentions to become greener, and share best practices. The Green City Index series began in 2009 and measures cities on approximately 30 indicators across eight to nine categories depending on the region. It covers 120 cities around the world, examining topics such as CO2 emissions, energy, buildings, land use, transport, water and sanitation, waste management, air quality and environmental governance. It also adjusts the indicators based on context; depending on data availability and the unique challenges in the region indicators will be different. For instance, the European Green Index is different from the African Index, which has indicators measuring access to electricity and potable water, as well as the percentage of people living in informal settlements. Various organizations and experts were consulted in the process of developing the index.

The index provides a mix of both quantitative and qualitative indicators, aiming to measure hard performance data from official public sources alongside an assessment of environmental policies and commitments. It also acknowledges that data collection is a challenge to some regions and that some cities collect and update quality environmental data, while others do not. The index aims to capture actual performance as well as the intended improvement in sustainability within the model. Reports are compiled and rankings are assessed for the global and regional level, providing a powerful tool for comparison and also describing individual city performance and highlighting good practices.

RESILIENCE CAPACITY INDEX

Developed by the University at Buffalo Regional Institute as a member of the Building Resilient Regions (Berkeley) research network, the Resilience Capacity Index is an index that summarizes and ranks U.S. metropolitan regions’ performance on 12 equally weighted indicators—four indicators in each of three dimensions of resilience: regional economic, socio-demographic and community connectivity attributes. As such, the index encompasses a broad range of resilience factors such as economic diversification, inequality, health insurance, education, poverty, home ownership, and voter participation. The tool aims to quantify a metropolitan region’s strengths and weaknesses, to allow leaders across 361 metropolitan regions in the United States to compare their capacity profile to that of other metropolitan areas. Although the index examines socio-economic resiliency, measures of environmental resiliency are absent. The index uses data from a variety of sources and statistics.

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<th>Score</th>
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Source: http://brr.berkeley.edu/rci/
CITY BIODIVERSITY INDEX / SINGAPORE INDEX

Recognizing that biodiversity and critical ecosystem services are often undervalued by municipal planners and also by most urban environment indices, the Singapore Biodiversity Index was developed by the Secretariat of the Convention on Biological Diversity, in partnership with Singapore and the Global Partnership on Local and Subnational Action for Biodiversity, to develop and refine a biodiversity index for cities. The Singapore Index is designed to help cities better understand how they can improve their biodiversity conservation efforts over time, and serves as a self-assessment tool for cities to benchmark and monitor the progress of their biodiversity conservation efforts against their own individual baselines. It consists of two parts, one being a profile of the city and the other being a set of 23 indicators that measure native biodiversity, ecosystem services provided by biodiversity, and governance and management of biodiversity.

Cities conduct a baseline scoring in the first year of applying the Singapore Index and it is recommended to repeat the scoring every three years to allow sufficient time for changes to take effect or the results of biodiversity conservation efforts to materialise. The index also can be used as a way to raise awareness for biodiversity, and helps identify strengths and weaknesses in decision-making processes. For example, the User’s Manual on the Singapore Index on Cities’ Biodiversity states that Brussels was able to identify gaps in its local biodiversity management strategies based on its findings from the index, leading the city to improve its data collection system.

ISO 37120 AND THE GLOBAL CITIES INDICATORS FACILITY NETWORK

Perhaps one of the best recognized international standards bodies, the International Organization for Standards (ISO) has developed an ISO standard for certification on urban sustainable development. While more typically associated with industrial standards, ISO is the world's largest developer of international standards, with over 19,500 published standards. First published in 2014, ISO 37120 Sustainable Development of Communities: Indicators for City Services and Quality of Life is the first ISO standard on city metrics. The standard provides a comprehensive set of 100 indicators, of which 46 are core - i.e. - must be reported for the basic level of certification to measure a city's social, economic and environmental performance. Cities obtain different levels of certification (platinum, gold, silver, etc.) based on the number of indicators that must be reported and verified annually. In order to be certified the data must be reviewed and assessed by qualified third-party certification specialists. Since 2014, more than 20 cities around the world have been certified.

The ISO 37120 standard was created through a University of Toronto, Canada project, called the Global Cities Indicator Framework network, with initial backing from the World Bank. This network of 255 cites from 82 countries works to build a standardized set of city indicators for performance management, which includes a database of comparable statistics that allow cities to track their effectiveness on many different variables from planning and economic growth to transportation, safety and education. The indicators help cities to measure the management of city services and quality of life over time, while also allowing them to learn from one another by offering comparisons across a wide range of measures and sharing best practices. The network supports the World Council on City Data (WCCD), as a sister organization, which allows for independent, third party verification of ISO 37120 data. As a part of the certification process, cities must provide their data to the WCCD Open Data Portal, allowing for city-to-city comparisons, visualizations and customized trend analyses.

Source: http://www.dataforcities.org/
MUNICIPAL SEAL OF APPROVAL - UNICEF BRAZIL

The UNICEF Municipal Seal of Approval is an initiative to improve living conditions and public services for children and adolescents in cities in the Brazilian Semiarid and Amazon Regions. Drawing from the Convention on the Rights of the Child and the Millennium Development Goals, progress is measured through a defined set of indicators and actions. When a municipality enrolls in the Seal, it commits to undertake a number of actions to achieve specific objectives related to the areas of education, health and protection – including environmental protection.

The programme aims to promote a level of competition between municipalities and to give recognition and visibility to their efforts in this domain. The programme also provides trainings, workshops, publications, newsletters, and social participation activities. It also works with federal, state, and municipal governments to promote a culture of results-based planning, monitoring, evaluation and communication aimed at influencing public policies and achieving concrete results for children and adolescents.

The Seal programme monitors and evaluates a municipality's performance over 3.5 years in social impact, public policy and social participation. The evaluation combines monitoring of indicators as well as a qualitative self-evaluation process carried out by the municipalities themselves. At the outset an initial situation diagnosis is conducted through a community forum. This is followed by a plan of action and prioritization process. At the end of the period, a final community forum takes place to assess progress. The process is conducted by the Municipal Council for the Rights of Children and Adolescents, under guidance from UNICEF.

Certified municipalities can use the UNICEF Municipal Seal of Approval trademark up until the next edition of the Seal is awarded. The trademark can be included in the municipality's publicity materials, on public buildings and vehicles, during events, with office materials, for fundraising material, etc. A users’ manual is sent to the award-winning municipalities showing them how to properly use the Seal trademark and other visual identification.

Source: http://selounicef.org.br/_selounicef.php
STAR COMMUNITIES CERTIFICATION

A US-based non-profit, the Sustainable Tools for Assessing and Rating (STAR) Communities provides a standard framework and certification programme for benchmarking and recognizing local sustainability efforts in the US and Canada. Developed by ICLEI-Local Governments for Sustainability USA, the U.S. Green Building Council, National League of Cities and the Center for American Progress, the system aims to support cities and counties to use STAR to measure their performance across social, economic and environmental indicators. The certification rating includes 7 goal areas (including built environment, climate and energy, economy and jobs, education, arts and community, equity and empowerment, health and safety, and natural systems), with 44 sustainability objectives, covering a total of 526 indicators. Cities voluntarily apply, selecting objectives that are most relevant or prioritized by their communities, and reporting on local targets and indicators for verification. The submissions are verified by the STAR technical team who assigns a sustainability rating to the city and certification for 3, 4 or 5-STAR community ratings. This certification program is intended to provide cities with assessments of their strengths and weaknesses. The rating is valid for 3 years, after which cities are expected to provide updates on the indicators to assess progress and to reapply for certification. By the end of 2016, hundreds of communities in the US and Canada were using the Community Rating System to measure their sustainability efforts and over 50 had attained STAR certification.

Source: http://www.starcommunities.org/
ICLEI CLIMATE CHANGE ADAPTATION TOOLS

ICLEI—Local Governments for Sustainability has developed a series of tools designed to help cities prepare and plan for the impacts of climate change. The tools provide a series of exercises that guide users through ICLEI’s Five Milestones of Climate Preparedness framework (initiate, research, plan, implement, monitor process to assist communities).

ICLEI Canada’s Building Adaptive & Resilient Communities Tool – (BARC) is an interactive web-based tool that takes users through the Five Milestone process outlined in the ICLEI Canada Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation. The tool assists communities in developing a municipal climate change adaptation plan through providing a series of exercises.

ICLEI USA’s ADAPT also supports the management of local climate preparedness analysis and planning processes. It aims to better organize preparedness efforts, enabling local government staff to scope out a process, identify and manage stakeholders, and conducts vulnerability and risk assessments. As a cloud-based tool, ADAPT aims to improve coordination and collaboration of the planning process and better integration of information across municipal departments, with a system that allows for managing and accessing the data by multiple users over time.
REFERENCE FRAMEWORK FOR EUROPEAN SUSTAINABLE CITIES

This joint initiative by the European Union Member States, the European Commission and European organizations of local governments builds upon the 2007 Charter on Sustainable European Cities, which outlined an ideal model for the European Sustainable City. The tool was created to provide a pathway for improving integration across the social, environmental and economic dimensions of sustainable development and developing a monitoring system.

This online toolkit works to support European cities in developing and monitoring integrated sustainable development plans. Similar to the STAR rating system, cities and municipalities must fulfill established targets in order to apply for RFSC City or Ambassador City status. It also provides opportunities for showcasing good practices and networking across cities. The Reference Framework has been widely used across European cities.

Source: http://rfsc.eu/
ENVISION SUSTAINABLE INFRASTRUCTURE RATING SYSTEM

The Envision Sustainable Infrastructure Rating System was developed as a joint collaboration between Harvard University and the Institute for Sustainable Infrastructure (founded by American Society of Civil Engineers, American Council of Engineering Companies and American Public Works Association). The system includes a checklist and a rating system to assess 60 sustainability criteria, called credits, divided into five sections: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Risk. Accompanying each credit area there is a package of information to build capacity for enhancing evaluation and achievement. The system aims to provide a holistic framework for evaluating and rating the community, environmental, and economic benefits of infrastructure projects over the course of the project life cycle. The rating system is intended for use with a third-party objective review by verifiers who guide the project team through the verification process and help projects to qualify for an Envision award. The tool targets infrastructure owners, design teams, community groups, environmental organizations, constructors, regulators, and policy makers. The tool is used particularly in the engineering sector, with around 180 ‘Envision-qualified’ companies applying the system.

Source: [https://sustainableinfrastructure.org/](https://sustainableinfrastructure.org/)
MAKING CITIES RESILIENT CAMPAIGN – UNISDR

The United Nations Office for Disaster Risk Reduction (UNISDR) Making Cities Resilient Campaign aims to mobilize mayors, local governments, civil society and urban planners around the world to reduce disaster risks. UNISDR provides a set of self-assessment tools intended to complement information gathered through the national Hyogo Framework for Action (HFA) monitoring system by providing local-level information for optional reporting to the national government. As of December 2016, 3406 cities have joined as members, and a ‘municipality of the month’ award recognizes the top performers.

As one of the tools in support of the campaign, the Local Government Self-Assessment Tool (LG-SAT), developed by UNISDR in consultation with ICLEI, local governments and the Global Network of Civil Society Organisations for Disaster Reduction (GNDR), guides local governments to self-assess or to structure discussions with stakeholders by providing a series of questions and measurements in order to benchmark their performance, plans and progress on disaster risk reduction. The self-assessment is suggested to coincide with the national HFA monitoring cycle, and to be undertaken every two years, in particular for those municipalities that have committed to the Making Cities Resilient Campaign. It is recommended that the self-assessment tool be undertaken as part of a multi-stakeholder process, led by local governments and the results are recorded in an online platform.

A second tool in this campaign is the CITY RESILIENCE SCORECARD, developed by IBM and AECOM, which provides a mechanism to measure a city’s progress in building resilience and allow the city to develop a prioritized list of actions to be taken to improve it. The scorecard is based upon a more detailed assessment of the Making Cities Resilience Campaign’s Ten Essentials. As a complement to the Local Government Self-Assessment Tools, it allows for a more a numerical and visual assessment of the status of indicators to track progress on a city’s total disaster resilience, while also identifying gaps in plans and provisions.

Following the implementation of the above two tools, UNISDR has also released a set of “new” draft indicators of local risk reduction and resilience. It is a tool to provide baselines for disaster risk reduction and subsequent planning and actions. The Local-Urban Indicators for disaster risk reduction and resilience are aligned with the Sendai Framework for Disaster Risk Reduction and to support the implementation of the Sustainable Development Goals.
INCLUSIVE GROWTH IN CITIES CAMPAIGN (OECD AND FORD FOUNDATION)

This campaign aims to increase awareness of rising inequalities, refocus the debate on concrete solutions, and empower local governments as leaders in the transition towards more inclusive growth. Central to this campaign is the creation of a network of mayors to promote Inclusive Growth. The mayors, who must have already demonstrated a strong commitment to tackling inequality in their city, commit to exchanging good practices and to attending knowledge sharing events with participating mayors. The Campaign was launched 29 March 2016, with over 40 mayors from around the world supporting it. The intention is to have 1-2 annual meetings hosted by Champion mayors from within the network. The Campaign also plans to establish a platform for the exchange of best practices for inclusive growth in cities.

A supporting resource as a part of OECD’s work on the topic is the OECD Regional Well-being web tool. It allows for the measurement and comparison for well-being indicators in 395 OECD regions, based on topics – income, jobs, housing, health, access to services, environment, education, safety, civic engagement and governance, community, and life satisfaction. A score is calculated for each topic so that you can compare places and topics within and across countries. A searchable database allows for download of data and comparative analysis across regions.

COMPACT OF MAYORS (C-40, ICLEI, UCLG AND UN-HABITAT)

The Compact of Mayors was launched in 2014 by UN Secretary-General Ban Ki-moon and Michael Bloomberg, the UN Special Envoy for Cities and Climate Change, under the C40 Cities Climate Leadership Group, ICLEI – Local Governments for Sustainability and the United Cities and Local Governments – with support from UN-Habitat. The Compact requires cities to report regularly on their climate actions, emissions and risk, through a shared platform, either the Carbon Climate Registry or CDP. It is a network that aims to enhance knowledge sharing across participants and the ability to quantify and compare data and good practices. There are around 450 cities that have joined the compact, representing 391 million inhabitants. The initiative has resulted in the largest database on actions cities are taking on climate change and resilience, which enables the quantification of the individual and combined impact. An analytics report is provided to cities, allowing them to benchmark themselves against others for more data-driven decision making and offers recommendations based on lessons from other cities.

Carbon Climate Registry is a designated central reporting platform for the Compact of Mayors to report on climate action of local and subnational governments. It aims to enhance transparency, accountability and credibility for climate action. The registry provides a 5 year report on progress. It enables them to publicly and regularly report their local climate action on greenhouse gas (GHG) reduction commitments, emissions inventories, climate mitigation / adaptation actions. The reported results are used in the Local Government Climate Roadmap, playing a key role in the advocacy of local governments in the global climate negotiations as the annual reports are presented to the United Nations Framework Convention on Climate Change (UNFCCC).
COVENANT OF MAYORS

An initiative closely related to the Compact of Mayors, the Covenant of Mayors is a European movement for local and regional authorities to voluntarily commit to EU climate and energy objectives. It has over 6,900 signatories representing 212 million people. As of 2015 new signatories are required to pledge to reduce CO2 emissions by at least 40% by 2030 and to adopt an integrated approach to tackling mitigation and adaptation. Signatories commit to submitting a Sustainable Energy and Climate Action Plan (SECAP) within 2 years, outlining the key actions they plan to undertake, including a Baseline Emission Inventory and a Climate Risks and Vulnerability Assessment. The process is accompanied by capacity building and knowledge products on planning methodologies and tools, benchmarking and measurement, funding sources, etc.

Under the Covenant of Mayors, the Mayors Adapt initiative, focuses on adaptation to climate change. The Urban Adaptation Support Tool has been developed to provide practical guidance and knowledge support with a quick-start step-by-step guidance through the adaptation planning and implementation cycles. It also facilitates access to in-depth, expert information and data by providing a comprehensive up-to-date database of literature and information sources for each step of the urban adaptation cycle.

URBAN SIM AND URBAN CANVAS

Developed by Synthicity, a startup at University of California, Berkeley (now part of Autodesk), Urban Sim is a modelling platform that supports integrated urban planning, to predict and analyze impacts of urban policy decisions. Initiated in the mid-1990s, the software-based simulation tool is widely used by metropolitan and planners around the world. In particular it aims to support planning and analysis of urban development, incorporating the interactions between land use, transportation, the economy, and the environment. It is intended for use by Metropolitan Planning Organizations, cities, counties, non-governmental organizations, real estate professionals, researchers and students interested in exploring the effects of infrastructure and policy choices on community outcomes such as motorized and non-motorized accessibility, housing affordability, greenhouse gas emissions, and the protection of open space and environmentally sensitive habitats. For instance, the Société du Grand Paris has used UrbanSim to model the impacts of the Grand Paris Express metro project on sustainable development in the greater Paris region, in terms of demographic patterns, land use, and economic development.

Urban Canvas is a more recent addition to the tool that provides a 3D visualization and analysis that builds upon the results of Urban Sim, for a more visual approach to urban planning and stakeholder involvement in the urban design process. The system provides visualizations for modeling land-use and zoning based on different scenarios over time. It is a cloud-based platform that allows users to edit and improve the quality of
the data and for collaboration across city departments or different levels of government. The overall objective of both initiatives is to support informed engagement by all stakeholders to encourage new ways to propose projects, to share and visualize them and to evaluate their impacts and feasibility.

**UN-HABITAT URBAN PLANNING AND DESIGN LAB**

Launched in 2014, UN-Habitat’s Urban Planning and Design LAB is an integrated technical assistance facility that supports local, regional and national authorities to implement policies, plans and designs for equitable sustainable urban development. It does this by coordinating participatory planning processes that integrate legal, financial, economic, urban planning and design expertise and bring together governments, local and international specialists and UN agencies. The Lab has created an international portfolio and practical experience that allows for a comparison and normative assessment of applied planning tools, methodologies and processes in different local conditions. It also provides on-demand technical advice on legal planning documents that are under development.

**SIEMENS CyPT - CITY PERFORMANCE TOOL**

The City Performance Tool is a dynamic simulation tool, developed by Siemens, to assist city officials to evaluate the projected impacts of introducing or expanding the use of technology options in transport, buildings and energy. The CYPT model is customized to individual cities, using around 300 city-specific data points from official public sources about electricity, heating, and cooling demand for buildings; passenger and freight transport demand; and the transport network. It aims to support decision-making in planning and investment by forecasting likely environmental and economic impacts of several options. For instance, the tool assesses how a given transportation technology such as a light-rail system would reduce demand/traffic, shift the balance between public transport and cars, or improve efficiency. It also aims to measure the impacts of a city’s strategic plans, and conduct a cost-benefit comparison between technologies. The tool calculates environmental results relative to the money invested, and it can enable city managers to prioritize projects and develop a plan for meeting targets for carbon emissions, clean air and job growth.
The city of Seattle has developed an online tool to support citizens to participate in zoning and development decisions. The application allows citizens to open and view a map of the city showing ongoing construction projects across the city, with options to view the full project details and receive email updates. This is a level of participation which has long been mandated in many cities, but which often entails a more bureaucratic process for the public to be able to access sufficient information to engage.
EQUINOX PROJECT QUALITY OF LIFE DASHBOARD

The Quality of Life Dashboard is an initiative by the Center for Sustainable Energy that looks at the San Diego, California region. It uses credible data, as well as clear metrics and benchmarks to provide a balanced snapshot of the region. The Dashboard has been produced annually since 2012 and tracks the region’s progress on various quality-of-life issues, demonstrating the areas in where things could be improved. The dashboard examines 15 indicators, including air quality, border region, climate change, economic prosperity, electric vehicles, energy, housing, land use, transportation, waste, and water. Although the dashboard does not provide comparisons of different regions, it does compare annually, showing which aspects have improved and which have deteriorated over time in the region.

Source: Equinox
PARTICIPATORY METHODS TOOLKIT: A PRACTITIONERS MANUAL

This toolkit developed by the United Nations University, King Baudouin Foundation, and the Flemish Institute for Science and Technology Assessment provides a comparative chart assessment and facilitation techniques to define a wide range of methods for participatory processes. The toolkit offers an in-depth description to guide a user in undertaking a particular method in greater detail for ten different approaches and methodologies including: Charrette, Citizens Jury, Consensus Conference, Delphi, Expert Panel, Focus group, Participatory Assessment, Monitoring and Evaluation, Planning cell, Scenarios, and The World Café.

TOOLS TO SUPPORT PARTICIPATORY URBAN DECISION MAKING

This toolkit, developed in 2001, was a contribution to the Global Campaign on Urban Governance, an initiative led by UN-Habitat in collaboration with a range of partners aiming to support the eradication of poverty through improved urban governance. The guidebook provides a rationale and description of experiences with participatory urban planning, and a detailed overview of a wide range of tools for participatory planning developed by international organizations and civil society.

PARTICIPATORY URBAN PLANNING: PLANNING THE CITY WITH AND FOR ITS CITIZENS

This guidebook, developed by the Montréal Urban Ecology Centre (MUEC) and the Project for Public Spaces draws upon years of experience of participatory planning in Quebec, Canada. It provides compelling examples and a rationale to demonstrate the importance of participatory planning and it outlines a 6-phase approach to including citizens in all steps from inception to inauguration of a design process. Most readily applied at a local level, the process assumes that citizens who are in their neighbourhood every day can offer more complete information and observations to complement conventional data sources available to professional planners. It also encourages the involvement of citizens in implementation, contributing to the success and ongoing community support/upkeep to projects.

VISIONING AS A PARTICIPATORY PLANNING TOOL: LEARNING FROM KOSOVO PRACTICES

This guidebook produced by UN-Habitat, draws upon experiences in Kosovo in applying participatory workshops in the post-conflict era, with the aim of including a broad range of non-professional stakeholders in the community strategic planning process. The guidebook offers good practices and lessons learned, accompanied by a collection of planning tools, exercises and ideas for facilitators. It discusses various methods and techniques for setting up a visioning project/workshop and identifies the impact of this approach in the ten communities in Kosovo.