Global Platform for Sustainable Cities

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C40 Cities Climate Leadership Group

Global Platform for Sustainable Cities (GPSC)

Sustainable Urban Development Assessment (SUDA)

Summary Report

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Executive Summary

The Sustainable Urban Development Assessment (SUDA), created in the framework of the Global Platform for Sustainable Cities (GPSC) project that is funded by the Global Environment Facility (GEF), is used to help establish a baseline for Sustainable Urban Development (SUD) planning in a territory or jurisdiction, such as a city or region.

A SUDA was compiled for 23 selected GPSC cities / territories, of which 21 were cities, with one region and one subnational state.

This summary document presents an overview of the results obtained from the SUDAs, presenting highlights and interesting trends, as well as lessons learned and recommendations, which can be used to inform future action in the GPSC cities. Overall these results will inform the GEF Secretariat, the GPSC cities and the Implementing Agencies (IAs), as well as the new GEF 7 Sustainable Cities Impact Program (SCIP) Global Project and Child Projects.

A brief introduction to the SUDA, its purpose and methodology is followed by a high-level analysis addressing specific elements from the profiles of the 23 GPSC cities, considering demographical developments, geographical characteristics, governance, economy and sustainability performance in the policy context.

Challenges and capacity building needs have been identified and are grouped, considering similar cities characteristics and national contexts(see Annexes 3 and 4).Major challenges identified include governance that is not optimized, limited administrative resources which blocks action, poor coordination and resources management which negatively impacts on implementing a sustainable approach. Critical issues impacting on urban sustainability planning are mainly related to loss of natural resources, pollution, uncontrolled urbanization and population growth, as well as vulnerability to and the impact of climate change, among others.

Figure 1 below outlines the trends identified in this regard across all 23 subnational governments.

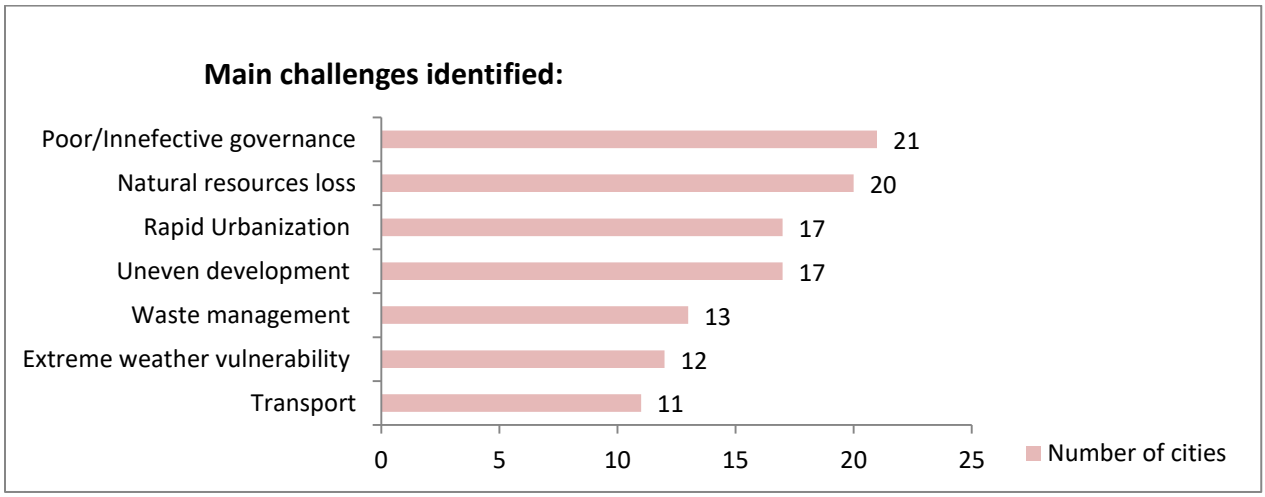

Figure 1: Main challenges identified in the selected GPSCcities

The capacity building needs identified in the local and regional governments largely correspond to the above mentioned challenges. In particular, there was an interest in capacity development on management of waste and water, sustainable infrastructure, energy efficiency and clean energy, sustainable mobility solutions, and access to finance, but also the need for further training of local leadership and technical staff on sustainable urban development, as an overarching topic.

Figure 2gives an overview of the main topics identified, for consideration in further training plans.

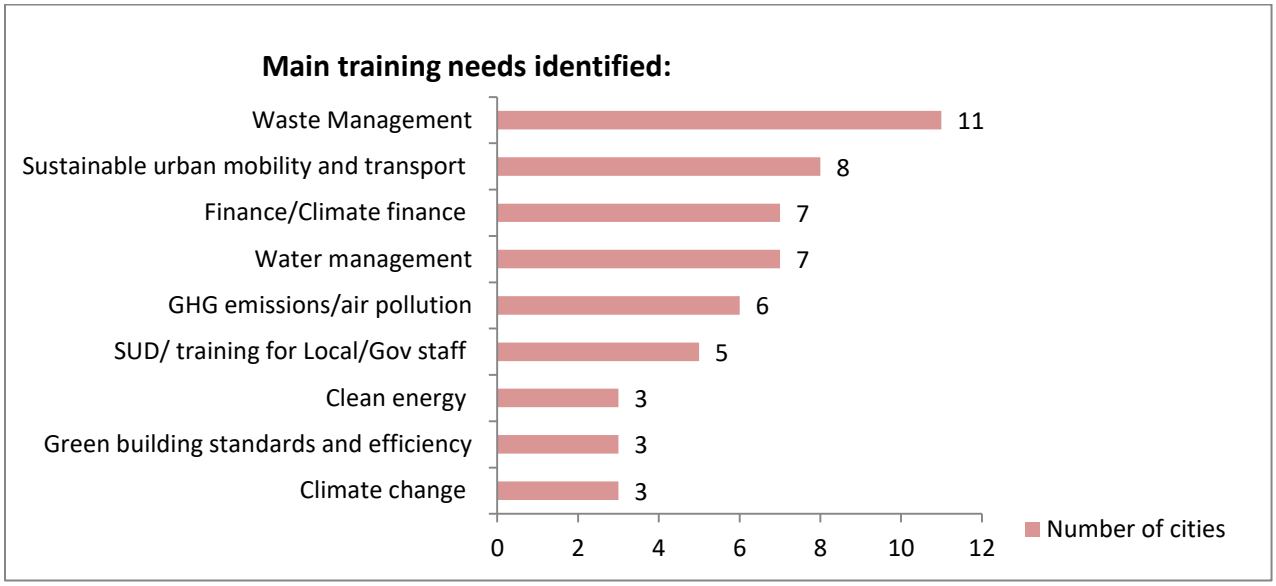

Figure 2: Main training needs identified in the selected GPSC cities

With an enhanced awareness and understanding of the value and use of a SUDA, any local or regional government can apply this tool to define a basic baseline and track progress over time in an easy, structured way – towards achieving integrated planning and sustainable urban development. Based on lessons learned, a more robust approach will be taken to assessing SUD progress, by refining the SUDA tool and creating *Integrated Sustainable Urban Development Assessment* (ISUDA) to help subnational governments set a more comprehensive baseline and process to monitor developments, embedded in their governance and monitoring processes.

1. Introduction

The purpose of the SUDA is to conduct a basic assessment of the local or regional government's commitment and approach to sustainable urban development in its territory. The outcomes (i.e. the completed SUDA) can be used for several purposes, among others:

- To determine whether the approach to planning is holistic and integrated, by identifying where a plan(s)/strategy(ies) exists and which sectors are considered / not yet considered under the SUD umbrella;
- To review the government's sustainability efforts and assessing points of connectivity across planning strategies, and whether localizing the Sustainable Development Goals

(SDGs) is taking place, and to what extent – potentially this could be a driver for SUD planning;

- To identify context-specific challenges: major, persistent and emerging challenges that (could) impede SUD;
- To identify strengths and weaknesses in the current approach to SUD planning, monitoring and governance;
- To support inter-departmental exchange and joint planning, with a view to enhance structures, processes and approaches that enable multi- and cross-sectoral cooperation on SUD;
- To identify priorities for capacity development and technical training of local political leaders, other decision-makers and technical staff of the local/regional government; and
- To identify good practices and their replication potential, either in other sectors or in other territories.

By gaining an enhanced understanding on whether sustainable development is part of existing strategies and plans, whether there is an integrated holistic approach or rather an ad hoc and sectoral course,can inform the political (re)direction and strategy of the subnational government towards SUD. This is an iterative process, and by regularly compiling the assessment, one can review where progress is being made and where corrective measures are required.

The SUDA template was created by reviewing and building on a number of relevant instruments and references. Chief among these are the ISO 37120:2018[1] (the main reference used for the list of sectors relevant to sustainable urban development); ICLEI's carbon*n* Climate Registry (cCR)[2] which has embedded the GCoM Data Standard for cities on reporting climate action, hazards and associated adaptation planning[3];and questionnaires of city-relevant financing initiatives and Project Preparation Facilities, including the C40 Cities Finance Facility (CFF)[4], ICLEI's Transformative Actions Program (TAP)[5], and Felicity / Global Climate City Challenge (GCCC)[6] from the European Investment Bank (EIB). The SUDA template and data collection methodology was prepared by the ICLEI World Secretariat team and finalized in consultation with the other members of the Resource Team (WRI and C40), and the World Bank.

SUDAs were compiled for the following 23 selected GPSC cities / territories:

- Autonomous District of Abidjan (Cote D'Ivoire / Ivory Coast)
- Johannesburg (South Africa)

[1] https://www.iso.org/standard/68498.html
[2] http://carbonn.org - global reporting platform for subnationals on climate commitments and action
[3] https://www.globalcovenantofmayors.org/press/raising-ambition-gcom-releases-impact-data-reporting-standard-and-new-tool-at-global-climate-action-summit
[4] https://www.c40cff.org
[5] www.tap-potential.org – a project pipeline and PFF created for local infrastructure projects that address climate change (adaptation, resilience, mitigation)
[6] https://www.eib.org/en/projects/sectors/urban-development/city-call-for-proposal/index.htm

- Greater Dakar Metropolis (Senegal)
- Beijing, Shenzhen, Shijiazhuang, Tianjin, Guiyang, Nanchang and Ningbo (People's Republic of China - PRC)
- Guntur, Jaipur, Bhopal, Vijayawada and Mysore (India)
- Brasilia and Recife (Brazil)
- Xalapa, Campeche and La Paz (Mexico)
- Asuncion (Paraguay); Lima(Peru)
- Melaka State(Malaysia)

Regarding the methodology, compiling a SUDA uses quantitative as well as qualitative techniques. These include desk-based research of publicly available materials, with information further enhanced or clarified through interviews with city officials (conducted in English or preferably using the main local language).The research process gathers information to complete:

i) General Profile in terms of jurisdiction type (refer to the definitions in ICLEI's Jurisdiction Typology, Annex 1), geography, governance, economy, demography; and

ii) Sustainability Performance, in terms of existing SUD plans and relevant strategies, their connection to the Sustainable Development Goals (SDGs), and the identification of the main sustainability challenges and capacity building needs for the local / regional government.

This information was retrieved from online sources, (i.e. the official website of cities) as well as inputs from government officials. Relevant information, including a questionnaire, was shared with city officials prior to the interviews, allowing them to consult with colleagues from different departments in order to have a comprehensive and inclusive response. Local representatives were suggested for interviews by the GPSC Implementing Agencies (IAs)and ICLEI offices.

2. Trends, Highlights and Recommendations

2.1 Approaches to planning

A particular highlight of the SUDA results shows that many of the 23 cities are addressing the over-arching GPSC focus of integrated planning to some extent through their plans.

Fourteen (14) cities have sustainable urban development (SUD) incorporated in their Master Plans, while eleven (11) cities have stand-alone SUD Plans, and three (3) cities have both Master Plans and SUD Plans. Sectoral Plans of sixteen (16) Cities include SUD elements and Climate Action Plans exist in thirteen (13) cities. At the centre of urban development processes, city assets should be considered, such as locally available/generated water, waste, food, biomass, transport systems, renewable energy. These provide relevant parameters, either as

windows of opportunity and scope for enhanced sustainable development, or as limitations to be considered and/or overcome as the city grows and evolves.

Almost all cities have prepared Master Plans and SUD Plans, some of them even before 2015. Another positive fact that emerged is that SUD elements are included in a wide range of sectors of these Master Plans and SUD stand-alone Plans, crucial for cities development (the dominant sectors are displayed in Figure 3). Furthermore, in six of the city's plans SDGs are included, which indicates a coherence of local polices with national and global objectives.

A weakness identified is the minimal reference to energy, though typically a national mandate, the aspects of leapfrogging old and unsustainable energy technologies, by addressing energy efficiency and locally generated renewable energy, offer tremendous potential for local energy security, use of local resources and expertise, urban-rural energy cooperation, and local job creation, to mention but a few aspects for consideration. Also, education and awareness-raising could be included in all sectoral approaches, to help draw attention, interest and the engagement of multiple key stakeholders.

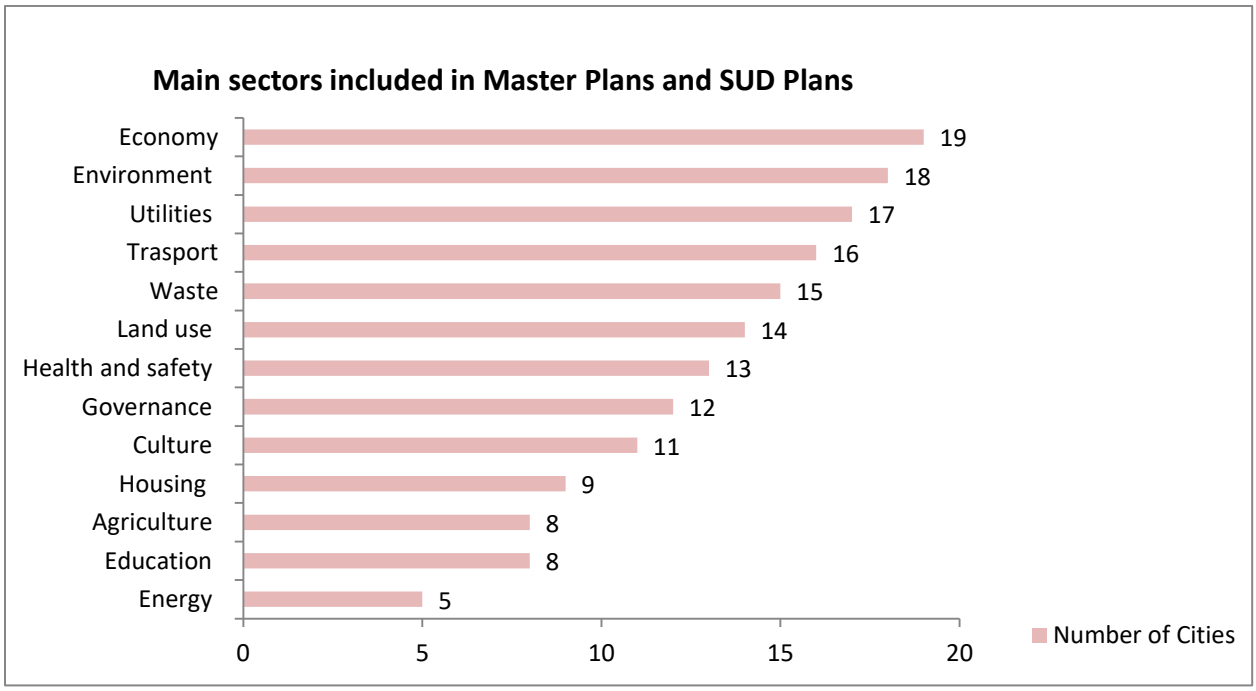

Figure 3: Main sectors covered by Master Plans and SUD Plansin the 23 cities studied

Below, key elements that have been identified are listed, with interesting responses by the local / regional governments, as potentially recommended actions for replication, while considering the local context elsewhere. General SUDA recommendations are made for consideration to all levels of government, with further recommendations added in chapter 5.

There are different approaches to planning, for example in Abidjan the general strategy and sectoral policies are combined in a single document (of around 500 pages).

Abidjan: "The Greater Abidjan Urban Master Plan (SDUGA) pulls all sectoral planning and policies together and serves as the overarching sustainability framework for the jurisdiction. It provides the main direction along with a few major policies for each relevant sector (Land Use and Growth, Housing, Urban Planning, Social infrastructure, Business, Industry, Open spaces and Landscapes, Utilities, Tourism, and Environment) and a more detailed transport sectoral plan called the Greater Abidjan Transportation Master Plan".

While Mysore (India) is the only GPSC city without a Master Plan or SUD Plan, the SUD principles are included in several Sectoral Plans of the city.

Mysore: "SUD elements are included in the Revised Master Plan 2031 for Mysore; Comprehensive Traffic and Transportation Plan 2008; Detailed Project Report on Non-Motorized Transit infrastructure and Intelligent Transport System; Solar City Master Plan 2012 and Climate Risk Assessment 2014".

The neighbour cities Guntur and Vijayawadain India implement the same Master Plan called Draft perspective plan of Andhra Pradesh Capital Region Development Authority, 2015-2050.

Shenzhen is one of the six National Innovation Demonstration Cities for 2030 Agenda for Sustainable Development in the People's Republic of China (PRC).

Shenzhen: "According to the Development Plan on Implementation of National Innovation Demonstration Cities for 2030 Agenda for Sustainable Development in China, 2016, one mission for all selected demonstration cities is to develop a local sustainable development plan. Shenzhen published its plan in 2018."

Some cities have mandatory obligations to preparing regular municipal plans of sustainable development, following national plans.

Asuncion: "It fulfils the legal responsibilities established in the "National Municipal Law" where it is mandated that municipalities conduct their planning through a municipal plan of sustainable development and an urban and territorial management plan. The SUD plan is aligned to the "National Sustainable Development Plan" and to Asuncion's Environmental Municipal Policy (PMA)".

Campeche: "Municipal plan of Development of Campeche, was approved in November 2018 through Act 23, as part of the national and state constitutional obligations of the municipal administration. It considers State Development Plan (2015-2021) and the SDGs.

2.2 Similar challenges

Through the compilation of the 23 SUDAs, very similar challenges and obstacles to SUD planning and action were identified. All cities are facing multiple interconnected challenges related not only to critical sustainability issues, but also to their management and administration systems.

Many problems are related to uncontrolled urbanization and population growth, a global trend of the last decades (ESPAS, 2019). This phenomenon is often accompanied by unplanned development and chaotic expansion of informal settlements (e.g. an influx from rural areas), degradation of environment and natural resources, health problems, and social segregation. Local governments often do not have sufficient resources to provide basic services, such as water supply, waste-water infrastructure, public transport, etc. They are however typically responsible for urban planning. Juggling the prioritization of tasks and planning, often with

limited budget, remains a general challenge. An option is to consult and coordinate with neighbouring territories, especially as it relates to connection of plans or establishing joint plans (transport, energy, and climate).

> *Greater Dakar Metropolis: "Entering into a dialogue with other regions and synergizing actions, encouraging sustainable development of hinterland regions and their cities and towns may help reduce migration to the capital, and thus slow down urbanization in Greater Dakar Metropolis".*

- *SUDA recommendations to address uncontrolled urbanization:*
    - *Planning policies should aim for balanced development between cities and their neighbours (cities and towns in the region or state), and jointly strengthening institutional and legal frameworks.*
    - *It is important to integrate SUD elements within the master plans, sectoral plans, but also synergising stand-alone SUD plans with the regional and national priorities, and ideally do this together with neighbouring communities (same timeframes, where possible).*
    - *Although all GPSC Cities have incorporated SUD elements in plans and strategies, a better horizontal and vertical coordination can further improve the collective impact.*
    - *SUD Plans should also consider the development and planning of the outskirt expansion.*

Thirteen cities have Climate Action Plans (CAPs).Based on the information shared; the impact of climate change is evident in most of the GPSC cities. The majority are also located in vulnerable areas, on the coast or close to rivers, increasing their exposure to severe climate events such as flooding, drought, soil erosion and landslides.

- *SUDA recommendations to address Climate Change and Resilience:*
    - *Building community resilience and increasing institutional capabilities to deal with the impacts of climate change should be part of the local / regional government's approach, ideally through one comprehensive plan that addresses integrated climate action, which could also be embedded in the mandatory urban development plan (should this exist and be required).*
    - *It is important to encourage nature-based solutions for climate change mitigation and adaptation measures.*
    - *Large-scale infrastructure projects or strategic investment should consider direct and indirect risks from climate change to ensure these are robust, sustainable projects.*
    - *Conflicts and trade-offs between different policies or investment decision scan affect SUD. Dialogue and exchanges with all relevant stakeholders can lead to a co-designed approach, ideally based on consensus.*
    - *Those subnational governments which have not yet started the process to develop a CAP are encouraged to prioritize this. All planned actions by the local /*

regional government should ideally include a climate lens and a lens from the sustainable development perspective, to optimise the concepts and their implementation, with an inclusive stakeholder engagement process to obtain buy-in of civil society and businesses.

A major challenge that has been identified is the lack of awareness about SUD challenges, both at institutional level and among the public.

Recife: "Citizens' engagement and public participation has allowed City of Recife in Brazil, to gather new knowledge for the elaboration of the SUD strategy, so as to tune it as much as possible to existing socio-economic conditions, accepted by local communities".

- *SUDA recommendations for building awareness about SUD challenges:*
    - *By mainstreaming sustainability perspectives and commitments into all sectors and across administrative departments, a holistic and integrated approach can be achieved.*
    - *Introducing mechanisms for citizen involvement in the design and the implementation of SUD Plans, raising awareness and gaining public acceptance, is a proven approach. For consideration, this could include actions that encourage behaviour change, mechanisms to gather local knowledge (e.g. from elders and the vulnerable), as well as other collaborative approaches in policies and project cycles.*
    - *Local governments have an important role to play, not only locally but also towards achieving national and global goals, such as the Paris Agreement, 2030 Agenda for Sustainable Development; and Sendai Framework for Disaster Risk Reduction 2015-2030, among others. This is increasingly understood by local political leaders looking to the future, and interested in helpful tools and monitoring frameworks.*
    - *Local / regional governments that commit to sustainable development should assess availability of local resources, expertise and opportunities, encouraging innovative bottom-up initiatives and investigating their socio-economic capital.*

2.3 Lessons learned through SUDA compilation process

The assessment of SUD processes in the cities can help to increase institutional awareness and be an important step for scaling up future commitments on sustainability. Coordination between different levels of government is needed for effective SUD plans, ensuring a national framework supports and enables action. This means alignment with national priorities and international frameworks such as the 2030 Agenda for Sustainable Development; Paris Agreement, Sendai Framework etc. A good example on where this is being implemented is in the Mexican cities (Xalapa, Campeche and La Paz) which relate their strategies to the SDGs.

In Lima, Metropolitan Units receive special attention when it comes to defining the authorities in charge of planning and implementing SUD, while in Xalapa and Asunción these are being created.

The lack of monitoring frameworks, clear targets and the use of indicators are weak points in many SUD Plans. These can be overcome by following an integrated and holistic approach.

- *SUDA recommendation for setting targets and indicators and establishing monitory frameworks:*
    - *It is useful to design and embed monitoring systems in municipal systems and structures, with clear procedures. This can help to facilitate continuity, even where local leadership changes due to elections.*
    - *A multi-sectoral approach is needed to address sustainability challenges, as they typically foster inequalities and social segregation, where not considered form a more holistic approach. For example, inefficiency of the transport system can increase the use of private vehicles and contribute to worsening air pollution, as well as social division. Local governments can prioritize actions that respond to several SUD challenges at once, by investing in a smart way, addressing several challenges and achieving multiple co-benefits.*

"In Abidjan, a peri-urban agriculture project may provide benefits in terms of green space conservation, risk reduction and flood control, food security, job creation, pollution reduction, environmental education, social cohesion, etc".

Child Projects can inform SUD Plans in the GPSC cities by creating synergies. In Brasilia for example, the project "Citinova" and the "Federal District Strategic Plan" informed each other during the development process, while in Johannesburg the project "Building a resilient and resource-efficient Johannesburg: Increased access to urban services and improved quality of life" influenced the strategic responses and the targeted interventions in SUD planning, aligning objectives on resource efficiency and community resilience. However, due to different timeframes, some local government representatives were not aware of the GPSC Child Projects, which is a lost opportunity to establish synergies.

Beyond the above mentioned role of local/regional governments in the global arena and their contribution to global commitments, which is highly relevant to scale up impact around the globe, strategic and sectoral commitments can help define a clear vison for the territory. For example, Johannesburg is committed to the "Net Zero Carbon Buildings Declaration", and several local governments have committed to the Global Covenant of Mayors for Climate & Energy (GCoM), including Abidjan, Brasilia, Dakar, Johannesburg, Lima, and Recife, to mention some. These initiatives support peer exchange and even offer technical assistance in some cases.

To become more sustainable in urban development, local/regional governments are recommended to explore the following:

- Coordinate with national and other subnational governments on issues related to SUD and SDGs;
- Adopt integrated, multi-sectoral approaches to address SUD form a holistic perspective;
- Foster education and awareness raising on sustainability, both for the public but also within government departments and institutions;

- Ensure transparency and make all commitments and plans available online, accessible to the public;
- Connect the Child Projects to the SUD Plan(s) to help integrate SUD principles, policies and plans in projects, exploring knowledge sharing and training opportunities;
- Strengthen institutional and legal frameworks related to SUD;
- Ensure the monitoring systems and structures are firmly embedded in the government approach, to ensure continuity between administrations, building on previous efforts regarding SUD and avoiding waste of governmental resources and progress made;
- Enable the role and engagement of citizens in planning by creating engagement mechanisms and opportunities, as well as participatory practices that can lead to collaborative governance;
- Promote opportunities and mobilize successful examples, such as citizens' bottom-up initiatives for sustainability.

2.4 Recommendations on localizing the SDGs

In 2015, 193 UN member states committed to implement the 2030 Agenda for Sustainable Development, with 17 SDGs as focus areas. Although national governments are the main responsible entities for translating SDGs into national policies, an integrated approach between all actors and sectors is required.

Localizing the SDGs is an approach increasingly used by many subnational governments. The OECD report "A Territorial Approach to the Sustainable Development Goals" stresses that "*at least 105 of the 169 SDGs targets will not be reached without proper engagement and coordination with local and regional governments*" (OECD, 2020). By conducting Voluntary Local Reviews (VLRs) local governments can also create partnerships with other stakeholders.

"Global action", "Local action" and "People action" are key areas for "Decade of Action" until 2030, according to the UN High Level Political Forum (UN, 2019). The 2030 Agenda monitoring framework allows measuring the cities sustainability performance, through 10 Targets and 15 Indicators of SDG11 "Make Cities and Human Settlements inclusive, safe, resilient and sustainable". Many SDGs are relevant to urban areas, as they are interconnected and interdependent. Although, not all targets and indicators can be implemented by local governments, these can nonetheless influence and reshape policies from bottom-up and facilitate vertical and horizontal coordination. Local governments can align their policies and strategies for sustainable development with the 2030 Agenda, by scaling down the SDGs Targets and Indicators that synergize with their local priorities.

The following influencing factors should be considered when localizing the SDGs:

- Recognize and address the territory's most critical sustainability challenges and opportunities, considering local and regional characteristics and vulnerabilities;
- Awareness about the importance of the local contributions to global commitments;

- The level of decentralization and associated jurisdictional competences and mandates on SDGs–sectors and themes – are these adequate to respond to local needs?;
- Political will and defined programs for action;
- Good governance and necessary measures to trigger diverse positive impacts;
- Available financial resources and in-house expertise required;
- Support required from national governments and international sources;
- An interconnected national and local monitoring framework to track targets and indicators (e.g. though national statistics buro);
- Explore increasing partnerships and collaboration with different actors (civil society, communities, academia, and businesses), attracting business investments and accessing funds for the SDGs.

3. Categorizing according to City Profile Information

3.1 Types of jurisdictions

The focus of the GPSC project is mainly on cities and their local governments, though one region and one state were included in the selected territories where SUDAs were compiled. The SUDA can be used to assess any subnational government's approach towards integrated planning and sustainability in strategies and plans within its territory.

According to ICLEI's jurisdiction type, (see Annex1) sixteen cities are defined as "municipality": Asuncion, Bhopal, Campeche, Guiyang, Guntur, Jaipur, La Paz, Lima, Mysore, Nanchang, Ningbo, Recife, Shenzhen, Shijiazhuan, Vijayawada, and Xalapa. Five cities (Abidjan, Beijing, Brasilia, Johannesburg and Tianjin) are defined as "special municipality"[7]; while the Greater Dakar Metropolis and Melaka State, are defined as "State/Region".

3.2 Geographical characteristics

Geographical location of the cities can impact SUD. The majority of GPSC cities, (Abidjan, Campeche, Greater Dakar Metropolis, La Paz, Lima, Melaka, Ningbo, Shenzhen, Recife, Tianjin), are located in coastal areas, which are more likely to be prone to climate-induced hazards such as sea level rise. While six cities are categorized as lowlands: Asuncion, Guyang, Guntur, Nanchang, Recife and Vijayawada, with the risk of flooding from nearby water sources, and, in case of Asuncion, Nanchang, Recife and Vijayawada from the rivers. The importance of knowing the geographic characteristics is related to the impact of climate change and vulnerability of the cities for extreme weather events, such as flooding, draughts, loss of land and displacement of people, coastal erosion as in the case of Abidjan, land slide in Xalapa, or La Paz remote location

[7]According to ICLEI's jurisdiction type, a special municipality refers to a local government with the authority and responsibilities of all administrative levels below the national government. These heightened administrative powers are usually given to large or significant cities within a country, often the capital city.

which increases dependency of fossil fuels for energy generation, etc. Furthermore, cities located in coastal zones incur additional costs associated with maintaining infrastructure due to the erosion activities.

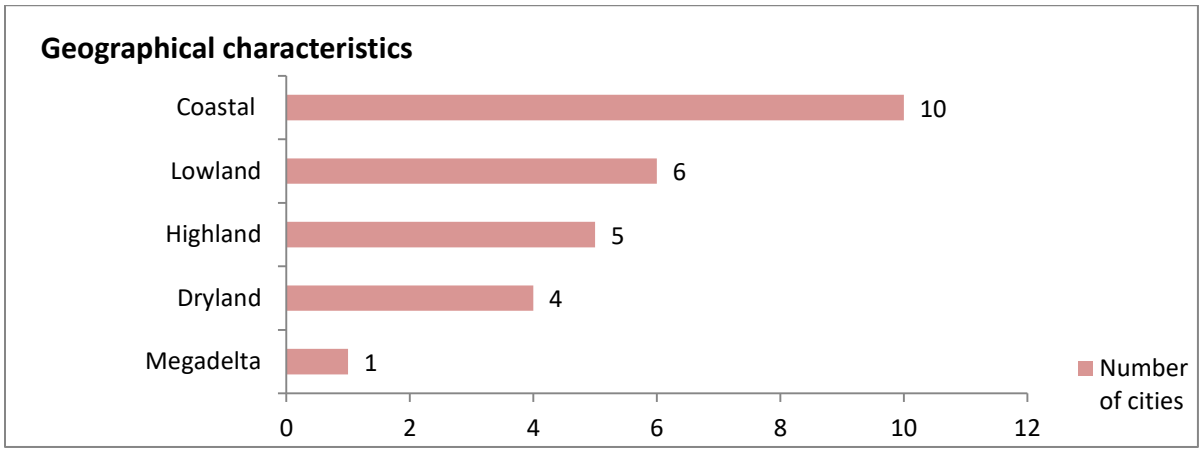

Figure 4:Geographical characteristics of the GPSC selected cities

3.3 Demographic developments

SUD is largely affected by demographic changes such as population growth which can contribute to problems related to uncontrolled urbanization and insufficiency of basic services.

The high rates of population growth identified, especially in India and Africa (over +2%),in Nanchang, China (annual,+ 8.27%) and Asuncion, Paraguay (+3%),show that these local governments need to deal with rapid urban growth. This impacts not only urban planning, but especially the delivery of necessary basic services to a constantly growing population – with many of the services not necessarily in the mandate of the local government.

Even though the population of the GPSC cities varies substantially, from the largest with 21.5 million inhabitants (Beijing) to the smallest with 283,025 inhabitants (Campeche),all these cities are experiencing annual population growth (from + 8.27/year Nanchang, to +0.19/year Tianjin). An overview by region is provided in Table 2 (Annex 2). Due to the difference in year of population measurement (i.e. Indian cities' data are from 2011, while Chinese cities from 2018/2019), no further analysis is made.

3.4 Governance

Leadership, good governance (administration and management) of the local government and territory are important in cases. When considering these in the context of climate change and sustainable urban development, the efficient organisation of the administration as well as planning, implementation and monitoring approaches are critical elements to make progress and be in a position to track and redirect, as needed.

At any level or tier of government, the duration of government term impacts the planning and implementation, especially of medium to long-term policies, including SUD. For example, the "Law for Planning of the State of Campeche" mandates that municipalities elaborate their Municipal Development Plan at the beginning of every municipal administration period. Furthermore, the local government level is dependent on national policies which establish the appropriate framework; ideally conducive to local implementation. These two aspects were not studied in great detail, but it was noticed that two cities, Bhopal and Melaka, have limited terms of two years, while the majority of cities have local election cycles between three to five years.

3.5 Economy

The economy can play an important role for SUD and be a strong asset especially when prioritizing the non-exploitation of natural resources and giving consideration to socio-economic development based on sustainable development principles.

The main economic activities of the GPSC cities can be categorized as follows: majority in the secondary sector "Industry and Manufacturing" and the tertiary sector "Services and Retail". The exception is the city of Guntur which has indicated the primary sector "Agriculture, Fishing, Mining", with specific reference to agriculture (production of cotton, chillies etc.) and fisheries.

Secondly, the majority of the cities are experiencing high inflation rates. This may have different implications on promoting SUD in these jurisdictions, for instance it can affect the affordability of loans that business or industry would use to invest in sustainable practices.

No further analyses addressing budgets and expenditures is available, due to the difference in information provided on municipal operational budgets, in terms of expenditures, formats, and conversion rates, etc.

4. Sustainability Profile

An overview of the cities' Master Plans, stand-alone SUD Plans, Sectoral Plans, Climate Action Plans and SDGs is displayed below in Table 1. The majority of the cities have SUD elements included in at least one of the analysed plans, though many plans expire in 2020 or 2021 (Campeche, Guiyang, La Paz, Nanchang, Melaka State, and the sectoral plans in many of the Chinese cities).

Table 1. SUD presence in city plans by plan type, identified through desk research and interviews

Colored boxes indicate plans with approaching expiration date

		City	Master Plan and sectors covered	SUD Plan and sectors covered	Sectoral Plan with SUD principles	Climate Action Plan (mitigation adaptation)	SDGs
Asia	China	Beijing		Beijing Urban Master Plan (2016-2035) Governance Population and Social Conditions; Economy; Culture and Recreation; Health and Safety; Education; Environment and Climate/Air Quality Agriculture and Food Security; Land Use Planning Transportation; Housing; Utilities (energy, water, telecommunication) Waste Management		Beijing 13th Five-Year Plan (FYP) on Energy Saving and Consumption Reduction, and Climate Change (2016-2020) Includes adaptation plan	Not explicitly mentioned
		Guiyang	13th five-year plan for national economic and social development 2016-2020 Society and Economy: Promoting technology-leading projects • Promoting optimization of platforms. • Promoting city park projects. • Promoting cultural programs. • Improving social governance. • Promoting cohesive	Guiyang National Ecological Civilization Demonstration Development Plan (2012-2020) Governance; Environment; Economy Circular development; Climate change mitigation; Utilities; Energy; Urban/Local Agriculture; Land use	13th FYPs (2016-2020) on: Agriculture Urban waste circular treatment; Transport; Ecology; Environmental conservation, Water; Energy	Guiyang 13th FYP for Controlling Greenhouse Gas Emissions 2017 covering both mitigation and adaptation plans	Not explicitly mentioned

			projects.				
		Nanchang	Greater Nanchang Metropolitan area (2019-2025) but there is no info how this plan and SUD plan are related. Sectors covered: Spatial planning and Transport	Nanchang 13th five-year plan for economic and social development (2016-2020) Governance; Social conditions Economy; Environment Urban/Local Agriculture; Land use planning; Transportation; Housing Waste Management	Ecology and green space Nanchang Land use planning (2006-2020) 13th FYP for ecology and environmental protection (2016-2020) 13th FYP for urban modern agriculture development (2016-2020)	Nanchang's Low Carbon City Action Plan was developed in 2011 No adaptation plan	Not explicitly mentioned
		Ningbo	Ningbo City Master Plan 2006-2020 Sectors Covered: • Population and social conditions. • Health and Safety. • Education. • Culture and recreation. • Land Use.	Ningbo 2049 Urban Development Strategy (2018-2049) Trade Culture, Ecology , Public services Transport Manufacturing Land use planning	13th 5 FYPs : Social development; Integrated Transport; Environmental protection; Modern Agriculture; Education Development; Hydropower development; Low city carbon plan; Local resilience action plan 2011	Ningbo Low-Carbon City Pilot Implementation Plan Ningbo Local Resilience Action Plan 2011	Not explicitly mentioned
		Shenzhen		Shenzhen Sustainable Development Plan (2017-2030) Innovation; Economic Development; Social Development; Environmental Protection	Governance, population and social conditions; Economy Culture and Recreation; Health and Safety; Education Env/climate/air quality; Land use; Transportation; Housing Utilities; Waste management	Shenzhen 13th Five-Year Plan on Climate Change, 2017 Both mitigation and adaptation plans	2030 Agenda for Sustainable Development

		Shijiazhuan	Shijiazhuang 13th Five Year Plan (FYP) for National Economy and Social Development (2016-2020) Social governance; Economy; Health Education; Energy; Water Infrastructure; Environment and Ecology; Air quality and climate; Waste management; Culture, sports, tourism; Agriculture; Telecommunication End poverty; Social security and social welfare; Public security		City community service system construction and development plan 2016-2020; 13th 5 FYPs 2016-2020: Health industry development; Transport; Energy/remission reduction; City plan for meteorological disaster prevention (2014-2020); Development plan of modern crop industry 14-2020 Shijiazhuang new smart city master plan 2019-2021	13th Five-Year Action Plan for Energy Saving and Emission Reduction (2016-2020). Adaptation plan City Plan for Meteorological Disaster Prevention (2014-2020).	Not explicitly mentioned
		Tianjin	Overarching Tianjin 13th five year plan FYP for economic and social development 2016-2020 Transportation Service economy	Tianjin leading urban development strategy (2013-2020)	13th FYPs (2016-2020): Governance, population and social conditions; Education Economy; Health and safety Environment/ Climate/ Air quality Land use; Transport Housing; Utilities	The 13th Five Year Plan (FYP) for Climate Change (2016-2020) Includes adaptation plan	Not explicitly mentioned
	India	Bhopal		Green and Blue Master Plan (2018-2036) Energy; Buildings; Waste; Water; Transport	Comprehensive Mobility Plan (CMP); Public Transport Master Plan. Bhopal City Development Plan 2005.		Not explicitly mentioned
		Jaipur	Master Development Plan 2025 for the Jaipur region(2009-2025)		Comprehensive Mobility Plan,		Not explicitly mentioned

			Health and Safety Education Environment and Climate/Air Quality Land Use Planning Transportation Utilities (energy, water, telecommunication) Waste Management		2010 City Development Plan		
		Guntur	Draft detailed perspective Plan of Andhra Pradesh Capital Region Development Authority (APCRDA) (2015-2050) Governance, Population, and Social Conditions; Economy; Culture and Recreation; Health and Safety; Education; Environment/Climate/Air Quality; Urban/Local Agriculture and Food Security; Land Use Planning Transportation Housing; Utilities (energy, water, telecommunication); Waste Management		Proposed Land Use Map 2021; Detailed Project Report for Augmentation of Water Supply System in Guntur Municipal Corporation Waste to Energy project with a Solid Waste management plant		Not explicitly mentioned
		Mysore			Revised Master Plan 2031; Comprehensive Traffic and Transportation Plan 2008; Detailed Project Report on Non-Motorized Transit infrastructure and Intelligent Transport System Solar City Master Plan of Mysore 2012; Climate Risk Assessment 2014; Environment /Climate/Air Quality; Land Use Planning; Transportation; Utilities (energy, water,		Not explicitly mentioned

					telecommunication); Waste Management		
		Vijayawada	Draft Detailed Perspective Plan 2050 for Andhra Pradesh Capital Region Development Authority (APCRDA) 2015-2050) Governance, Population, and Social Conditions; Economy; Culture and Recreation; Health and Safety; Education; Environment /Climate/Air Quality; Urban/Local Agriculture and Food Security; Land Use Planning; Transportation; Housing; Utilities (energy, water, telecommunication); Waste Management		Proposed Land use Map 2021 and the Solar City Master Plan Land use Transport Utilities		Not explicitly mentioned
	Malaysia	Melaka State	Melaka Green City Action Plan (GCAP), 2014-2020) Governance, Population, and Social Conditions; Economy; Culture and Recreation; Health and Safety; Environment/Climate/Air		Melaka State Climate Action Plan 2020 -2030 Conservation Management Plan for the Historic City Of Melaka	The Melaka State Climate Action Plan (MSCAP) 2020-2030	Not explicitly mentioned

			Quality; Urban/Local Agriculture and Food Security Land Use Planning; Transportation; Utilities (energy, water): Waste Management				
Africa	South Africa	Johannesburg		Environmental Sustainability Strategy and Action Plan (2019-2040) Rapid urbanization; Integrated waste management; Energy; Air quality and Greenhouse Gas emissions; Infrastructure and services; Water quality and water scarcity; Biodiversity and conservation; Risk reduction; Circular economy; Governance; Awareness raising		Climate action plan 2015 Climate change adaptation plan 2009	SDG 11
	Cote d'Ivoire	Autonomous District of Abidjan	Greater Abidjan Master Plan (2016-2030) Land Use and Growth; Housing; Urban Planning; Transportation; Social Infrastructure Business; Industry; Open spaces/Landscapes; Utilities; Tourism; Environment; Sustainable Development (mainstreaming SUD - developing standards and evaluations mechanisms for new buildings and new development)		All sectorial plans are included in Greater Abidjan Master Plan		Not explicitly mentioned

	Senegal	Greater Dakar Metropolis		Urban Master Plan for Dakar and Neighboring Area for (2020-2035) Economic development (including agriculture); Logistical infrastructure; Water resources; Wastewater management and sanitation; Urban transportation; Solid waste management; Electricity and renewable energy; Risk reduction; Environment; Land use plan		Local Climate and Energy Plan 2017	Not explicitly mentioned
Latin America	Brazil	Brasilia	Brasilia Federal District Strategic Plan (2019-2060) Health; Safety; Education; Economic Development; Social Development; Territorial Development; Environment				17 SDGs
		Recife		Recife 500 strategy (2019-2037) Social Development; Economic Development; Culture Heritage; Health; Education; Environment; Utilities; Waste Management; Housing; Urban/Local Agriculture and Food Security; Land Use Planning; Mobility	Education; Waste Management; Utilities; Climate Change Mitigation and Greenhouse Gas Emissions Reduction Plan; Housing, Environment	Climate Action Plan 2019 Climate adaptation plan 2016	Not explicitly mentioned
	Paragu	Asunci on		Municipality of Asunción - Asunción 2030 Sustainable Development Plan (2016-2030)			Not explicitly mentioned

				Governance, Population, and Social Conditions Economy Culture and Recreation Health and Safety Education Environment and Climate/Air Quality Land Use Planning Transportation Housing Utilities (energy, water, telecommunication) Waste Management			
	Mexico	Campeche	Municipal Plan of Development of Champeche (2018-2021) Governance, Population, and Social Conditions; Economy; Culture and Recreation Health and Safety; Education; Environment and Climate/Air Quality; Land Use Planning Transportation; Housing; Utilities (energy, water, telecommunication); Waste Management				Inclusive citizens (SDG 1, 2, 3, 4, 5, 10, 11, 16, 17); Economicy (SDG 2, 5, 8, 9, 11, 12, 16, 17); Infrastructure (SDG 6, 7, 9, 11, 13, 15); Safety (SDG 5, 11, 13, 16); Transparency/Innovation (SDG 16, 17)
		Xalapa	Xalapa Development Plan (2018-2021) Governance, Population, and Social Conditions Economy; Culture and Recreation; Health and Safety Education Environment and Climate/Air Quality; Land Use Planning Transportation Housing; Utilities (energy, water, telecommunication);		Ecology Territorial Ecological Planning Program of the Capital Region of Xalapa, 2018		Inequality(SDG1,2)Environment (SDG 6, 13); Open government (SDG16); Security (SDG11,16); Economy (SDG 12); Human rights (SDGs 1, 6, 11, 12, 13); Participation (SDG 16); Gender equality (SDG 5, 13, 16)

			Waste Management				
		La Paz	Municipal Plan of Development of La Paz (2018-2021) Governance, Population, and Social Conditions; Economy; Culture and Recreation; Health and Safety; Education Environment and Climate/Air Quality; Land Use Planning; Transportation; Housing; Utilities (energy, water, telecommunication); Waste Management			Climate action plan (2013) Mitigation/Adaptation (not available online)	SDG 1,5,11,12,15,16
	Peru	Lima	Lima's Development Plan (2012-2025) Governance, Population, and Social Conditions Economy; Culture and Recreation Health and Safety; Education Environment Climate/Air Quality: Land Use Planning: Transportation Housing; Utilities (energy, water, telecommunication) Waste Management		Mobility, Waste management Climate Action Noise pollution Green areas (no documents online)	Climate Action Plan 2014 Climate change adaptation plan 2014 In one document vision till 2025 and targets till 2019	Not explicitly mentioned

4.1 Challenges for sustainable urban development

Local governments are facing many problems related not only to critical sustainability issues, but also to the efficacy of management and administration systems. Detailed information of challenges in all cities is displayed in Table 3, Annex 2.

The main institutional challenges for sustainable urban development identified in the 23 GPSC cities through the SUDA process are:

- Ineffective governance (21 cities indicated poor governance as one of the main challenges impeding SUD in their jurisdiction);
- Lack of political will to focus on sustainability;
- Limited political power or mandate needed to efficiently address sustainable development issues;
- Limited expertise and administrative resources;
- Poor coordination and communication between departments;
- Lack of awareness for sustainability challenges;
- Poor communication with public and other actors, e.g. civil society.

The main critical sustainability issues identified are:

- Rapid urbanization/population growth, informal settlements, overloaded infrastructure, public health (in 23 cities);
- Extreme weather vulnerability;
- Waste management;
- GHG emissions and air pollution;
- Inefficient use of natural resources (i.e. water and land use, in 20 cities);
- Transport, traffic management;
- Uneven development.

Specific challenges depend on the context of the respective cities and regions, and have been further analysed and displayed in Figures 5-8, Annex 3. Latin American cities are characterized by unplanned expansion, inappropriate land use etc., which generate environmental and social problems and service deficiencies (water supply, waste water, and waste collection) for informal settlements. This leads to open air dumps or leakages of waste leachates affecting the natural environment. Location on sensitive zones on most of the cities increases their vulnerability to disasters, especially in the absence of adaptation/resilience plans. Other issues are waste management, low institutional and technical capacities (i.e. to collect revenues), lack of funding etc.

La Paz: "*Scarcity of natural resources, e.g. water resources, lead to the exploitation of the aquifer resulting in longer term contamination of water through salt water intrusion as the aquifer is close to the sea. This is also reflected in local government's pressure, i.e. high expenses to provide water services but little money collected from users*".

Cities in the PRC, apart from facing environmental problems,(the industrial development largely depends on heavy chemicals industries, and energy generation relies heavily on fossil fuels)also addressed "brain-drain" and inability to attract young people to the administration.

Guiyang: The city is not a lively and attractive place for the young talents and fresh graduates.

ln lndia, Vijayawada, the lack of digitalization processes reduces efficiency of public services, e.g. no efficiency in tax collection. In Guntur, traffic congestion is aggravated by street vendors blocking streets and people's non-compliance with traffic rules. Slums and informal settlements also require special programs for rehabilitation. In Jaipur, there is no stable electricity, with an impact not only on people but also the economy.

This is also the case in Greater Dakar Metropolis, Africa. Cities in Africa are mostly characterized by uneven development.

4.2 Training and capacity building assessment

Through the SUDA, topics of interest were also identified for further training and capacity building, mostly collected through the interviews conducted with representatives of the local governments. Analyses show the correlation between city challenges and identified training needs, displayed in Table 3, Annex 2. Furthermore, detailed analyses cluster the main challenges according to the regions in Figures 9-12, Annex 4.

All three GPSC cities in Africa identified GHG emissions, air pollution and waste management as main topics of interest for training. In Latin America, knowledge exchange needs were related to waste management (Asuncion, Brasilia, Campeche, La Paz and Lima), water management (Asuncion, Brasilia, Campeche and Lima), and funds management with opportunities to access climate finance (Brasilia, Campeche, La Paz and Recife). In India and Malaysia, training needs focused on waste management (Guntur, Melaka, Mysore and Vijayawada), while SUD issues and approaches for political and technical staff were of interest to Bhopal, Guntur, Mysore and Vijayawada. In addition, interviewees from the Indian cities expressed an interest on curbing GHG emissions in city centres, especially as it relates to air pollution and public health.

For the Chinese cities only two interviews were conducted, so a more limited scope has been identified on training needs. The city of Ningbo expressed an interest in training on building efficiency and biodiversity. Transport and traffic management was among the topics identified by most of the cities.

Finally, from different SUDAs it is clear that city representatives find a global platform to facilitate peer exchanges and trainings for cities with similar challenges useful, also enabling them to learn about and from each other as they in part face similar challenges, and where knowledge exchange and effective solutions can be discussed with peers. The Resource Team

has offered training and exchange opportunities throughout the Global Project implementation, and these results also inform the GEF7 funded SCIP Global Offer.

Furthermore, the library of knowledge on the GPSC official website offers cities the opportunity to access material on different topics, i.e., solid waste management, greening cities, integrated urban planning, municipal finance and PPP and climate change.

4.3 Success stories

Four GPSC cities (Brasilia, Recife, Greater Dakar Metropolis, and the Autonomous District of Abidjan) expressed an interest in sharing their successful or challenging experiences with others. To enable peer exchange and learning through the Platform, presentations during webinars and at events were organised and some case studies were compiled. Some successful projects identified through the SUDAs, include:

i. Recife: Maratona Verde do Recife, an afforestation project, aimed at planting10,000 trees working with citizens, schools and clubs. This effort gained huge media attention, as Recife is a dense city in need of more green areas. Furthermore, citizen engagement and public participation has allowed the local government in Recife to gather new knowledge and secure acceptance by communities for the SUD strategy. It overcame limitations in technical knowledge and capacity by cooperating with the private organization "Porto Digital Management Center for Recife 500" and the academic institution Federal University of Pernambuco for the Capibaribe Park project. More information about this project can be found at the following link:https://tap-potential.org/projects/capibaribe-park/.

ii. Greater Dakar Metropolis: GEF Child Project "Improving planning and implementing capacities with sustainable practices" implemented by the World Bank, prepared SUD action plans and detailed master plans in two cities, Diamniadio and Saint Louis, by focusing on resilience to climate change, implementing priority projects, building partnerships on SUD and strengthening the national policy framework. Under this project, a partnership was created with the University of Cheikh Anta Diop and the University in Saint-Louis to include SUD in the existing curricula. New Master's degrees with a focus on sustainability and resilience were established with the purpose to train experts on SUD planning processes.

iii. Guiyang, in 2002, proposed to build an eco-economic city by accelerating the transition to a circular economy. The city became a circular economy pilot city appointed by the United Nations Environment Programme (UNEP). More information about this project can be found at the following link:http://www.unep.fr/shared/publications/pdf/DTIx0919xPA-circulareconomyEN.pdf.

iv. Abidjan: The GEF Child Project "Abidjan Integrated Sustainable Urban Planning and Management" and the Greater Abidjan Urban Master Plan (SDUGA) was developed with the support of the Japanese International Cooperation Agency (JICA). These were prepared approximately at the same time, and synergized their objectives. The local

government proposed to share experiences in Waste Management and Environmental Education Initiatives with other cities.

v. Brasilia: The local government's approach to access finance for its low-emission andclimate resilient projectwas developed as a case study "Successful Local Government Fundraising and Project Pitching"and shared through a webinar hosted by ICLEI. More information about the webinar can be found at the following link: https://www.thegpsc.org/events/webinar-17-successful-fundraising-and-project-pitching.

vi. Xalapa: good examples of participatory councils on transport, water management, rural development and high human capital. The city would like to highlight their participatory councils on: mobility, water management, rural development, and high human capital (large share of very educated population).

vii. Lima: "Children Council" an innovative project that aimed at looking at the city through the eyes of children, in order to apply the children's vision for solutions to various challenges (waste management, biodiesel projects, etc.).

5. References and data availability

References:

ESPAS, 2019. Global Trends to 2030: The future of urbanization and Megacities. https://espas.secure.europarl.europa.eu/orbis/document/global-trends-2030-future-urbanization-and-megacities-0

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Data availability:

Based on the experience of ICLEI team compiling the SUDA desk research, most data can be extracted from the following sources, though not all information is up to date:

- Municipal/ subnational/national website
- Statistical offices (national/subnational)
- City data (where they exists)
- Most updated/recent city plans

- Implementing Agency (IA)
- International websites and data bases of international agencies, working with cities in different projects (World Bank, UN organizations etc.)

6. Annexes

See overleaf

Annex 1: ICLEI's Jurisdiction Typology

ICLEI global database documentation: Organization types & sub-types

In the local and regional database, organizations are classified per organization type and organization sub-types. This categorization refers to the level of government in relation to the rest of the levels of government in the country. This field is critical to understand administrative hierarchies and sub ordinance structures internal to a country or a territory and to understand the relationship of a specific local or subnational government to the other local and subnational governments in the same country, as well as its relationship to and administrative distance from the respective national government.

- **Municipality**
  The most common form of local government, and is responsible for administering areas often referred to as cities or towns.
- **Province / County**
  Middle level administrative subdivision of a country.
- **State / Region Special municipality / Federal district**
  Local government with the authority and responsibilities of all administrative levels below the national government. These heightened administrative powers are usually given to large or significant cities within a country, very often the capital city.
- **Sub-municipal district**
  Further administrative subdivision of a Municipality or Special city / Federal district. They are occasionally present in very large cities, and are responsible for many of the tasks assigned to municipalities in other parts of the country.
- **Inter-communality**
  Inter-municipal administrative level for a cluster of municipalities in one geographic area. This form of government is responsible for many local issues of infrastructure and maintenance, and is common in Francophone territories. They can be confused with the LG associations (subnational). The big difference is that inter-communalities elect someone as head.
- **Independent municipality**
  Local government with the authority and responsibilities of both a municipality as well as the next higher administrative level in the respective country. Exists in parallel to both municipalities and the next higher administrative level. We use the word independent when two bodies merge into a single one with both responsibilities and duties.
- **Independent province**
  Province / County and at least one higher administrative level in the respective country. We use the word independent when two bodies merge into a single one with both responsibilities and duties.
- **Independent inter-communality**

  An Inter-communality which also has the authority and responsibilities equivalent to at least one higher administrative level in the respective country Exists in parallel to both other inter-communalities and the next higher administrative level. We use the word independent when two bodies merge into a single one with both responsibilities and duties.
- **Sovereign city-state**
  "State / Region" Top level administrative subdivision of a country.
- **Constituent country**
  A country which is part of a larger country. Constituent countries may have a high level of autonomy, but in international relations and law, are represented by the larger country to which they belong.

Annex 2: Tables with key data from SUDAs

Table 2. Population size and surface area

Regions	Countries	Cities	Inhabitants	Year of measurement	Average Annual Population Change Rate	Surface area (km^2)
Asia	China	Beijing	21,542,000	2018	(+) 0.35	16,410.54
		Guiyang	4,881,900	2018	(+) 0.68	8,043.37
		Nanchang	5,545,500	2018	(+) 8.27	7,194.61
		Ningbo	6.085,00	2019	(+) 0.26	9,816.00
		Shenzhen	13,026,600	2018	(+) 0.64	1,997.47
		Shijiazhuang	11,031,200	2019	(+) 2.20	13,504.00
		Tianjin	15,596,000	2017	(+) 0.19	11,966.5
	India	Bhopal	1,798,218	2011	(+) 2.53	285.88
		Jaipur	3,073,000	2011	(+) 2.56	467
		Guntur	647,508	2011	(+) 2.86	159.46
		Mysore	920,55	2011	(+) 2.11	128.00
		Vijayawada	1,048,240	2011	(+) 2.31	61.88
	Malaysia	Melaka State	930.000	2019	(+) 0.90	1,720.00
Africa	South Africa	Johannesburg	4,949,347	2016	(+) 2.49	1,645.00
	Cote d'Ivoire	Autonomous District of Abidjan	4,707,404	2014	(+) 2.67	2,119.00
	Senegal	Greater Dakar Metropolis	3,732,284	2019	(+) 3.42	547.00
Latin America	Brazil	Brasilia	2,974,703	2018	(+) 2.19	5,779.00
		Recife	1,645,727	2019	(+) 0.78	218.435
	Paraguay	Asuncion	3,000,000	2016	(+) 3.00	809.00
	Mexico	Campeche	283,025	2015	(+) 1.80	3,410.64
		Xalapa	457,928	2010	(+) 1.03	124.4
		La Paz	305,454	2017	(+) 2.80	20,274.98
	Peru	Lima	8,574,974	2017	(+) 1.20	2,812.00

Table 3.Main challenges and training needs identified with correlations

- Red arrows: indicate full correlation between challenges and training needs
- Blue arrows: partial correlation
- Gray arrow: no correlation

Region	Country	City	Challenges	Training needs
Asia	China	Beijing	1. In-migration (no actions to manage this phenomenon) 2. Water-use and land-use efficiency 3. Air quality 4. Traffic management (and environmental and social consequences of current measures) 5. Uneven development (high economic and social development – low resource efficiency)	✓ Peer exchange opportunity on measures to reduce energy consumption in service industries ✓ Transport and building efficiency ✓ How to implement Chinese National Carbon Treaty (2017) at the city level. Since 2013 (even before the national treaty rolled out), Beijing has been chosen as a pilot city for realizing the goals of the national treaty and the associated scheme
		Guiyang	1. Low community resilience to disasters 2. Air pollution 3. Discrepancy between the financial input and outcomes in terms of SUD 4. High energy consumption 5. Low attraction for young talents with negative impact on the community's ability to innovate	✓ Participation in GPSC events such as 3rd GPSC Global Meeting
		Nanchang	1. Economic challenges (business shutdown, unemployment, lack of investment) 2. Decreasing citizens' trust in government 3. Environmental degradation and food security 4. Natural hazards 5. Public health and safety (accidents related to transportation and infrastructure, disease outbreaks) 6. Governance for SUD (Sectoral coordination; ambiguous goals in relevant plans; lack of defined actions and measures to achieve those goals; competing planning documents; and lack of enough/effective measures to mainstream sustainability in city's planning processes)	• No training needs as no interview were conducted
		Ningbo	1. Industrial development on heavy chemicals, fossil fuels 2. Underdeveloped service industry 3. Lack of biodiversity and resilience considerations in urban planning 4. Information sharing and communication among and between departments 5. Ill-considered and unscientific decision-making 6. The revenue difference between the traditional and emerging industries widens the income gaps 7. Construction of sewage treatment facilities in rural areas lags behind the rapid urbanization	✓ Building efficiency and biodiversity

			8. Increasing floating (migrant) and elderly population 9. Lack of awareness and consideration of climate change in policy-making	
		Shenzhen	1. High consumption of natural resources and low resource efficiency 2. Urban expansion and low land use efficiency 3. Waste management (high rates of solid waste – low capacity of current waste treatment plants, etc.) 4. Water management (low water-use efficiency and hi rate of water consumption) 5. Population growth and migration (increasing migrants population and excessive pressure on urban infrastructures)	✓ Peer-exchange opportunity to share experience with other cities about sustainable transport ✓ Low emission developments as Shenzhen is updating the City's low carbon city masterplan
		Shijiazhuang	6. Serious environmental issues: water scarcity; poor air quality; severe natural resources pollution, and low disaster resilience 7. Issues of livelihood 1. Weak local economic system 2. Brain drain 3. Public awareness for engaging in sustainability planning processes, measures, and implementation at the local level	• No training needs as no interview were conducted
		Tianjin	1. Low community resilience to sudden shocks and stresses (natural hazards, disease outbreaks, etc.) 2. Weak economic resilience 3. Environmental degradation and pollution of natural resources 4. Slow development of public services and grass-roots social governance 5. Insufficient development of innovation capabilities and social civilization (which also results in brain drain)	• No training needs as no interview were conducted
	India	Bhopal	1. Frequent changes in governance hamper development programs 2. Public transport system: management, fuels, technology 3. Financial resources for development 4. Dependence on government grants 5. Holistic and integrated development planning 6. Enforcement of environmental rules and regulations effect quality of life and well-being 7. Climate change; Education; Land use; Energy; Waste	✓ Sustainable infrastructure ✓ Project planning and management ✓ Financing
		Jaipur	1. Traffic congestion, Air Pollution 2. Domestic waste water treatment management 3. Electricity supply 4. Solid Waste Management (dumping waste in open areas, causing environmental problems and degradation of quality of life) 5. Community awareness and education for clean green and livable city 6. Finance for development programs 7. Floating and rising population, water management 8. City heat strokes, extreme weather	✓ Sustainable mobility planning to offload emission ✓ Integrated urban water management
		Guntur	1. Old open drainage system covering only 22% of the city area /health problems, drinking water contamination 1. Traffic congestion, street vendors, road users do not follow traffic rules 2. Sustainable revenue generation and investments for sustainability 3. Creation of jobs: capitalize on agro-based industries and markets of livelihood for citizens 4. Re-development of slum areas and creation of new social housing schemes to improve the well-being	✓ Sustainable urban development ✓ Waste management ✓ Renewable energy, etc.

		Mysore	1. Administrative and political power for SUD, no specific plans, policies for sustainability and climate considerations in the city's urban services 2. Knowledge and trainings for high-level city officials for better understanding SUD 3. Inadequate funding from state and central governments for sustainable urban development 4. Awareness among general public, for sustainable development 5. Inefficiency of the city government. City staff is under qualified and lack effective communication and coordination skills (officials hired without due process/illegal means i.e. through bribery and corruption)	✓ E-governance and IT infrastructure, still manual services ✓ Innovative financing models and how to build bankable projects for fund raising ✓ Waste management, waste compost and waste to energy ✓ Information about initiatives to encourage residents to reduce and reuse waste
		Vijayawada	1. Economic, financial, job creation, attracting investments to kick-start green development 2. Lack of affordable housing provision 3. Natural and environmental preservation (agriculture of 3 crops is already damaged, land partly (50%) available to the government for public roads, space, and partly (50%) as returnable lands to the initial land contributors (farmers) 4. Traffic congestion: dense population, no option for city expansion due to geographical constraints: between Krishna river and hillocks 5. Natural hazards (like flooding, earthquake, etc.) 6. Solid waste management plan 7. Illegal construction of settlements around the railway tracks 8. Water pollution of the Krishna river from different sources (waste, mining, etc.) due to lack of controls/curbs of waste dumping in the river. Mining areas in the outskirts,/air pollution, Krishna River pollution	✓ Database system for ULBs is much required ✓ Skill development and database management trainings should be made mandatory and regular, for officials ✓ Water ✓ Solid Waste Management ✓ Renewable Energy, ✓ GHG Emissions ✓ Efficient transport systems.
	Malaysia	Melaka State	1. Waste management: source segregation, waste collection, landfill capacities, associated land and water pollution, lack of capacity to implement new technologies, public awareness and social behavior 2. Poor public transportation system and high dependency on private cars 3. Land use planning, land development, and coastal development: growing peril-urban areas, concentration of low-income residents in hazard-prone peripheries of urban areas, loss of arable lands and forests 4. Water management: water scarcity, urban flooding (both coastal, rainfall flooding) 5. Buildings' energy efficiency: high energy demand, energy by none-renewable sources	✓ Technical assistance and access to financing for the implementation of sustainable infrastructure based on green technologies (City is planning to have an incinerator and is interested in learning from other cities' experiences together with successful waste management approaches that other cities have implemented) ✓ Climate change adaptation measures with a focus on flooding (from policy perspective at the local level)

Africa	**South Africa**	Johannesburg	1. Rapid urbanization (pressure on infrastructure and services) 2. Greenhouse gas emissions 3. Water quality 4. Scarcity of water 5. Solid waste management (pollution-land, water, air)	✓ Political support for innovations in water and waste management ✓ Sustainability thinking to TOD planning ✓ Design eco-districts and green buildings standards in developing countries ✓ Rapid urbanization (pressure on infrastructure and services) ✓ Greenhouse gas emissions ✓ Water quality ✓ Scarcity of water ✓ Solid waste management (pollution-land, water, air)
	Cote d'Ivoire	Autonomous District of Abidjan	1. Rapid urbanization, pressure on infrastructure and services 2. Climate change, extreme weather events, flooding, sea level rise 3. Coastal erosion 4. Waste management, solid/liquid 5. GHG emissions and air pollution/health risk 6. Political will for local actions on SUD 7. Mechanisms for citizen engagement in local policies 8. Financial resources for SUD 9. Capacity building of local government staff for SUD 10. Legislation and local plans for SUD policies	✓ Rapid urbanization, pressure on infrastructure and services ✓ Climate change, extreme weather events, flooding, sea level rise ✓ Coastal erosion ✓ Waste management, solid/liquid ✓ GHG emissions and air pollution/health risk ✓ Political will for local actions on SUD ✓ Mechanisms for citizen engagement in local policies ✓ Financial resources for SUD ✓ Capacity building of local government staff for SUD ✓ Legislation and local plans for SUD policies
	Senegal	Greater Dakar Metropolis	1. Air pollution from traffic/respiratory cases 2. Environmental degradation, loss of green spaces, agricultural land and wetlands, coastal erosion, decline of land and sea resources, with negative impacts on the agriculture, fishing, industry and tourism sectors and living conditions of population 3. Unbalanced regional development: concentration of activities at the historical center of Dakar which creates extra pressure on urban infrastructure - uncontrolled growth and settlement in risk-prone (mainly flooding) peril-urban areas 4. Inefficient mobility: public transportation, infrastructural failures (ports, railways and roads) 5. Waste management: domestic, construction waste (air, land, water pollution, health risks) 6. Energy: the instability of electricity supply, high cost no actions toward renewables Climate change, foreseen extreme weather events floods 7. Low quality of life, low resilience to climate change and natural hazards, and poor sanitation infrastructure	✓ Urban mobility ✓ Clean energy and decreased dependence on fossil fuels ✓ Innovations in sanitation system

Latin America	**Brasil**	Brasilia	1. Water resource management (serious droughts, etc.) 2. Land grabbing and informal settlement 3. Waste management (the largest waste dump in South America, lack of separated collection at source) 4. Governance challenges, political power of Environment Department 5. Deforestation and loss of biodiversity	✓ Waste management ✓ Water management ✓ Finance for sustainable development ✓
		Recife	1. Inefficient drainage system/ extreme events such as flash-flooding, heavy rains and sea-level rise 2. Waste management and wastewater treatment 3. Housing accessibility and occupation (both formal and informal settlements) along the rivers and coastal areas prone to flooding 4. Unequal territorial distribution of urban infrastructure, services, and activities 5. Inadequate infrastructure for public transportation and sustainable modes of transport	✓ Financing partnerships with the private sector ✓ Sustainable procurement
	Paraguay	Asuncion	1. Unplanned, informal urban growth 2. Traffic congestion and GHG emissions 3. Integrated waste management system 4. Flooding by location /Paraguay River 5. Economic, human, logistic resources in the administration	✓ Integrated waste and wastewater management ✓ Water resources management
	Mexico	Campeche	1. Capacities for efficient waste and water management 2.Unplanned and informal growth 2. Vulnerability to extreme meteorological events, coastal location, flooding 3. Transport system management 4. Capacity in municipal administration 5. Water supply and sewage systems, city low-density	✓ Waste management ✓ Sewerage systems ✓ Environmental management ✓ Fund management
		Xalapa	1. Inefficient waste management capacity, polluting water bodies 2. Inefficient water management for entire municipality 3. Inefficient mobility systems due to low technical capacities and lack of funding 4. Low institutional capacities especially to handle land use tenure 5. Undiversified economy causing a high rate of unemployment 6. Population growth, mobility, unplanned urban sprawl, social segregation, Coordination among different levels of government	✓ Diversification of their economic activities in a sustainable way ✓ Technical capacities for decision-making processes on sustainable mobility
		La Paz	1. Water scarcity 2. Geographic location 3. Lack of capacity for waste management 4. Unplanned and informal urban growth 5. Unsustainable municipal administration finances	✓ Waste management ✓ Sustainable mobility ✓ Resilience ✓ Public funds management
	Peru	Lima	1. Population growth, pressure on public services for water supply and sewage systems 2. Scarcity of water sources 3. Informal occupations located in vulnerable areas 4. High deficit of housing. 5. Social inequality: the populations living in periphery zones, big social gaps in poverty, human development etc.	✓ Project formulation, planning and controlling ✓ Waste management ✓ Decision-making based on indicators ✓ Nature-based solutions ✓ Water treatment ✓ Environmental legislation ✓ Eco-efficiency management hydric resources ✓ Methodologies for the evaluation of climate vulnerability and risks

Annex 3: Figures displaying main challenges identified in:
Latin America, the PRC, India and Malaysia, Africa

Figure5: Main challenges identified in Cities in Latin America:
Brasilia, Recife, Xalapa, Campeche La Paz, Asuncion and Lima

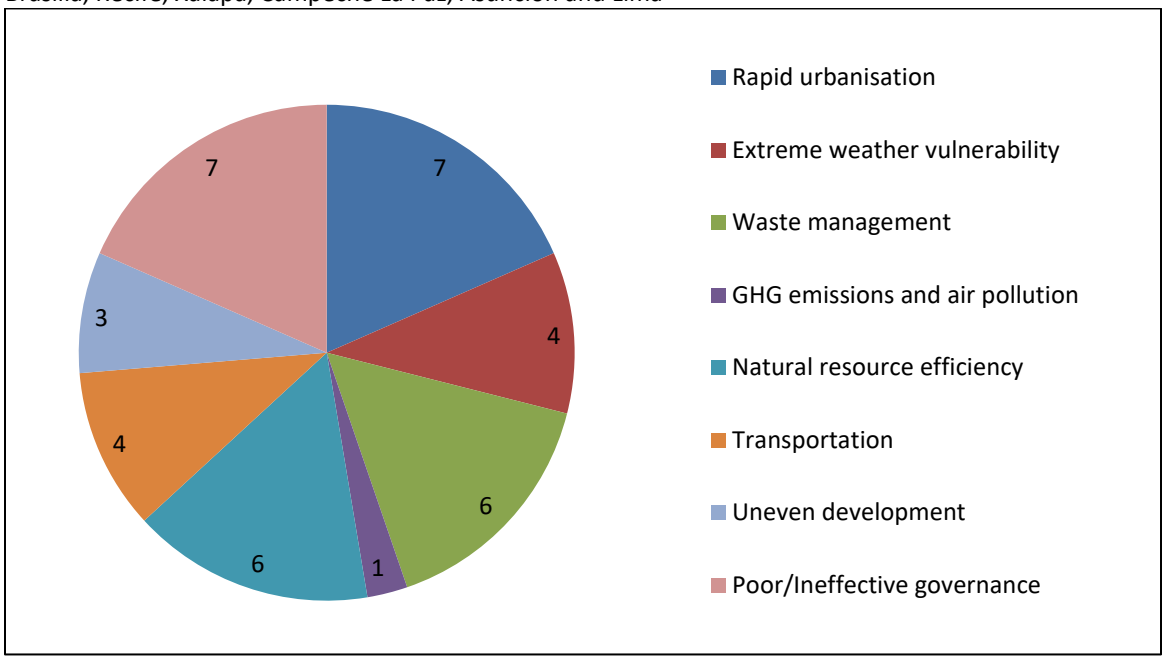


Figure6: Main challenges identified in Chinese cities:
Beijing, Shenzhen, Shijiazhuang, Tianjin, Guiyang, Nanchang and Ningbo

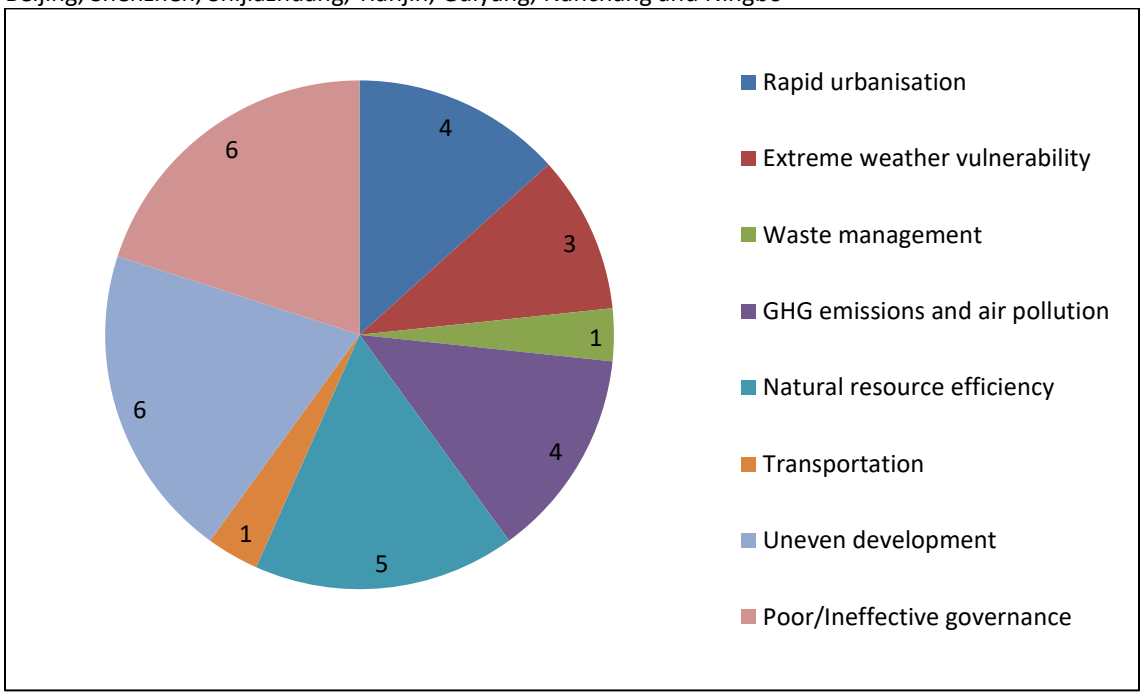


Figure7: Main challenges identified in Cities in India:
Guntur, Jaipur, Bhopal, Vijayawada, Mysore, and Melaka State in Malaysia

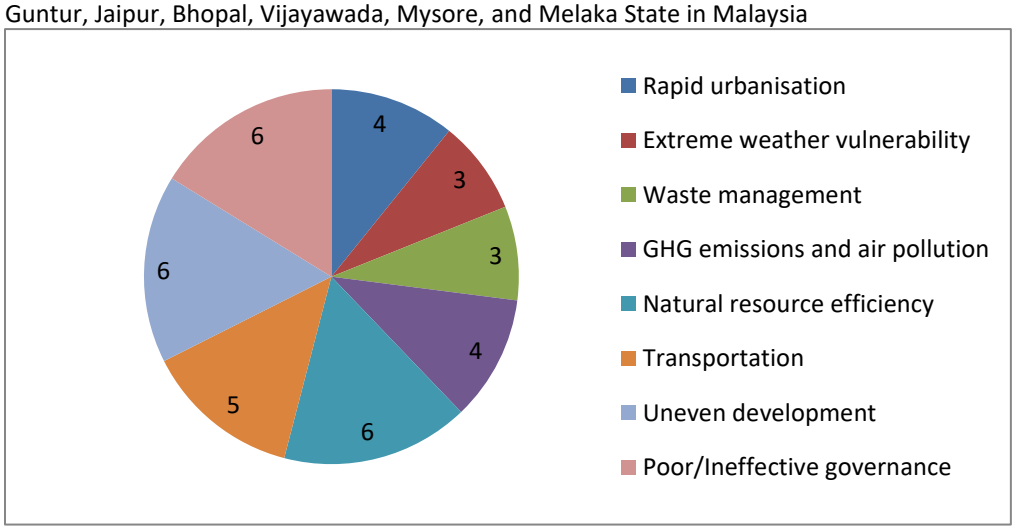
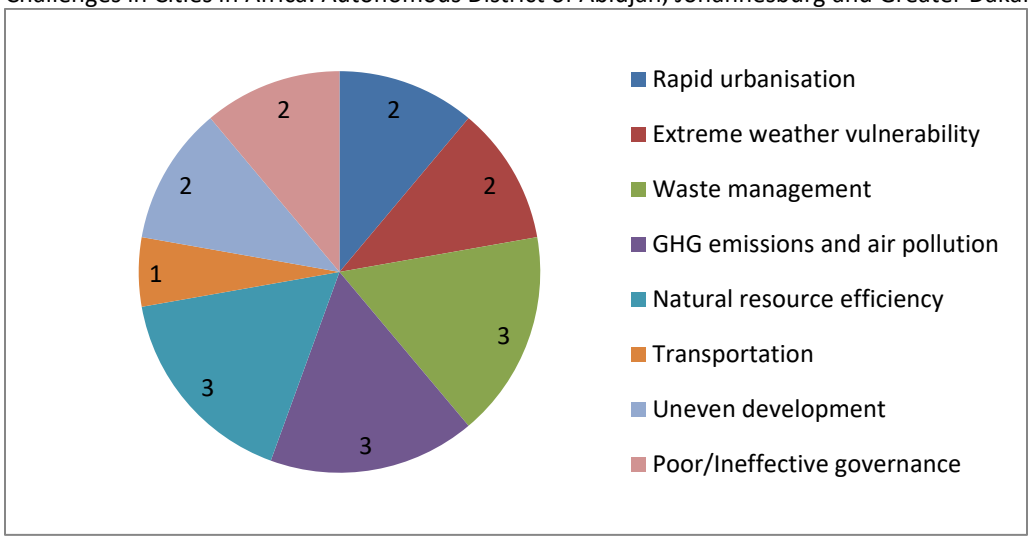


Figure 8:
Challenges in Cities in Africa: Autonomous District of Abidjan, Johannesburg and Greater Dakar Metropolis



Annex 4: Graphs on identified training needs in Africa, Latin America, India and Malaysia, and the PRC

Figure 9. Training needs in Cities in Africa:
Autonomous District of Abidjan, Johannesburg and Greater Dakar Metropolis

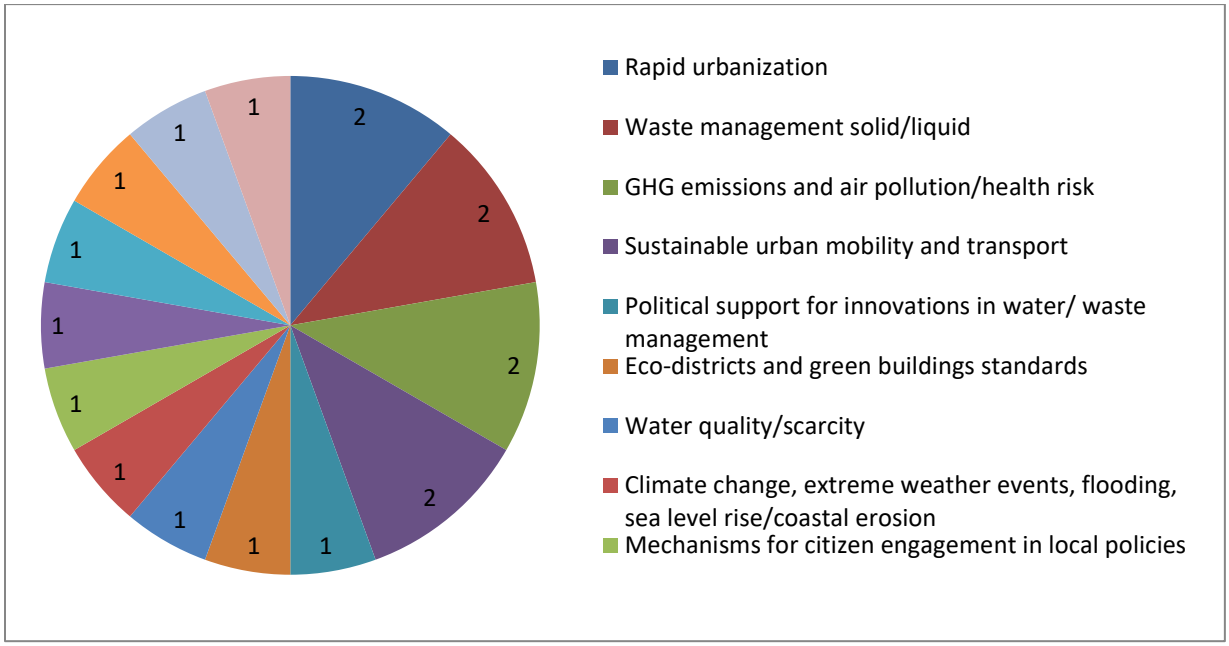


Figure 10. Training needs in Cities in Latin America: Brasilia, Recife, Xalapa, Campeche La Paz, Asuncion and Lima

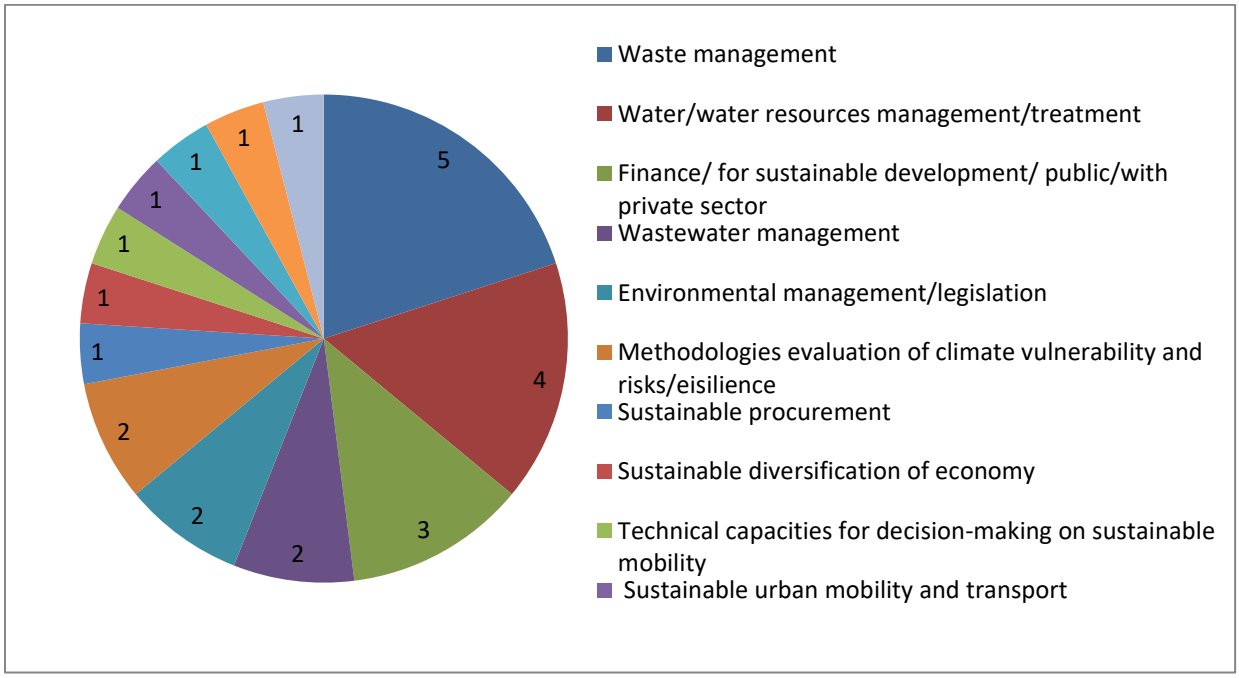


Figure 11: Training needs in Cities in India and Malaysia
Guntur, Jaipur, Bhopal, Vijayawada, Mysore, and Melaka State

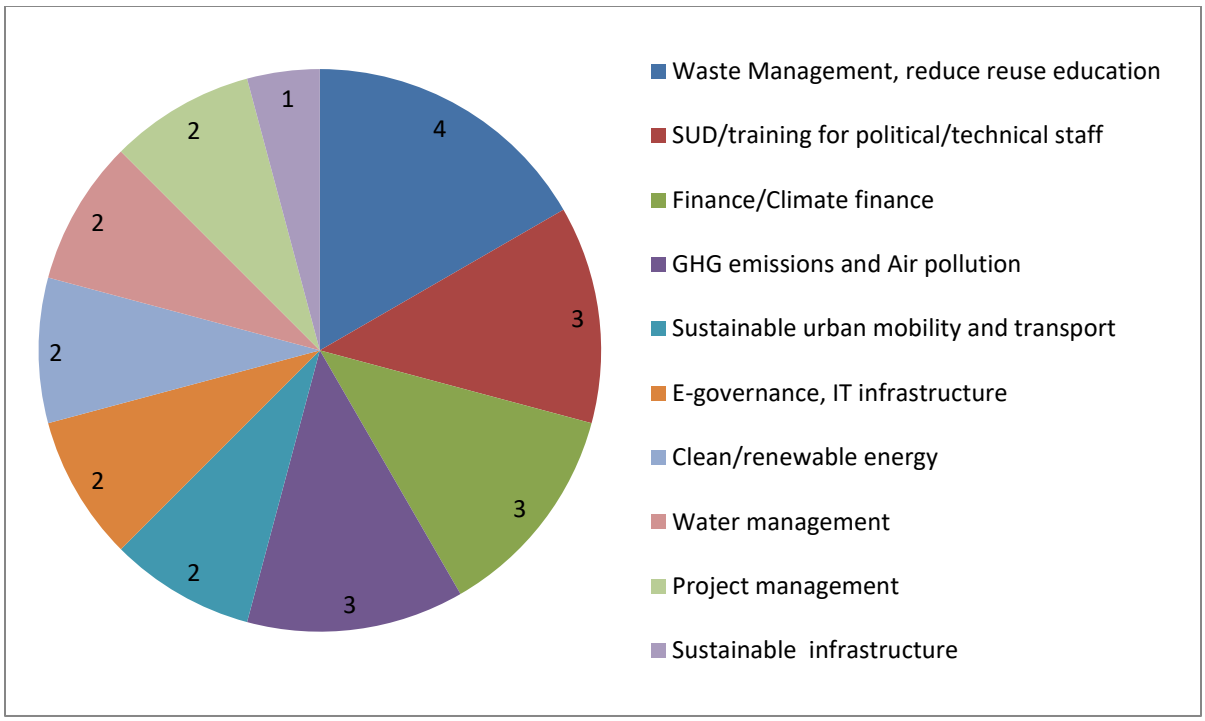


Figure 12: Training needs in Cities in PRC:
Beijing, Shenzhen, Shijiazhuang, Tianjin, Guiyang, Nanchang and Ningbo