

# CITY RESILIENCE PROFILING PROGRAMME

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**UN HABITAT**  
FOR A BETTER URBAN FUTURE



With the support of

## **Climate Action Enhancer**

Climate Action and Development

Climate Action and Resilience

Climate Action and the City Resilience Profiling Tool





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The Resilience Enhancers developed under the City Resilience Profiling Tool isolate the cross-cutting themes that underpin UN-Habitat's resilience building methodology into an advocacy and training tool.

The Enhancers provide both an understanding of the relationship between the topic in focus (i.e. Gender, Climate Action, Humanitarian Action among others) and development, development agendas, resilience and the CRPT. In the case of the latter, the indicators related to the topic have been extracted from the global CRPT and are included in the Enhancers. They can provide a first approach to the resilience related matter, taking into consideration the systemic, holistic and comprehensive understanding of urban resilience that moves away from assessment in silos.

The objective of the Enhancer is to help governmental actors or other partners to assess the resilience of their urban settlements while putting a special focus on certain topics that need to be addressed such as gender or climate. They can be used as a starting point to assess resilience and to discuss how to take resilience building further.

The Climate Action Enhancer firstly explores the links between the climate, urban development and resilience before detailing the specific indicators from the CRPT that can be applied to obtain a snapshot of the city from a climate lens.

Like the CRPT, the CAE indicators are mapped in parallel with the targets of global agendas such as the Sustainable Development Goals and New Urban Agenda.

## **Using the Enhancers**

The Enhancers can be used as training or advocacy tools within a city by local governments actors or partners. The Enhancers also serve to complement existing tools, approaches and methodologies that are being implemented in the city. The objectives are therefore:

### **1. Initiate Discussion**

The indicators extracted from the CRPT can be used to start the discussion around resilience and the issue in focus within the city. An initiating body such as a specific department within the municipality, can begin the collection of data for the indicators and call for a half-day workshop to validate or complete the responses. Other departments within the municipality should be invited as well as other actors such as NGOs working in the city, utilities, civil society groups, among others. The Enhancer can as such become a shared project to initiate discussion on resilience. Once the exercise has been completed, contact us to find out how to take it further.

### **2. Snapshot**

The outcome of the enhancer is a partial resilience snapshot of the city from the perspective of the issue under consideration, i.e. Climate Action. This can be shared among all stakeholders and used to inform initial decision-making and priority setting. Knowing which are the strengths and the weaknesses in relation to a certain topic within the city allows local governments to consider appropriate measures to make the city more resilient. All of the cities that have completed this exercise are invited to share their findings on the City Map on UN-Habitat's Urban Resilience Hub. Sharing these findings will be useful to locate other cities facing similar challenges and to start a discussion on how to tackle them.

### **3. Counter-check**

Many cities are already implementing tools and methodologies to build resilience. The Enhancers serve as an approach to evaluate how well the tool is capturing the issue in question. It allows cities to assess if their tools need some adjustments or if they are already capturing the issues in questions. Having a preliminary idea on the resilience of the city helps to take appropriate measures and to counter-check the efficiency of the ones that have been taken.

## **Disclaimer**

The Enhancers are under continual development and should not be taken as complete or comprehensive resilience tools. They serve to increase engagement, validate approaches and lead to further engagement of resilience building through the CRPT.









## **Disclaimer**

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Barcelona, July 2018  
City Resilience Profiling Programme  
UN-Habitat

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# 1. Introduction

Climate change is impacting natural and human systems on all continents and across all our oceans. Regardless of its causes, the observed impacts of climate change are bringing the sensitivity of natural and human systems to the forefront<sup>1</sup>.

From altered weather patterns to rising sea levels and more extreme meteorological events, the bearings of climate change impact on people's wellbeing and livelihoods<sup>2</sup>. Many of these changes are strongly linked to human activity, notably intensified temperatures, high seas and the rain patterns. The consequences of non-action will be disruption not only for economies and environments but for all people and human activity. Climate change cannot be considered a distant threat to future generations, but as the most pressing and challenging issue for humanity today. Although all peoples are affected, it is the poorest and most vulnerable who pay and will continue to pay a proportionately higher price as disruption, deterioration, displacement or even destruction of human life become more frequent<sup>3</sup>.

Without action, the average global surface temperature is expected increase over the course of the century and may exceed 3°C, with some areas expected to increase even more. Ocean temperatures are equally set to rise and ice melting is likely to continue at current or accelerated rates. Predictions put the average elevation of sea level between 24-30 cm up to 2065, and 40-63 cm up to 2100<sup>4</sup>. Even if emissions stop tomorrow, climate change and its impacts will persist for many centuries. Climate resilience measures are therefore an imperative for the foreseeable future.

In a rapidly urbanizing world, UN-Habitat is committed to promoting effective climate action in our cities and recognizes that sustainable and resilient urban development cannot be achieved or sustained without mitigation and adaptation measures. Cities may be the biggest polluters, but they are also centres of innovation, transformation, growth and large-scale gains where climate action stands to be catalysed. Recognizing the complexity of cities and the need for a collective response to climate action, UN-Habitat works with a broad range of agencies and entities to mobilize expertise, experience and effective action towards sustainable urban development.

The City Resilience Profiling Tool (CRPT), developed by UN-Habitat, is a leading methodology for resilience building in cities and has a strong climate action focus. The CRPT identifies resilience trends, vulnerabilities, synergies, and interlinkages within the urban system that become the basis for prioritized actions. This Climate Action Enhancer extracts the elements of the CRPT methodology that relate most closely to climate challenges and as such aims to provide a snapshot of the city in relation to climate action.



## 2. Climate Action and Urban Development

Climate change is the defining topic of our time. Its prominence not only in national and international policy, but in mainstream media, grassroots movements and citizen consciousness attests to this. With around 54 percent of the world's population currently living in urban areas and urban population growth projected at 2.5 to 3 billion by 2050, cities are the primary battle ground where the fight to manage and respond to climate change will be won or lost.

In urban settings, climate action presents specific challenges owing to scale (cities account for the majority of greenhouse gas emission), the complexity of urban systems, governance (often mandates and responsibilities overlap), and many other factors. The opportunities for positive climate action are however equally as significant, from economies of scale to the proximity and density of people that favour resource efficiency. It is therefore unsurprising that global development agendas such as those elaborated below give special consideration to nexus between climate action and sustainable urban development.

Urban vulnerabilities are predicted to increase in the coming decades. Projections by the Intergovernmental Panel on Climate Change presents an increase of 1.2 million square kilometres of urban land cover from 2000 to 2030. The projection includes the loss of green infrastructure that is key to climate change adaptation, as well as increasing the exposure of population to greater risks, especially those residing in informal settlements. The greater the deficit in infrastructure and public services, the greater the exposure to the impacts of climate change.

### 2.1. The Paris Agreement

The Paris Agreement (2015) recognize that climate change is a real and unprecedented challenge, requiring urgent global action<sup>5</sup>. Bridging today's policies with climate-neutral vision set out for the end of the century, the Agreement sets out ambitious targets to limit global temperature increase.

The concepts and trends highlighted in the Agreement are fundamental for climate action and balance both mitigation and adaptation action while highlighting how financing, capacity building and technology sharing can also support achieve the mission. Through the Nationally Determined Contributions, most countries committed to present their main climate change challenges and measures with many seeking or already adopting innovative holistic solutions.



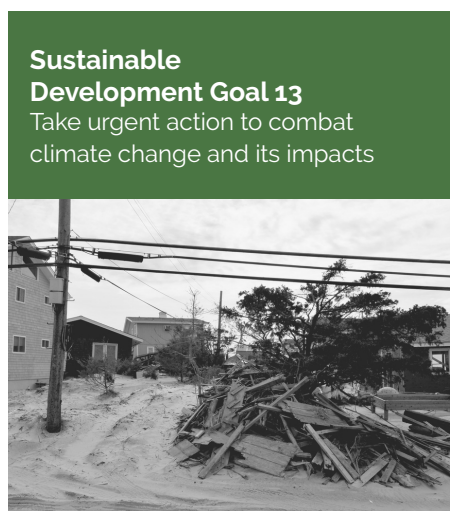
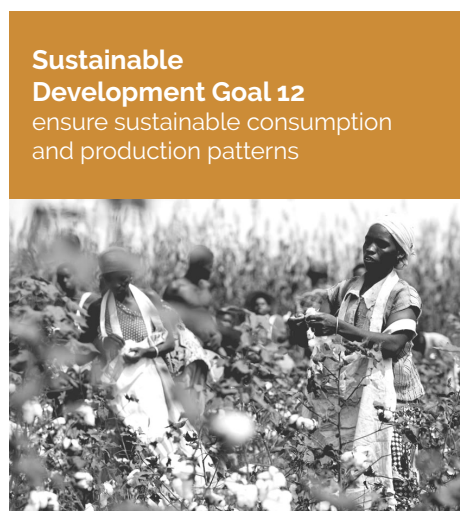


## 2.2. Sustainable Development Goals (SDGs)

Achieving sustainable development requires a harmonized approach that encompasses the three pillars of sustainability: economic, social and environmental. Without all pillars, gains and progress will not be sustainable over the long-term. In 2015, the Sustainable Development Goals set out an ambitious set of 17 targets to transform our world<sup>6</sup>.

**SDG 13** acknowledges that climate change is already impacting public health, food and water security, migration, peace and security. This goal advocates for development that addresses climate change by reducing greenhouse gas emissions, building climate resilience, and developing adaptive capacity to climate-related hazards and natural disasters. Furthermore, it emphasizes the importance of improving education, awareness-raising and human and institutional capacity in the areas of: climate change mitigation, adaptation, impact reduction and early warning.

Mitigation actions are closely linked to reducing greenhouse gas emissions through resource efficiency. **SDG 12** pledges to achieve the sustainable management and efficient use of natural resources, as well as substantially increase the number of human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, and resilience to disasters.





## 2.3. The New Urban Agenda

The New Urban Agenda (2016)<sup>7</sup> acknowledges the key role that cities play in climate action. The way in which human settlements are planned, financed, developed and built directly impacts sustainability and resilience far beyond city boundaries. The vision presented in the NUA is one of sustainable, inclusive, and safe cities that are accessible for all. Resource-efficient consumption and production models should protect, conserve, restore and promote ecosystems, water resources, natural habitats and biodiversity, hereby minimising environmental impact.

The framework also reinforces the need to adopt and implement risk reduction and management mechanisms to reduce vulnerabilities, build responsiveness to natural and human-made hazards and foster mitigation and adaptation to climate change.

### Article 79 ✓

-

*We commit ourselves to promoting international, national, subnational and local climate action, including climate change adaptation and mitigation, and to supporting the efforts of cities and human settlements, their inhabitants and all local stakeholders to be important implementers. We further commit ourselves to supporting building resilience and reducing emissions of greenhouse gases from all relevant sectors.*

### Article 80 ✓

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*We commit ourselves to supporting the medium- to long-term adaptation planning process, as well as city-level assessments of climate vulnerability and impact, to inform adaptation plans, policies, programmes and actions that build the resilience of urban inhabitants, including through the use of ecosystem-based adaptation<sup>21</sup>.*

## 2.4 Sendai Framework for Disaster Risk Reduction

Building urban climate resilience contributes to the reduction of vulnerability to disasters (intensified by climate change) and increases preparedness for response and recovery. The Sendai Framework (2015) promotes analysis and action to address the interlinked challenges of disaster risk, sustainable development and climate change, and calls on national and local governments to undertake climate action. The Framework stresses that achieving stronger recognition of disaster risk reduction and climate change adaptation are complementary strategies that lead and facilitate appropriate climate risk management.

# 3. Climate Action and Resilience

Natural hazards alone do not cause catastrophes. It is the combination of exposed, vulnerable, and poorly prepared populations with a hazardous event that results in a disaster. Any resilience analysis must focus on how people, places and institutions can be affected by climate-change related hazards, or otherwise put, their sensitivity. The degree of sensitivity is captured by the combination of environmental and socioeconomic aspects such as the natural resources assessment, and trends in demographics and poverty status. In this process, the characteristics of people in vulnerable situations must be given special attention, notably relating to gender issues, coverage and access to basic services, land, housing, critical infrastructure, and other services.

Cities are only able to understand, manage and achieve resilience if they are able to read their changing reality in a critical manner from evidence-based data and by engaging with all stakeholders to undertake action from both a mitigation and adaptation perspective.

## 3.1. Climate mitigation measures towards resilience

Climate change mitigation refers to efforts to reduce or prevent emission of greenhouse gases<sup>8</sup>. The Paris Agreement defines mitigation efforts as those contributing to, "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impact of climate change".

To include mitigation measures in urban policies, UN-Habitat set out recommendations in the policy guide Addressing Climate Change in National Urban Policy. These include:

1. support the development of local level plans and strategies to reduce GHG emissions,
2. increase the share of low-carbon/renewable energy sources, promoting efficient energy consumption,
3. boost sustainable urban development patterns that minimize journey times and travel distances and reduce emissions, and stimulate sustainable transport modes,
4. reduce emissions by promoting more sustainable design and construction,
5. sustainable management of solid and liquid waste.

Climate change mitigation measures should be informed by greenhouse gas emissions and environmental quality indicators.

### **3.2. Climate adaptation measures towards resilience**

In the Paris Agreement, climate adaptation is defined as, "increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production".

Adaptation measures are those that propose adjustments in ecological, social or economic systems in response to present or future climatic phenomena and their effects or impacts. There are changes in processes, practices, and structures to moderate potential damage or to create new opportunities associated with climate change.

In the Climate Change Strategy, UN-Habitat's recommendations to build climate resilience (adaptation) include:

- 1.** promote applied research into risks associated with climate change impacts and other hazards,
- 2.** encourage and support local level climate change vulnerability assessment,
- 3.** map hazards (including those that can evolve over time),
- 4.** plan human settlements, regulate land use, and provide critical infrastructure and services considering risk information and building resilience,
- 5.** prioritise actions that strength resilience of vulnerable and marginalised populations, upgrade slums and informal settlements,
- 6.** promote the restoration of ecosystems and natural buffers,
- 7.** provide for regional planning that protects ecosystems and guards against 'mal-adaptation'.

Any climate change adaptation measure should seek to improve the resilience of the system. Using nature-based solutions and a holistic approach, actions should maintain and improve a system's inherent resilience. Climate change adaptive strategies should take into consideration the impact of these measures on the city.

# 4. Climate Action through the CRPT

The impact of climate change must be analysed in an evidence based manner. This approach underpins the City Resilience Profiling Tool and is intrinsic to climate change analysis. The CRPT's resilience analysis is comprehensive, covering the entire urban system in its measurement of vulnerabilities, and potential hazards while also taking into account governance issues. The CRPT provides a holistic approach to tackle climate action, combining climate-related hazards through a cross-sectoral analysis of urban physical, organisational, functional and social environment.

To build urban climate resilience, it is important to understand the challenges that a changing climate pose to the city's environmental, economic and social systems and from this understanding, outline the mitigation and adaptation plans, and actions for resilience.

## 4.1. Evidence-based data knowledge

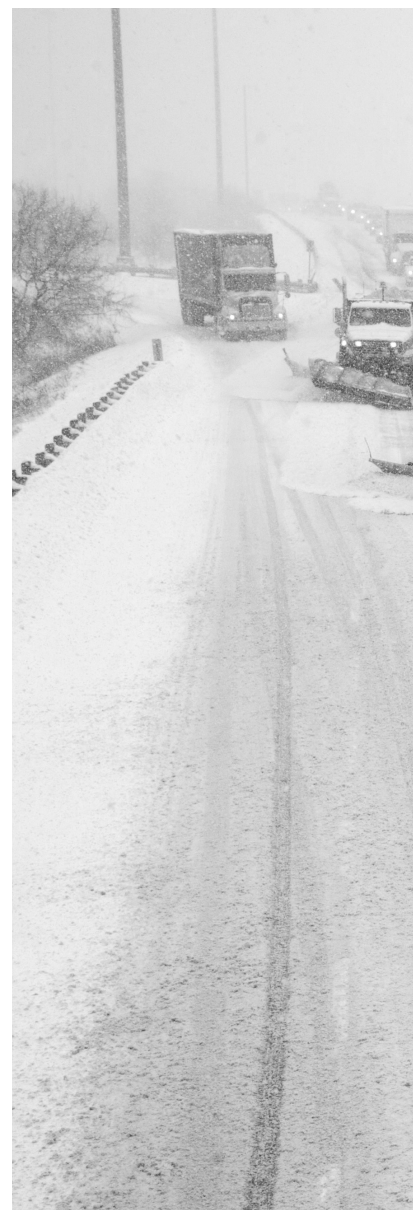
Climate change data, trends and models can be complex tools for governments and inhabitants to adopt, especially in contexts where capacity and resources are limited. The City Resilience Profiling Tool is an accessible methodology built to support local governments and city inhabitants overcome this challenge. By connecting stakeholders (from climate change experts, data service providers, people and city authorities) around a common resilience framework, data collection is extensive and forms the basis of a diagnostics on exposure, sensitivity, and the adaptive capacity of a city.

## 4.2. Identifying climate change challenges in the city

The CRPT analysis evaluates how the city suffers from current and long-term climate conditions and hazards through models that extract information on temperature, heat waves, precipitations, water runoff, snow/ice cover, thermal stress, droughts, floods, among others. The CRPT approach draws on the available capacity from scientists, engineers, satellite experts, and software & tool developers who support the local government to downscale global climate change scenarios to the local and regional levels. At this scale, validation can be sought from the local community, and climate change challenges and actions (on-going and planned) can be identified.

## 4.3. Climate change impacts in cities

Exposure analysis from current and projected climate data combined with the sensitivity data is fundamental to assess the degree to which urban systems are affected by the biophysical impact of climate change. To plan climate action, it is also essential to assess the city's adaptive capacity by its current abilities and efforts in both physical elements (infrastructure, material wealth, and technology) and social/institutional elements (human capital, governance, and institutional strength).





# 5. Climate Action Workflow

Climate Action is a complex set of strategies that link vulnerability assessment to the climate impacts of an urban settlement and a wide spectrum of actions that can mitigate and adapt to these impacts at different levels. To mainstream climate action, the CRPT focuses on the promotion of a straightforward, efficient and effective understanding of the climate resilience status within the urban system.

For the Climate Action Enhancer, the pertinent indicators from the CRPT that relate to climate change have been extracted. The information gathered through these indicators should be processed through a workflow. The workflow gradually filters the information and classifies it into the following 4, according to its function in the process of constructing public policies for the climate action:

## 5.1. Climate Trends Data

The climate data modelling is fundamental to understanding the current and foreseen future situation faced by urban systems in order to articulate climate change issues into the city's policies. The task is to co-design the way in which we produce and show climate change information. To do so, stakeholders' collaboration and expertise in urban settings and climate observations, governance and management is needed.

## 5.2. Environmental Quality Data

Environmental quality is comprised of data that can provide an understanding of how a changing climate could affect the region's bio-capacity and environmental qualities, such as air, water and soil quality.

Together with Climate Resilience Data (below), this category assesses the sensitivity and adaptive capacity of the urban systems. With this data (including satellite observation data), current impacts on the system are measured, providing information related to actual stresses faced by the cities.

## 5.3. Climate Resilience Data

Resilience data assess the links within the urban system, and its capacities to mitigate and adapt to climate change. The indicators are filtered through a set of cross sectoral issues<sup>10</sup>:

**Land Use:** Compact, transit-oriented, mixed-use development; regulations based on risk mapping that reflects both current risk plus the projected impacts of climate change.

**Business and Livelihoods:** Incentives and training to encourage green economy industries; green procurement policies.

**Energy efficiency:** Applies to various sectors listed above, including buildings and basic urban services.

**Consumption:** Incentives for more sustainable packaging; addressing emissions linked to city supply chains including food, cement and construction materials; green procurement; addressing vulnerability of key supply chains.

**Natural environment:** Solutions that involve protecting, restoring and enhancing green and blue infrastructure; ecosystem based approaches to adaptation; managing the impact of climate change on native and invasive species.

**Natural hazards:** Disaster-resilient public and private investments in various sectors, and other priorities applicable at the city-level that are identified in the Sendai Framework for Disaster Risk Reduction (2015-2030).

## 5.4. Resource Efficiency

Mitigation related indicators include those that assess the city's capacity to monitor and reduce emissions, including resource efficiency combined with the effectiveness of urban systems in delivering positive contributions towards the SDGs. The indicators taken from the CRPT on this subject will be covered within a specific category.

## 5.5. Climate Action

After the city-specific diagnosis and through the Actions for Resilience, the CRPT devises concrete climate actions that are tailored to each city. The main aspects of these recommendations are related to collecting data in order to build up reliable climate models and better understand climate change impacts. This entails studying the combination of hazards (shocks and stresses) that can lead to malfunctions in the city, proposing governance measures that work in the direction of climate justice, and supporting inhabitant participation. The recommendations seek to encourage compact urban development, promote more sustainable building codes and reduce consumption to help achieve national goals, amongst others.

The development of appropriate urban solutions requires advancement beyond purely sectoral approaches towards a more integrated and holistic planning, construction and management of cities, and a political, legislative and fiscal environment that supports action.



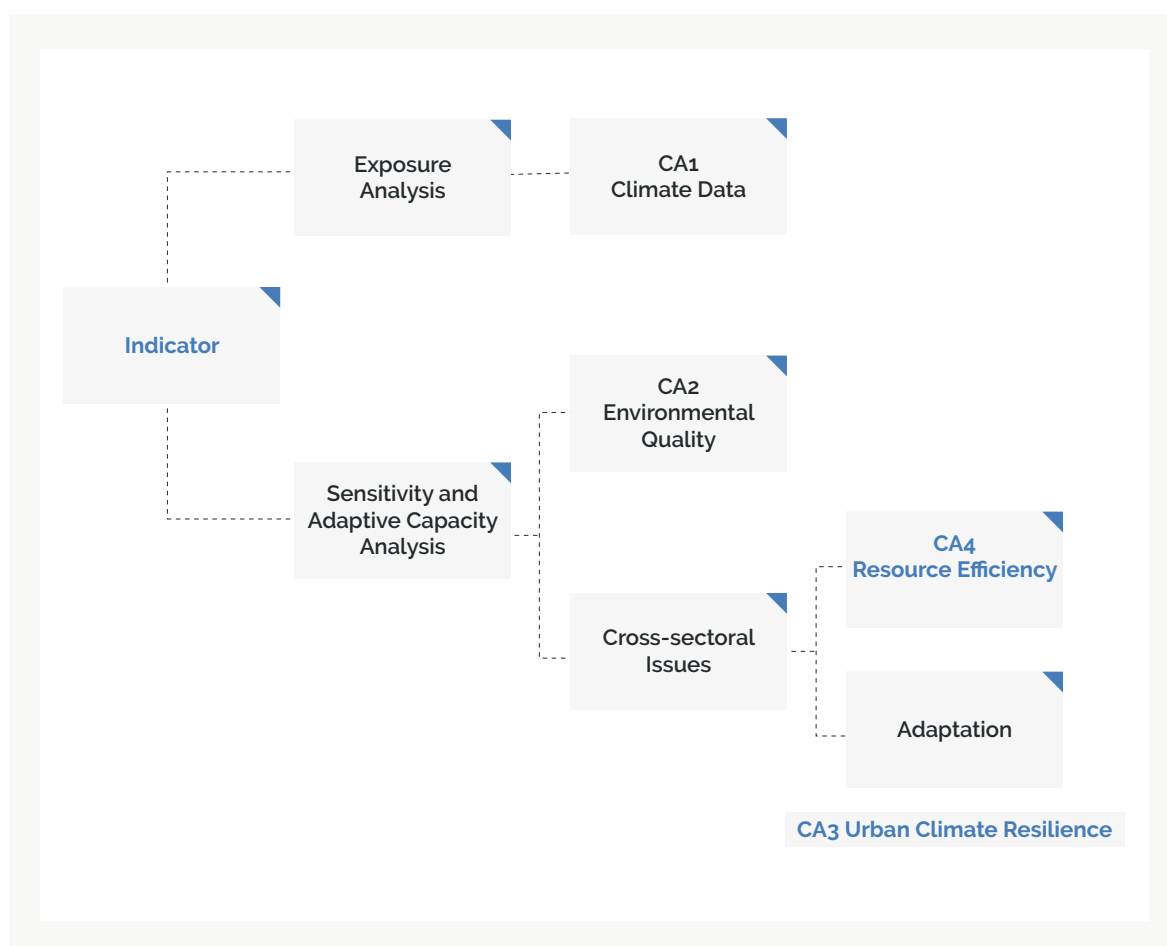
# 6. Climate Action Indicators in the CRPT

In the following pages are the indicators extracted from the CRPT that related to climate change. By applying these indicators, a city is able to gather a snapshot of the climate change situation, identify missing critical data, engage with relevant stakeholders and plan actions.

The process of identifying climate action should remain an iterative one, and it is expected that CRPT piloting in the cities will bring new elements to enrichen the current approach. At a later stage, the CAE is expected to contribute to broader policy-making and strategy development process in cities, thus fulfilling a new role, and shifting from tool strengthening (in terms of climate action) to strengthening the capacity of the city to address complex climate action issues they are confronted with.

Indicators in SET 4 are references with their alignment to global frameworks, tools and indexes. See reference 11 for full list.

As explained above, the data gathered from each indicator is filtered into four categories.



|              |                               | CITY ID c | SET4 c     | TOTAL      |
|--------------|-------------------------------|-----------|------------|------------|
| <b>CC-1</b>  | Climate Data                  | 22        | 0          | 22         |
| <b>CC-2</b>  | Environmental Quality Data    | 3         | 28         | 31         |
| <b>CC-3</b>  | Urban Climate Resilience Data | 14        | 80         | 94         |
| <b>CC-4</b>  | Resource Efficiency Data      | 0         | 49         | 49         |
| <b>Total</b> |                               | <b>39</b> | <b>157</b> | <b>196</b> |



# SET 1 - City ID

## City ID

|        |  |      |
|--------|--|------|
| 1      | HISTORICAL CONTEXT   |      |
| 1.1    | Setting  |      |
| 1.1.4  | Coordinates  | CA-1 |
| 2      | SPATIAL CONTEXT  |      |
| 2.1    | Climate  |      |
| 2.1.1  | Climate type   | CA-1 |
| 2.1.2  | Altitude   | CA-1 |
| 2.1.3  | Temperature range  | CA-1 |
| 2.1.4  | Heatwave   | CA-1 |
| 2.1.5  | Tropical nights  | CA-1 |
| 2.1.6  | Ice days   | CA-1 |
| 2.1.7  | Frost days   | CA-1 |
| 2.1.8  | Zero crossing of air temperature days                            | CA-1 |
| 2.1.9  | Degree days  | CA-1 |
| 2.1.10 | Solar Insolation   | CA-1 |
| 2.1.11 | Precipitation  | CA-1 |
| 2.1.12 | Short-duration extreme precipitation                             | CA-1 |
| 2.1.13 | Snow cover and water equivalent                                  | CA-1 |
| 2.1.14 | Snow water equivalent  | CA-1 |
| 2.1.15 | Water runoff or discharge  | CA-1 |
| 2.1.16 | Thom Discomfort Index  | CA-1 |
| 2.1.17 | Universal Thermal Climate Index                                  | CA-1 |
| 2.1.18 | Growing season   | CA-1 |
| 2.1.19 | Droughts   | CA-1 |
| 2.1.20 | Floods   | CA-1 |
| 2.2    | Ecosystems   |      |
| 2.2.1  | Ecosystem types  | CA-2 |
| 2.2.3  | Surface water bodies   | CA-2 |
| 2.3    | Urban Area   |      |
| 2.2.1  | Total urban footprint  | CA-2 |
| 3      | LOCAL GOVERNMENT AND PUBLIC ADMINISTRATION                       |      |
| 3.4    | Resilience including Risk Reduction                              |      |
| 3.4.1  | Entities in charge of resilience and/or risk reduction           | CA-3 |
| 3.4.2  | Existing policies and plans for resilience and/or risk reduction | CA-3 |
| 3.4.3  | Budget allocation  | CA-3 |
| 3.4.4  | Resilience partnerships  | CA-3 |
| 4      | POPULATION AND DEMOGRAPHICS                                      |      |
| 4.1    | Population Characteristics                                       |      |
| 4.1.1  | Population size  | CA-3 |
| 4.1.2  | Population density   | CA-3 |
| 4.2    | Population Dynamics  |      |
| 4.2.1  | Population growth rate   | CA-3 |
| 4.2.8  | Migration rate   | CA-3 |
| 4.2.9  | Migration streams  | CA-3 |
| 4.2.13 | Tourism rate   | CA-3 |
| 5      | ECONOMY AND LIVELIHOODS  |      |
| 5.2    | Urban Economy  |      |
| 5.2.3  | Industrial and natural resources extraction                      | CA-3 |
| 6      | HAZARDS AND CHALLENGES   |      |
| 6.2    | Challenges   |      |
| 6.2.1  | Shocks   | CA-3 |
| 6.2.2  | Stresses   | CA-3 |
| 6.2.5  | Main risk-prone areas  | CA-3 |
| 6.2.6  | Challenges attributed to climate change                          | CA-1 |

## SET 4 - Built Environment

### 1. Built Environment

|         |   |   |  |      |
|---------|---|---|--|------|
| 1.1     | URBAN FORM  |   |  |      |
| 1.1.1   | Urban Growth Model  |   |  |      |
| 1.1.1.1 | Land consumption rate to population growth rate in the past 10 to 15 years. | SDG 11.3.1C<br>CPI-UGL 3.1C<br>ESCI 41P |  | CA-4 |
| 1.1.1.2 | Percentage of urban footprint located in hazardous areas.                   |   |  | CA-3 |
| 1.2     | LAND TENURE   |   |  |      |
| 1.2.1   | Legal Status of Land  |   |  |      |
| 1.2.1.2 | Percentage of city area considered informal.                                | SDG 11.1.1A<br>ESCI 50A<br>CPI-ESI 2.1A |  | CA-3 |
| 1.2.1.3 | Percentage of informal land under tenure formalisation.                     |   |  | CA-3 |
| 1.3     | HOUSING   |   |  |      |
| 1.3.1   | Availability of Adequate Housing  | SDG 11.1.1P                             |  |      |
| 1.3.1.1 | Percentage of homes in hazardous location.                                  | ESCI 43A<br>CPI-ID 11A                  |  | CA-3 |
| 1.3.1.2 | Percentage of homes with inadequate structure.                              | ESCI 43A<br>CPI-ID 11A                  |  | CA-3 |
| 1.4     | BUILT ASSEST  |   |  |      |
| 1.4.1   | Robustness of Critical Facilities   | ESCI 39P                                |  |      |
| 1.4.1.1 | Percentage of critical facilities in hazardous locations.                   |   |  | CA-3 |
| 1.4.1.2 | Percentage of critical facilities with inadequate structure.                |   |  | CA-3 |
| 1.4.2   | Robustness of Key Buildings   | ESCI 39P                                |  |      |
| 1.4.2.1 | Percentage of key buildings in hazardous locations.                         |   |  | CA-3 |

## 2. Supply Chain & Logistics

|           |   |   |      |
|-----------|---|---|------|
| 2.1       | WATER RESOURCES   |   |      |
| 2.1.1     | Availability of Water Resources   |   |      |
| 2.1.1.1   | Proportion of water supply from each resource type.   |   | CA-3 |
| 2.1.1.1.1 | Inter-annual Variability.   |   | CA-2 |
| 2.1.1.1.2 | Does the city have a plan for prioritisation of water based on historical water level data?               |   | CA-3 |
| 2.1.2     | Water Consumption   |   |      |
| 2.1.2.1   | Total water consumption per capita (litres/day).  | ISO-37120 21.5C<br>ISO-37120 21.4P<br>ESCI 2P | CA-4 |
| 2.1.2.2   | Trend in water consumption.   |   | CA-4 |
| 2.1.3     | Water Resource Balance  |   |      |
| 2.1.3.1   | Level of Water Stress (Baseline Water Stress).  | SDG 6.4.2C                                    | CA-4 |
| 2.1.3.2   | Frequency the city needs extra support from other systems.  | ESCI 6C                                       | CA-4 |
| 2.1.4     | Water Resource Management   |   |      |
| 2.1.4.1   | Is the city implementing Integrated Water Resource Management (IWRM) tools?                               | SDG 6.5.1A                                    | CA-3 |
| 2.1.4.3   | Is the city implementing water demand management strategies?  |   | CA-3 |
| 2.2       | ENERGY RESOURCES  |   |      |
| 2.2.1     | Energy Resource Diversity   |   |      |
| 2.2.1.1   | Energy supply diversity (% of the supply).  | IEAA<br>CityStrength 8A                       | CA-3 |
| 2.2.1.2   | Spare capacity available? (per source) [+]  |   | CA-3 |
| 2.2.2     | Energy Efficiency   |   |      |
| 2.2.2.1   | Energy intensity measured in terms of primary energy and GDP.   | ESCI 22P<br>SDG 7.3.1C<br>IEA/EEAA            | CA-4 |
| 2.2.2.1.1 | Consumption disaggregated by sector.  |   | CA-4 |
| 2.2.2.2   | Existence of energy efficiency regulations in place.  | ESCI 23P                                      | CA-4 |
| 2.2.3     | Clean and Renewable Energy  |   |      |
| 2.2.3.1   | Non-carbon energy share in the total final energy consumption (%).  | IEAA<br>EIST ECO12C<br>SDG 7.2.1C             | CA-3 |
| 2.2.3.2   | Renewable energy share in the total final energy consumption (%).   | ISO 37120 7.4C<br>ESCI 24C<br>EIST ECO13C     | CA-3 |
| 2.2.3.3   | Ratio of municipal financing for clean energy transition in local budget.                                 |   | CA-3 |
| 2.3       | FOOD SUPPLY   |   |      |
| 2.3.1     | Availability of Food  | SDG 2.1A                                      |      |
| 2.3.1.1   | Average value of food production (disaggregate by food type).   | FAO-FS I_1.2C,<br>L_3.5P                      | CA-3 |
| 2.3.1.3   | Trends in production and supply of basic food.  |   | CA-4 |
| 2.3.2     | Food Supply Dependencies  |   |      |
| 2.3.2.1.1 | Does the city have policies and programmes promoting local food production and consumption?               |   | CA-4 |
| 2.3.2.2   | Percentage of households/entities practicing urban farming and aquaculture (disaggregate by tenure type). |   | CA-3 |
| 2.3.2.3   | Percentage of arable land equipped for irrigation.  | FAO FS I_3.2C                                 | CA-3 |
| 2.3.3     | Food Chain Efficiency and Continuity  |   |      |
| 2.3.3.1   | Percentage of food waste and production losses (disaggregate per stage).                                  | SDG 12.2.1A                                   | CA-4 |
| 2.3.3.1.1 | Does the city have policies and programmes to prevent food waste?   |   | CA-4 |

## SET 4 - Basic Infrastructure

### 3. Basic Infrastructure

|  |  |  |      |
|--|--|--|------|
| 3.1.1 ENERGY - ENERGY SUPPLY FOR BUILDINGS         |  |  |      |
| 3.1.1.1 Access to Energy Supply                    |  |  |      |
| 3.1.1.1.2  | Proportion of population with primary reliance on clean fuels and technology for heating, cooling and cooking.         | SDG 7.1.2C                               | CA-3 |
| 3.1.1.1.3  | Proportion of household budget spent on energy for domestic purposes (electricity, heating, cooking).                  | EISD SOC2A                               | CA-3 |
| 3.1.1.3 Energy Supply Efficiency                   |  |  |      |
| 3.1.1.3.1  | Buildings Sector (Residential + Services) energy consumption per capita (ToE/cap).                                     | EISD ECO9A<br>ESCI 21A<br>ISO_37120 7.5A | CA-4 |
| 3.1.1.3.1.1  | Trend in Consumption.  |  | CA-4 |
| 3.1.1.3.1.2  | Consumption disaggregated by end use.  |  | CA-4 |
| 3.1.1.3.1.3  | Consumption by energy sources.   |  | CA-4 |
| 3.1.1.3.2  | Percentage of non revenue consumption. (per public network: Electricity, Gas, Heating/Cooling District) [+]            | CityStrenght 8A                          | CA-4 |
| 3.1.1.3.3  | Energy consumption of public buildings per year (kWh/m <sup>2</sup> ).   | ISO_37120 7.3C                           | CA-4 |
| 3.1.1.3.3.1  | Trend in Consumption.  |  | CA-4 |
| 3.1.1.3.4  | Energy consumption of Public Spaces and Street lighting (kWh/m <sup>2</sup> ).   |  | CA-4 |
| 3.1.1.3.4.1  | Trend in Consumption.  |  | CA-4 |
| 3.1.1.3.5  | Percentage of customers with Smart Electricity Meters (%).   |  | CA-4 |
| 3.1.1.3.5.1  | Access to real time electricity consumption data?  |  | CA-4 |
| 3.1.2 ENERGY - ENERGY SUPPLY FOR MOBILITY          |  |  |      |
| 3.1.2.1 Vehicle Supply Network Coverage            |  |  |      |
| 3.1.2.1.1  | Percentage of vehicle fuel demand covered by supply network.   | CityStrenght 8A                          | CA-3 |
| 3.1.2.1.2  | Existence of alternative clean fuel vehicle network. (per network: compressed gas vehicle, electric vehicles) [+]      |  | CA-3 |
| 3.1.2.2 Efficiency of Energy for Transportation    |  | EISD ECO10A                              |      |
| 3.1.2.2.1  | Transport energy consumption (ToE/capita).   |  | CA-4 |
| 3.1.2.2.1.1  | Disaggregated by end use.  |  | CA-4 |
| 3.1.2.2.1.2  | Disaggregated by energy source.  |  | CA-4 |
| 3.1.2.2.2  | Non-carbon fuels share (%).  |  | CA-3 |
| 3.1.2.2.3  | Renewable fuels share (%).   |  | CA-3 |
| 3.2.1 WATER - WATER SUPPLY                         |  |  |      |
| 3.2.1.1 Access to Drinking Water                   |  |  |      |
| 3.2.1.1.2  | There are obligations/incentives in the building codes for secondary source/reusing of water?                          |  | CA-4 |
| 3.2.1.2 Water Supply Network Coverage              |  |  |      |
| 3.2.1.2.2  | Percentage of water samples in a year that complies with drinking water quality standards.                             | ESCI 4 C<br>SDG 6.1.1 A                  | CA-4 |
| 3.2.1.3 Efficiency of Water Supply Operations      |  |  |      |
| 3.2.1.3.1  | Percentage of unaccounted for water (water loss).  | ESCI 5 C<br>ISO 217 C                    | CA-4 |
| 3.2.2 WATER - WASTEWATER AND SANITATION            |  |  |      |
| 3.2.2.2 Wastewater Network Coverage                |  |  |      |
| 3.2.2.2.3  | Is the network able to cope with seasonal increase in rain/stormwater (if combined sewer system)?                      |  | CA-3 |
| 3.2.2.3 Wastewater Treatment and Discharge         |  |  |      |
| 3.2.2.3.1  | Proportion of wastewater that is safely treated.   | SDG 6.3.1 C<br>ESCI 8 C                  | CA-4 |
| 3.2.2.3.2  | Proportion of hazardous wastewater that is safely treated.   |  | CA-4 |
| 3.2.2.3.3  | Proportion of sludge that is safely treated.   |  | CA-4 |
| 3.2.2.3.4  | Return flow ratio - Percentage of available water that has been previously used and discharged upstream as wastewater. | WRI Aqueduct C                           | CA-4 |
| 3.2.2.4 Efficiency of Water Operation              |  |  |      |
| 3.2.2.4.1  | Total number of sewage overflows reported per 100km of sewer main per year.  |  | CA-4 |
| 3.2.3 WATER - STORMWATER                           |  |  |      |
| 3.2.3.1 Stormwater Collection                      |  |  |      |
| 3.2.3.1.1  | Percentage of urban area covered by stormwater collection system.  |  | CA-3 |
| 3.2.3.1.2  | Is the city's drainage system currently able to cope with seasonal increase in rain/stormwater?                        | CityStrenght 17A                         | CA-3 |
| 3.2.3.1.3  | Is the city reusing rainwater to reduce drinking water consumption?  |  | CA-4 |
| 3.2.3.2 Stormwater and Flood Management Strategies |  |  |      |
| 3.2.3.2.1  | Is existing protective infrastructure well-designed and well-built based on flood risk information?                    | UNISDR Scorecard D8. 1A                  | CA-3 |
| 3.2.3.2.2  | Does the city regularly and extensively consider the use of alternative water management strategies?                   | UNISDR Scorecard D4. 2.1A                | CA-3 |
| 3.2.3.2.2.1  | If yes, what is the percentage of total urban runoff retained through water sensitive urban design solutions?          |  | CA-4 |

### 3. Basic Infrastructure

|             |  |   |      |
|-------------|--|---|------|
| 3.2.3.2.3   | Percentage of impervious surface coverage within urban area.   |   | CA-3 |
| 3.2.3.2.4   | Do building codes or standards exist, and do they address water sensitive urban design and/or onsite stormwater solutions?   | UNISDR Scorecard D4.3A  | CA-4 |
| 3.2.3.2.4.1 | Are zoning rules, building codes and standards widely applied, properly enforced and verified?   |   | CA-4 |
| 3.2.3.3     | Effectiveness of Stormwater Solution   |   |      |
| 3.2.3.3.1   | Percentage of dwellings damaged by intense flooding (10 years).  | ESCI 9P   | CA-3 |
| 3.2.3.3.2   | Please describe disruptions on road traffic due to water logging and occurrence, if applicable.  |   | CA-3 |
| 3.2.3.3.3   | Please describe disruption of access to public services due to water logging and occurrence, if applicable [+] (for education and health services. If the city monitors interruption in other services please include)       |   | CA-3 |
| 3.3         | SOLID WASTE  |   |      |
| 3.3.1       | Solid Waste Collection Coverage  | CityStrength 15A  |      |
| 3.3.1.1     | Proportion of solid waste collected out of total solid waste generated by the city, per category of waste (municipal/non-municipal; hazardous/non-hazardous; including through waste drop-off facilities for non-municipal). | SDG 11.6.1P & 12.4.2P<br>ISO_37120 16.2P & 16.9P<br>CPI-ES 2.1A<br>CityStrength 15A     | CA-3 |
| 3.3.2       | Access to Collection Service   |   |      |
| 3.3.2.1     | Percentage of population with regular municipal solid waste collection service (at least once a week).   | ESCI 10C<br>ISO_37120 16.1C   | CA-3 |
| 3.3.3       | Pre-treatment of Solid Waste   |   |      |
| 3.3.3.1     | Main method(s) used for pre-treatment (specify percentage, if available).  | SDG 12.5A<br>ESCI 15P   | CA-4 |
| 3.3.3.2     | Legal obligation of pre-treatment for non-municipal solid waste generators?  |   | CA-4 |
| 3.3.4       | Treatment: Recovery of Solid Waste   |   |      |
|             | <i>Urban/Municipal Solid Waste</i>   |   |      |
| 3.3.4.1     | Proportion of urban/municipal solid waste treated out of total generated, by type of treatment? (incl. municipal Hazardous Waste).   | SDG 12.5.1P & 12.4.2P<br>ESCI 14C, 15C & 16C<br>ISO_37120 16.3P & 16.10P<br>CPI-ES 2.3C | CA-4 |
|             | <i>Non-municipal Solid Waste</i>   |   |      |
| 3.3.4.2     | Proportion of non-municipal solid waste treated out of total generated, by type of treatment? (incl. non-municipal Hazardous Waste).   | SDG 12.5.1P & 12.4.2P<br>ISO_37120 16.3P & 16.10P                                       | CA-4 |
|             | <i>Solid Waste Recovery Trend</i>  |   |      |
| 3.3.4.3     | Characterise the recovery trend of solid waste in the last 10 years.   |   | CA-4 |
| 3.3.5       | Treatment: Disposal of Solid Waste   |   |      |
| 3.3.5.1     | Percentage of solid waste that is disposed of out of the total solid waste generated, by types of disposal and types of waste.   | SDG 11.6.1P & 12.4.2P<br>ISO_37120 16.4C, 16.5C, 16.6C, 16.7C & 16.8C<br>ESCI 11C & 13C | CA-3 |
| 3.3.5.3     | Characterise the trend of solid waste that has been landfilled in the last 10 years.   |   | CA-3 |

# SET 4 - Mobility

## 4. Mobility

|   |  |   |  |  |
|---|--|---|--|--|
| 4.1 URBAN MOBILITY  |  |   |  |  |
| 4.1.1 Diversity of Transport Modes and Modal Share                                  |  |   |  |  |
| 4.1.1.1   | Percentage of commuting trips per mode of transport (Please disaggregate by sex, if possible).                                   | SDG 9.1.2P<br>ESCI 56P<br>CPI-ID 4.1P<br>ISO-37120 18.3<br>A, 18.5A | CA-3                                     |  |
| 4.1.1.2   | Percentage of population using paratransit modes of transportation (Please disaggregate by sex, if possible).                    | SUTPA   | CA-3                                     |  |
| 4.1.1.3   | For each mode of transport, characterise the growth rate. [+]  |   | CA-3                                     |  |
| 4.1.2 Coverage of Urban Mobility Networks   |  |   | CPI-ID 4.3A<br>ISO-37120 18.1A,<br>18.2A |  |
| 4.1.2.2   | Road density dedicated for public transport only (km / 100 000 population).  | ESCI 53C  | CA-3                                     |  |
| 4.1.2.3   | Railway density (km / 100 000 population).   |   | CA-3                                     |  |
| 4.1.2.4   | Navigable water network density per population (km / 100 000 population).  |   | CA-3                                     |  |
| 4.1.2.5   | Density of side walks and pedestrian paths (km / 100 000 population).  | ESCI 55C  | CA-3                                     |  |
| 4.1.2.6   | Bicycle lanes density (km / 100 000 population).   | ESCI 54C<br>ISO-37120 18.7C   | CA-3                                     |  |
| 4.1.2.7   | Cable line density (km / 100 000 population).  |   | CA-3                                     |  |
| 4.1.3 Access to Urban Mobility Systems  |  |   | SDG 11.2.1P<br>UN-Habitat* P             |  |
| 4.1.3.1   | Percentage of city population within 500 m distance to nearest public transport stop. Please disaggregate by modes of transport. | SDG 11.2.1P<br>IND03 UN-Habitat* P                                  | CA-3                                     |  |
| 4.1.3.3   | Percentage of households with at least one car (Please disaggregate by sex of the head of the households, if possible).          | OECD<br>ISO 37120 18.4C   | CA-3                                     |  |
| 4.1.3.5   | Average commuting travel time using various modes of transport.  | SUTPP<br>CPI-ID 4.2P  | CA-3                                     |  |
| 4.1.4 Continuity of Urban Mobility Operations                                       |  |   |  |  |
| <i>Per transport mode [+]</i>   |  |   |  |  |
| 4.1.4.6   | What is the average age of the transport fleet?  | ESCI 57C  | CA-3                                     |  |
| <i>All transport mode</i>   |  |   |  |  |
| 4.1.4.8   | Does the city have an integrated central control of all transport modes?   |   | CA-3                                     |  |
| 4.2 INTER-REGIONAL MOBILITY   |  |   |  |  |
| 4.2.1 Diversity and Modal Share of Inter-Regional Mobility Systems                  |  |   |  |  |
| 4.2.1.1   | Percentage of trips per each mode of transport.  | SDG 9.1.2P  | CA-3                                     |  |
| 4.2.1.1   | For each mode of transport, characterise the growth rate. [+]  |   | CA-3                                     |  |
| 4.2.2 Coverage and Capacity of Entry Points and Inter-Regional Transport Facilities |  |   |  |  |
| 4.2.2.1   | Number of major coach/bus terminals in city with regional/ international destinations.   |   | CA-3                                     |  |
| 4.2.2.2   | Number of train stations in city with regional/ international destinations.  |   | CA-3                                     |  |
| 4.2.2.3   | Number of ports in city.   |   | CA-3                                     |  |
| 4.2.2.4   | Number of airports in city.  |   | CA-3                                     |  |
| 4.2.3 Access to Inter-Regional Mobility Systems                                     |  |   |  |  |
| <i>For each inter-regional transport facility [+]</i>                               |  |   |  |  |
| 4.2.3.3   | Is it accessible through at least one public urban transport mode?   |   | CA-3                                     |  |
| 4.2.4 Continuity of Inter-Regional Mobility Operations                              |  |   |  |  |
| 4.2.4.4   | What is average age of the fleet?  |   | CA-3                                     |  |

## SET 4 - Municipal Public Services

### 5. Municipal Public Services

|  |  |  |      |
|--|--|--|------|
| 5.1 CEMETERIES AND CREMATORIUMS  |  |  |      |
| 5.1.4 Quality and Safety Monitoring  |  |  |      |
| 5.1.4.4 Do any public or private burial sites or crematoriums pose a contamination risk?                                     |  |  | CA-3 |
| 5.9 STREET LIGHTING  |  |  |      |
| 5.9.2 Coverage of Public Lighting  |  |  |      |
| 5.9.2.2 Does the municipality use a night lighting schedule?   |  |  | CA-4 |
| 5.9.3 Maintenance of Public Lighting Infrastructure  |  |  |      |
| 5.9.3.1 Types of public lighting installed in the city and percentage as a part of the total public lighting infrastructure. |  |  | CA-4 |
| 5.9.3.3 Percentage of public lighting infrastructure equipped with electricity metering infrastructure.                      |  |  | CA-4 |

## SET 4 - Social Inclusion and Protection Element

### 6. SIP Element

|   |  |  |      |
|---|--|--|------|
| 6.3.2 ACCESS TO BASIC SOCIAL SERVICES - HEALTH  |  |  |      |
| 6.3.2.1 Coverage of Basic Health Services   |  |  |      |
| 6.3.2.1.3 Do local or national early warning systems for disease control exist (e.g. Ebola outbreak)? |  |  | CA-3 |
| 6.3.2.1.4 Are there protocols in place for monitoring infectious diseases.                            |  |  | CA-3 |

## SET 4 - Economy

### 7. Economy

|   |  |                                       |      |
|---|--|---------------------------------------|------|
| 7.1 LOCAL ECONOMIC STRUCTURE  |  |                                       |      |
| 7.1.1 Industrial Composition  |  |                                       |      |
| 7.1.1.1 Industrial diversity  |  | CPI-P 2.2A<br>ARUP 6.3A               | CA-3 |
| 7.1.2 Business Composition  |  |                                       |      |
| 7.1.2.4 Circular Economy: Number of Related Enterprises per 100,000 inhabitants |  | SDG 8.4A, 11.6A<br>NUA 60A<br>AAAA IA | CA-3 |
| 7.3.3 External Market Integration   |  |                                       |      |
| 7.3.3.3 Imports/exports composition   |  | SDG 8AA<br>ARUP 6.5A                  | CA-3 |
| 7.3.3.4 Import/Export diversity   |  | ARUP 6.5A<br>OECD A1.5A               | CA-3 |

## SET 4 - Ecology

### 8. Ecology

|  |  |   |      |
|--|--|---|------|
| 8.1 ECOSYSTEM SERVICES                                       |  |   |      |
| 8.1.1 Ecosystem Services Condition and Trends                |  | SDG 15.1A, 14.2A                                |      |
| 8.1.1.1  | Indicate the level of preservation (good, bad) of the provisioning services the inhabitants are obtaining from the ecosystem, as well as the trend (enhanced, stable, degraded) over the past 10 years.                                    |   | CA-2 |
| 8.1.1.2  | Indicate the level of preservation (good, bad) of the regulating services the inhabitants are obtaining from the ecosystem, as well as the trend (enhanced, stable, degraded) over the past 10 years.                                      |   | CA-2 |
| 8.1.1.3  | Indicate the level of preservation (good, bad) of the cultural services the inhabitants are obtaining from the ecosystem, as well as the trend (enhanced, stable, degraded) over the past 10 years.  |   | CA-2 |
| 8.1.2 Ecosystem Services Maintenance                         |  | SDG 15.1A, 14.2A                                |      |
| 8.1.2.1  | Please select the services the local government obtains from the surrounding ecosystems.   |   | CA-3 |
| 8.1.2.2  | Please identify the policies or the plans that the local government developed to preserve the ecosystem services selected in 8.1.2.1.  | SDG 15.9P, 2.3A, 2.4A, 2.CA, 6.6A, 12.2A, 14.4A | CA-3 |
| 8.1.2.3  | Does the local government take the ecosystem services approach or a different environmental approach into consideration in local policy and planning?  |   | CA-3 |
| 8.1.2.4  | Is the local government involved in transboundary agreements or collaborations to enable policy and planning for the implementation of ecosystem services approaches?  | UNISDR Scorecard 5.3.2C                         | CA-3 |
| 8.2 ECOLOGICAL FOOTPRINT                                     |  |   |      |
| 8.2.1 Biocapacity  |  |   |      |
| 8.2.1.1  | What is the biocapacity of the region over the last 10 years? Please specify the area size (in hectares) of each land use type present in the region, in order to calculate the area's biocapacity (in global hectares) for 2008 and 2017. | SDG 14.4A, 15.1A, 15.1.1P                       | CA-2 |
| 8.2.2 Ecological Footprint of Consumption                    |  | SDG 12.2A                                       |      |
| 8.2.2.1  | Ecological Footprint of Production (10 year trend).  |   | CA-4 |
| 8.2.2.1.1  | Break down the data (gha/pop) based on land use type and consumption output.   |   | CA-4 |
| 8.2.2.2  | Ecological Footprint of Consumption (10 year trend).   |   | CA-4 |
| 8.3 BIODIVERSITY AND GREEN INFRASTRUCTURE                    |  |   |      |
| 8.3.1 Native Biodiversity in the City                        |  |   |      |
| 8.3.1.1  | Specify the change in number of native species over the past ten years. If data is available, please disaggregate further, particularly into those species on the Red List of Threatened Species.  | SDG 15.5A<br>ISO-37120 8.8P                     | CA-2 |
| 8.3.1.2  | Proportion of invasive alien species as percentage of all species.   | SDG 15.8A                                       | CA-2 |
| 8.3.1.3  | Proportion of natural areas and urban green spaces in the city as a percentage of the urban area.  |   | CA-2 |
| 8.3.1.4  | Specify the urban green space per capita and disaggregate, if possible, by sex, age and groups in vulnerable situation.  | ISO-37120 19.1C<br>ESCI 45C                     | CA-2 |
| 8.3.1.5  | Proportion of urban green space cover (including vegetation canopy cover and blue areas), as percentage of the size of the functional area.  |   | CA-2 |
| 8.3.2 Protected Natural Areas in the Region and Connectivity |  |   |      |
| 8.3.2.1  | Please, specify the proportion of natural areas in the region that is protected.   | SDG 6.6A, 14.5.1P, 15.1.2P, 15.4.1P             | CA-3 |
| 8.3.2.2  | Please specify whether expenditure (public and private) per capita spent on the preservation, protection and conservation of natural heritage is increasing, stable, or decreasing.  | SDG 11.4.1P                                     | CA-3 |
| 8.3.2.3  | Please specify the total size of the number of areas (in ha) that connect protected natural areas and urban green spaces in the city, using the Green Infrastructure Index as measure.   |   | CA-3 |
| 8.3.2.4  | Does the city take the biodiversity in these corridors, and in their green spaces and blue areas in general, into consideration?   |   | CA-3 |
| 8.4 ENVIRONMENTAL QUALITY                                    |  |   |      |
| 8.4.1 Greenhouse Gas Emissions                               |  |   |      |
| 8.4.1.1  | CO <sub>2</sub> emissions (tones of CO <sub>2</sub> per inhabitant).   | ESCI 29C<br>ISO-37120 8.3P                      | CA-2 |
| 8.4.1.2  | CO <sub>2</sub> intensity (grams per unit of real GDP).  | ESCI 30C  | CA-2 |



## 8. Ecology

|           |   |  |   |      |
|-----------|---|--|---|------|
| 8.4.2     | Air Quality   |  | ESCI 26C                                  |      |
| 8.4.2.1   | Particulate matter (PM10) concentration (24-hour average).  |  | ESCI 27C<br>ISO-37120 8.2C<br>SDG 11.6.2P | CA-2 |
| 8.4.2.1.1 | Exceedance days (above 50µg/m3).  |  |   | CA-2 |
| 8.4.2.2   | Fine particulate matter (PM2,5) concentration (1-year average).   |  | SDG 11.6.2C<br>ISO-37120 8.1C             | CA-2 |
| 8.4.2.2.1 | Exceedance days (above 25µg/m3).  |  |   | CA-2 |
| 8.4.2.3   | Nitrogen dioxide (NO2) concentration (1-hour average).  |  | ISO-37120 8.4P                            | CA-2 |
| 8.4.2.3.2 | Exceedance days (above 200µg/m3).   |  |   | CA-2 |
| 8.4.3     | Water Quality   |  | SDG 6.3.2A                                |      |
|           | <i>Ground water quality</i>   |  |   |      |
| 8.4.3.1   | Select the pollutants present in ground water that have transgressed the established limit.   |  |   | CA-2 |
|           | <i>Surface freshwater quality</i>   |  |   |      |
| 8.4.3.2   | Select the pollutants present in inland surface water that have transgressed the established limit.   |  |   | CA-2 |
|           | <i>Marine water quality of Class I Water</i>  |  |   |      |
| 8.4.3.3   | Select the pollutants present in Class I Water that have transgressed the established limit.  |  | SDG 14.1A, 14.3.1<br>P                    | CA-2 |
|           | <i>Marine water quality of Class II Water</i>   |  |   |      |
| 8.4.3.4   | Select the pollutants present in Class II Water that have transgressed the established limit.   |  | SDG 14.1A, 14.3.1<br>P                    | CA-2 |
| 8.4.4     | Additional Pollution  |  |   |      |
| 8.4.4.1   | Are there areas in the city with significant land pollution (e.g. brownfield sites, riverbeds, agricultural sites etc.)?                    |  |   | CA-2 |
| 8.4.4.2   | Are there currently areas in the city with significant thermal pollution (e.g. heat island effect)?   |  |   | CA-2 |
| 8.4.4.3   | Are there currently areas in the city with significant radioactive pollution (e.g. nuclear power plants, industrial sites, hospitals etc.)? |  |   | CA-2 |
| 8.4.4.4   | Are there currently areas in the city with significant noise pollution?   |  | ISO 8.7A                                  | CA-2 |
| 8.4.4.5   | Are there currently areas in the city with significant light pollution?   |  |   | CA-2 |
| 8.4.4.6   | Other types of pollution not included in this report. [+]   |  |   | CA-2 |
| 8.4.5     | Monitoring of Environmental Quality   |  |   |      |
| 8.4.5.1   | Existence and monitoring of greenhouse gas inventory.   |  | ESCI 28C                                  | CA-3 |
| 8.4.5.2   | Existence, monitoring and enforcement of air quality regulations.   |  | ESCI 25C                                  | CA-3 |
| 8.4.5.3   | Existence, monitoring and enforcement of water quality regulations.   |  | SDG 6.3A<br>SDG 14.1A                     | CA-3 |
| 8.4.5.4   | Existence, monitoring and enforcement of regulations regarding the additional types of pollution identified in Indicator 8.4.4. [+]         |  | ESCI 32P                                  | CA-3 |

# 7. Climate Action Enhancer Questionnaire

## 7.1. Methodology and process for CAE

In order to make the Climate Action Enhancer effective and easily applicable, a semistructured questionnaire format was applied to the CRPT to extract key indicators and steps. The CAE has supported UN-Habitat to identify how much of the CRPT supports climate change projects and programmes. The questionnaire includes the following five sections:

1. Basic information for contextualisation
2. Climate Action Targeting
3. Climate Change Analysis
4. Climate informed Actions for Resilience (A4Rs)
5. M&E aspects for further applicability of recommendations

Whereas the team in charge of the elaboration of the CRPT benefited from the support of various specialists, the CAE questionnaire was designed as a complementary tool to support each team member in applying critical thinking in climate change action.

The process of climate action should remain an iterative one, and it is expected that CRPT piloting in cities will bring new elements and enrich the current approach. At a later stage, the CAE is expected to contribute to broader policy-making and strategy development process in cities, thus fulfilling a new role, and shifting from tool strengthening (in terms of climate action) to a strengthened capacity in cities to address challenges.

| 1. Basic Information about CRPT               |                              |
|---|------------------------------|
| Analytical set                                | Select: SET 1 to 4, or A4Rs  |
| Urban Element                                 | Select: Element 1 to 8       |
| (Supra) Component                             | Full name                    |
| Expert in charge with the component           | Name and role in the project |
| Climate / environmental expert (countercheck) | Name and role in the project |
| Date of assessment                            |                              |

## 2.Climate Action Targeting (component level)

| Questions   | Answers  |
|---|--|
| 2.1 Is the component relevant for climate action mainstreaming?                               | Yes <span style="float: right;">[ ]</span><br>No <span style="float: right;">[ ]</span><br>Not determined yet <span style="float: right;">[ ]</span>   |
| 2.2 Is the component relevant for climate change mitigation urban policies? (Multiple choice) | 1. Development of local levels plans and strategies to reduce GHG emissions <span style="float: right;">[ ]</span><br><br>2. Increasing the share of low-carbon/renewable energy sources, promoting efficient energy consumption <span style="float: right;">[ ]</span><br><br>3. Boosting sustainable urban development patterns that minimizes journey times and travel distances and reduce emissions, stimulate sustainable transport modes <span style="float: right;">[ ]</span><br><br>4. Reducing emissions by promoting more sustainable design and construction <span style="float: right;">[ ]</span><br><br>5. Sustainable management of solid and liquid waste <span style="float: right;">[ ]</span>   |
| 2.3 Is the component relevant for climate change adaptation urban policies? (Multiple choice) | 1. Promote applied research into risks associated with climate change impacts and other hazards <span style="float: right;">[ ]</span><br><br>2. Encourage and support local level climate change vulnerability assessment <span style="float: right;">[ ]</span><br><br>3. Mapping of hazards (including those ones that can evolve over time) <span style="float: right;">[ ]</span><br><br>4. Plan human settlements, regulate land use, and provide critical infrastructure and services considering risk information <span style="float: right;">[ ]</span><br><br>5. Prioritise actions targeting vulnerable and marginalised population, upgrade slums and informal settlements <span style="float: right;">[ ]</span><br><br>6. Promote the restoration of ecosystems and natural buffers <span style="float: right;">[ ]</span><br><br>7. Provide for regional planning to protect ecosystems and guard against 'mal-adaptation' <span style="float: right;">[ ]</span> |

### 3. Analysis (name the indicator or the supporting indicator)

| Questions  | Answers  |
|--|--|
| Does the indicator refer to climate change trends? | Yes <span style="float: right;">[ ]</span><br>No <span style="float: right;">[ ]</span><br>> go to section 4 |
| Does the indicator refer to environmental quality? | Yes <span style="float: right;">[ ]</span><br>No <span style="float: right;">[ ]</span>                      |
| Does the indicator refer to climate resilience?    | Yes <span style="float: right;">[ ]</span><br>No <span style="float: right;">[ ]</span>                      |

#### 4. Actions for resilience (name the A4R relevant or the analysed component)

|  |   |
|--|---|
| <p>Level of analysis</p> <p>The articulation with the New Urban Agenda implies the work at the following five levels. Specify whether the recommendation for action for resilience is action informed at each of these levels.</p> | <p>UN-Habitat thematic area of interest</p> <p>Climate Action mainstreaming areas, according to Cities and Climate Change Initiative, according to UN-Habitat Guiding Principles for City Climate Action Planning (2015). Select every relevant one.</p>  |
| <p>4.1 Local implementable actions</p> <p>Yes <span style="float: right;">[ ]</span></p> <p>No <span style="float: right;">[ ]</span></p> <p>If not, explain why:</p>  | <p>1. Urban legislation, land, governance <span style="float: right;">[ ]</span></p> <p>2. Urban planning and design branch <span style="float: right;">[ ]</span></p> <p>3. Urban economy <span style="float: right;">[ ]</span></p> <p>4. Urban basic services <span style="float: right;">[ ]</span></p> <p>5. Housing and slum upgrading <span style="float: right;">[ ]</span></p> <p>6. Research &amp; capacity development <span style="float: right;">[ ]</span></p> <p>7. Risk reduction and rehabilitation <span style="float: right;">[ ]</span></p> |
| <p>4.2 Financing the urbanisation</p> <p>Yes <span style="float: right;">[ ]</span></p> <p>No <span style="float: right;">[ ]</span></p> <p>If not, explain why:</p>   | <p>1. Urban legislation, land, governance <span style="float: right;">[ ]</span></p> <p>2. Urban planning and design branch <span style="float: right;">[ ]</span></p> <p>3. Urban economy <span style="float: right;">[ ]</span></p> <p>4. Urban basic services <span style="float: right;">[ ]</span></p> <p>5. Housing and slum upgrading <span style="float: right;">[ ]</span></p> <p>6. Research &amp; capacity development <span style="float: right;">[ ]</span></p> <p>7. Risk reduction and rehabilitation <span style="float: right;">[ ]</span></p> |
| <p>4.3 Strategies, planning, design</p> <p>Yes <span style="float: right;">[ ]</span></p> <p>No <span style="float: right;">[ ]</span></p> <p>If not, explain why:</p>   | <p>1. Urban legislation, land, governance <span style="float: right;">[ ]</span></p> <p>2. Urban planning and design branch <span style="float: right;">[ ]</span></p> <p>3. Urban economy <span style="float: right;">[ ]</span></p> <p>4. Urban basic services <span style="float: right;">[ ]</span></p> <p>5. Housing and slum upgrading <span style="float: right;">[ ]</span></p> <p>6. Research &amp; capacity development <span style="float: right;">[ ]</span></p> <p>7. Risk reduction and rehabilitation <span style="float: right;">[ ]</span></p> |
| <p>4.4 Existing rules and regulations</p> <p>Yes <span style="float: right;">[ ]</span></p> <p>No <span style="float: right;">[ ]</span></p> <p>If not, explain why:</p>   | <p>1. Urban legislation, land, governance <span style="float: right;">[ ]</span></p> <p>2. Urban planning and design branch <span style="float: right;">[ ]</span></p> <p>3. Urban economy <span style="float: right;">[ ]</span></p> <p>4. Urban basic services <span style="float: right;">[ ]</span></p> <p>5. Housing and slum upgrading <span style="float: right;">[ ]</span></p> <p>6. Research &amp; capacity development <span style="float: right;">[ ]</span></p> <p>7. Risk reduction and rehabilitation <span style="float: right;">[ ]</span></p> |
| <p>4.5 Harmonisation with national urban planning</p> <p>Yes <span style="float: right;">[ ]</span></p> <p>No <span style="float: right;">[ ]</span></p> <p>If not, explain why:</p>   | <p>1. Urban legislation, land, governance <span style="float: right;">[ ]</span></p> <p>2. Urban planning and design branch <span style="float: right;">[ ]</span></p> <p>3. Urban economy <span style="float: right;">[ ]</span></p> <p>4. Urban basic services <span style="float: right;">[ ]</span></p> <p>5. Housing and slum upgrading <span style="float: right;">[ ]</span></p> <p>6. Research &amp; capacity development <span style="float: right;">[ ]</span></p> <p>7. Risk reduction and rehabilitation <span style="float: right;">[ ]</span></p> |

## 5. M&E


| Questions  | Answers   |
|--|---|
| 5.1 Are any climate action related baselines used in the analysis?   | Yes <span style="float: right;">[ ]</span><br>No <span style="float: right;">[ ]</span><br>If not, explain why: |
| 5.2 Are any climate action related aspects monitored when implementing the recommendations for actions for resilience? | Yes <span style="float: right;">[ ]</span><br>No <span style="float: right;">[ ]</span><br>If not, explain why: |
| 5.3 Is any evaluation carried-out in order to assess whether the recommendations were implemented?                     | Yes <span style="float: right;">[ ]</span><br>No <span style="float: right;">[ ]</span><br>If not, explain why: |



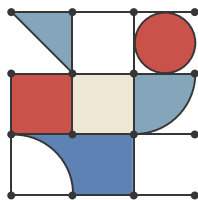




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  11. Frameworks
    - ARUP – ARUP City Resilience Index
    - CPI - City Prosperity Index
    - CSD / WBCSD - City Strength Diagnostic
    - ESCI - Emerging Sustainable Cities Initiative
    - GLII - Global Land Indicators Initiative
    - ISO - International Standards Organization
    - SDGs - Sustainable Development Goals
    - SUTP - Sustainable Urban Transport Programme
    - OECD - Organisation for Economic Cooperation and Development





If your organization would like to support or find out more about UN-Habitat's Urban Resilience work, please contact us at

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