CITY
RESILIENCE
PROFILING
PROGRAMME

Zero draft

Climate Action Enhancer

Climate Action and Development
Climate Action and Resilience
Climate Action and the City Resilience Profiling Tool

UN HABITAT
FOR A BETTER URBAN FUTURE

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[1] IPCC. (2014). Climate Change: Synthesis Report - Summary for Policymakers. https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

[2] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

[3] United Nations. Sustainable Development Goals. Goal 13: Take urgent action to combat climate change and its impacts. [online] http://www.un.org/sustainabledevelopment/climate-change-2/

[4] Idem 2.

[5] UN-Habitat Governing Council. (2015). Resolution 25/4: Implementation of the strategic plan for 2014-2019

[6] UN-Habitat Climate Change Strategy 2014-2019. Nairobi: UN-Habitat.

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[1] .

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[2]. 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[3].

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[4]. 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[6].

The City Resilience Profiling Tool (CRPT), developed by UN-Habitat, is a leading methodology for resilience building in cities[5] 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 action, and as such aims to provide a snapshot of the city in relation to climate change.

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[7].

2.1. The Paris Agreement

The Paris Agreement (2015) recognize that climate change is a real and unprecedented challenge, requiring urgent global action[8]. 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[9].

[7] UN-HABITAT. (2015). Climate Change Strategy 2014-2019. Nairobi: UN-Habitat.

[8] UNFCCC. (2015). Agenda item 4(b). Adoption of the Paris Agreement -/CP.21. https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf

[9] UN-HABITAT. (2017). Sustainable Urbanization in the Paris Agreement: Comparative review for urban content in the Nationally Determined Contributions (NDCs). Nairobi, October 2017.

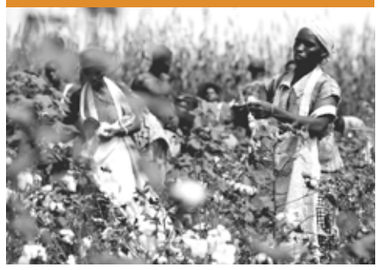
2.2. Sustainable Development Goals (SDGs)

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[10].

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.

Sustainable Development Goal 12
ensure sustainable consumption and production patterns



Sustainable Development Goal 13
Take urgent action to combat climate change and its impacts

[10] United Nations. (2015). Transforming Our World: The 2030 Agenda for sustainable Development. https://www.un.org/pga/wp-content/uploads/sites/3/2015/08/120815_outcome-document-of-Summit-for-adoption-of-the-post-2015-development-agenda.pdf

2.3. The New Urban Agenda

The New Urban Agenda (2016) 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
-
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[11].

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.

[11] United Nations (2016). New Urban Agenda. [online] http://habitat3.org/wp-content/uploads/NUA-English.pdf

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[12]. 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"[13].

To include mitigation measures in urban policies, UN-Habitat set out recommendations in the policy guide Addressing Climate Change in National Urban Policy[14]. 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.

[12] UN-Environment Programme https://www.unenvironment.org/explore-topics/climate-change/what-we-do/mitigation

[13] UNFCCC. (2015). Agenda item 4(b). Adoption of the Paris Agreement -/CP.21. https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf

[14] UN-HABITAT. (2016). Addressing Climate Change in National Urban Policy: a policy guide for low-carbon and climate-resilient urban development. Cities and Climate Change Initiative: policy note no.4. Nairobi: UN-Habitat

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"[15].

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[16], 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.

[15] Idem 16.

[16] UN–Habitat UN-HABITAT. (2015). Climate Change Strategy 2014-2019. Nairobi: UN-Habitat.

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 pertinant 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[17]:

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

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.