

Urban Climate Action. The urban content of the NDCs: Global review 2022

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Urban Climate Action

The urban content of the NDCs:
Global review 2022



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Urban Climate Action

The urban content of the NDCs:
Global review 2022



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TABLE OF CONTENTS

| | |
|--|-----------|
| LIST OF TABLES, FIGURES and MAPS | vi |
| ACRONYMS AND ABBREVIATIONS | vii |
| EXECUTIVE SUMMARY | 1 |
| FOREWORD | 5 |
| INTRODUCTION | 6 |
| 01 APPROACH AND METHODOLOGY | 8 |
| 1.1 Database architecture and indicators | 9 |
| 1.2 Data collection | 11 |
| 1.3 Data analysis | 11 |
| 1.4 Report writing | 14 |
| 1.5 Methodology improvement and limitations | 14 |
| 02 URBAN CONTENT OF NDCs AT THE GLOBAL LEVEL | 16 |
| 2.1 Urban Content of NDCs: The 2016-17 Analysis | 17 |
| 2.2 Urban Content of NDCs: The 2021 Analysis | 18 |
| 2.3 Urban Content of NDCs: The 2022 Global Analysis | 18 |
| Urban mitigation and adaptation content | 24 |
| Urban climate challenges and responses | 25 |
| Urban mitigation challenges and responses | 26 |
| Urban adaptation challenges and responses | 27 |
| Urban climate hazards | 29 |
| Gender and urban adaptation challenges and responses | 30 |
| Mitigation challenges (national vs urban) | 30 |
| Mitigation responses (national vs urban) | 31 |
| Mitigation challenges and responses (national vs urban) | 33 |
| Adaptation challenges (national vs urban) | 33 |
| Adaptation responses (national vs urban) | 35 |
| Adaptation challenges and responses (national vs urban) | 36 |
| Adaptation hazards (national vs urban) | 37 |
| Finance, technology, and capacity building request (national vs urban) | 38 |
| Cross-cutting issues (national vs urban) | 39 |
| NDC conditional/unconditional contribution | 40 |
| 2.4 Urban Content of NDCs: Trends Based on the 2016-17 and 2022 Analyses | 41 |
| 03 KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS | 42 |
| 3.1 Key Findings | 43 |
| 3.2 Conclusions and Recommendations | 45 |
| REFERENCES | 48 |
| ANNEXES | 49 |
| A.1. LIST OF INDICATORS USED FOR THE NDCs' URBAN CONTENT ANALYSIS 2022 | 50 |
| A.2. LIST OF COUNTRIES WHOSE NDCs' URBAN CONTENT WAS ANALYSED | 57 |

LIST OF TABLES, FIGURES AND MAPS

Tables

| | |
|---|----|
| Table 1. List of Countries with associated CO ₂ e Emissions and Urban Populations..... | 19 |
| Table 2. Urbanisation and pollution compared with NDCs' urban clusters..... | 24 |

Figures

| | |
|---|----|
| Figure 1. List of indicators' groups used to analyse the NDCs' urban content..... | 9 |
| Figure 2. Synthesis of the data analyses made for analysing the urban content of NDCs..... | 12 |
| Figure 3. Scheme of the sectors used to analyse NDCs adaptation and mitigation challenges and responses, both at the national and urban level..... | 13 |
| Figure 4. Global analysis of the NDCs' urban content (2016), excluding NDCs of the 27 European countries. Cluster A (26); Cluster B (87); Cluster C (51). | 17 |
| Figure 5. Global analysis of the NDCs' urban content (2016), including NDCs of the 27 European countries. | 17 |
| Figure 6. NDCs urban content: the majority of the NDCs (123 out of 193) have urban content, strong or moderate. | 24 |
| Figure 7. NDCs urban content: Urban clusters (A, B, and C). | 24 |
| Figure 8. NDCs urban content: Urban mitigation and adaptation content..... | 25 |
| Figure 9. NDCs urban content: Urban content in mitigation and adaptation challenges and responses (Clusters A+B). | 25 |
| Figure 10. NDCs urban content: Urban mitigation challenges and responses. | 26 |
| Figure 11. NDCs urban content: Urban adaptation challenges and responses. | 28 |
| Figure 12. NDCs urban content: Urban adaptation hazards. | 29 |
| Figure 13. NDCs urban content: Mitigation challenges (national vs urban). | 30 |
| Figure 14. NDCs urban content: Mitigation responses (national vs urban). | 32 |
| Figure 15. NDCs urban content: Mitigation challenges and responses (national vs urban)..... | 33 |
| Figure 16. NDCs urban content: Adaptation challenges (national vs urban). | 34 |
| Figure 17. NDCs urban content: Adaptation responses (national vs urban)..... | 35 |
| Figure 18. NDCs urban content: Adaptation challenges and responses (national vs urban). | 36 |
| Figure 19. NDCs urban content: Adaptation hazards (national vs urban)..... | 37 |
| Figure 20. NDCs urban content analysis 2022: Finance, technology, and capacity building requests (national vs urban). | 38 |
| Figure 21. NDCs urban content: Cross-cutting indicators (national vs urban)..... | 39 |
| Figure 22. NDCs' conditional and unconditional contributions. | 40 |
| Figure 23. NDCs urban content analysis: comparing 2016 and 2022 results..... | 41 |
| Figure 24. NDCs urban content analysis: adaptation and mitigation content, in challenges and responses, looking at urban and national level. | 43 |

Maps

| | |
|---|----|
| Map 1: Map of Urban Content, Cluster A, B and C..... | 44 |
| Map 2: Map of Urban Content, Adaptation and Mitigation, Adaptation Only, Mitigation Only..... | 45 |

ACRONYMS AND ABBREVIATIONS

| | |
|-------------------|--|
| NDC | Nationally Determined Contribution |
| NAP | National Adaptation Plan |
| CO ₂ | Carbon Dioxide |
| CO ₂ e | Carbon dioxide equivalent |
| COP | Conference of the Parties |
| EGM | Expert Group Meeting |
| GCF | Green Climate Fund |
| GDP | Gross Domestic Product |
| GHG | Greenhouse gas |
| HDI | Human Development Index |
| INDCs | Intended Nationally Determined Contributions |
| IPCC | Intergovernmental Panel on Climate Change |
| LULUCF | Land use, land-use change and forestry |
| MER | Monitoring, Evaluation, and Reporting |
| MRV | Monitoring, Reporting, and Verification |
| OECD | Organisation for Economic Co-operation and Development |
| RECNET | Recycling Cities Network |
| SDGs | Sustainable Development Goals |
| SDU.Resilience | UNESCO Chair on Urban Resilience at the University of Southern Denmark |
| UN-Habitat | United Nations Human Settlement Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WRI | World Resource Institute |



EXECUTIVE SUMMARY

This report was prepared by United Nations Human Settlement Programme (UN-Habitat) and the UNESCO Chair on Urban Resilience at the University of Southern Denmark (SDU.Resilience). It offers a global analysis of the urban content of 193 Nationally Determined Contributions (NDCs) submitted to the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) before the 19th of June 2022.

For this report, more than 200 indicators were used to analyse external data (e.g., Human Development Index and income categorisation) and data within the NDCs, including climate mitigation and adaptation challenges and responses, as well as specific sectors.

The present review has two main objectives:

1. To understand the urban content of NDCs by conducting the following: classifying NDCs into three clusters (A: strong urban content, B: moderate urban content, C: low or no urban content); identifying urban mitigation challenges and responses and urban adaptation challenges and responses by sector; and highlighting specific urban needs on finance, capacity building and technology.
2. To highlight (mis)alignment between: General mitigation/adaptation challenges vs Urban mitigation/adaptation challenges; Urban mitigation challenges vs urban mitigation responses; Urban adaptation challenges vs urban adaptation responses; Urban mitigation/adaptation challenges/responses vs request for finance; Urban mitigation/adaptation challenges/responses vs request for technology; and Urban mitigation/adaptation challenges/responses vs request for capacity building.

This analysis is instrumental to supporting Parties' efforts in further integrating national climate policies and urban climate actions, which is considered fundamental to raising ambition and developing adequate and timely actions as required by the current climate emergency. This review can be instrumental for advocacy and direct support to countries by partner organisations.

The work was supported by a group of experts from bilateral and multilateral organisations and academia. Three expert group meetings were convened, and a peer review was organised for the final report.

KEY FINDINGS

1. 47 of 193 NDCs have a strong urban content (Cluster A), 76 NDCs have a moderate urban content (Cluster B) and 70 NDCs have low or no urban content (Cluster C).
2. 64% of the NDCs analysed have a strong or moderate urban content (Cluster A+B).
3. The percentage of NDCs with urban content (Cluster A+B) has increased in comparison with 2016-17, from 60% in 2016-17 to 63% in 2022.
4. The NDCs with strong urban content (Cluster A) have significantly increased in number in comparison with the 2016 analysis, passing from 14% in 2016-17 to 24% in 2022.
5. The NDCs with urban content (Cluster A+B) originate from Parties that account for 70% of the world's urban population and 72% of CO₂e emissions of the total submitted NDCs.
6. 83 NDCs, or 43% of the NDCs analysed, focus both on urban adaptation and mitigation, whereas 12% of the NDCs focus on only urban adaptation. 9% of the NDCs focus on only urban mitigation.
7. NDCs with urban content (Cluster A+B) identify more urban responses than challenges. 74% of NDCs with urban content identify urban mitigation responses and 47% identify urban mitigation challenges. 67% identify urban adaptation responses and 47% urban adaptation challenges. Results are shown in Figure 24.
8. Energy, transport and mobility and waste are the most mentioned sectors in urban mitigation challenges and responses.
9. Infrastructure and water are the two most mentioned sectors in urban adaptation challenges and responses.
10. 48 NDCs, or 39% of the NDCs with urban content, identify urban climate hazards. Flooding is the most prominently identified urban climate hazard, although it is only included in 35 NDCs. All other climate hazards are each included with a relatively low maximum 8% of the total NDCs analysed.

11. Gender is almost not considered at all within urban mitigation and adaptation challenges, and it is minimally considered in urban climate mitigation and adaptation responses.
12. Mitigation responses by sector are more frequently mentioned at the national level than at the urban level. The sectors with the higher number of mitigation challenges and responses identified both at the national and urban levels are energy, transport and mobility and waste.
13. Adaptation responses by sector are more frequently mentioned at the national level than at the urban level; however, urban adaptation responses are in general mentioned in more NDCs than urban adaptation challenges.
14. Adaptation hazards are more frequently mentioned at the national level than the urban level: 116 NDCs, or 87% of the total NDCs analysed, identify national adaptation hazards; and 48 NDCs, of the 25% of the total NDCs analysed and 39% of the NDCs with urban content, identify urban adaptation hazards. Droughts, floodings and temperature rise are the adaptation hazards included in most NDCs at national level, followed by a lower inclusion of other national adaptation hazards, notably sea level rise, storm events, heat/cold waves, vector-borne diseases and land degradation. Flooding is the adaptation hazard included in most NDCs at urban level, followed by limited inclusion of several other hazards.
15. The vast majority of NDCs identify requests: 162 NDCs include requests for technology, 153 NDCs request capacity building and 144 NDCs request finance. Only an extremely limited number of NDCs include specific requests at urban level for finance (22 NDCs), capacity building (8 NDCs) and technology (7 NDCs).
16. NDCs show most of the national cross-cutting issues for the topics: participation, gender and loss and damage. Informal settlements and public spaces are the least mentioned among the cross-cutting issues within the NDCs. In the urban context, NDCs show most cross-cutting issues related to nature-based solutions, ecosystem services, informal settlements and youth; whereas data analysis, multilevel governance, innovation, indigenous, social inclusion and circular economy are the least mentioned cross-cutting issues within the NDCs in an urban context.

Conclusions

The number of NDCs with urban content increased in a very limited manner among the most recent submissions compared to 2011-17, but there has been a substantial increase of the number of NDCs with strong urban content. It is very positive to acknowledge that almost two out of three NDCs have an urban focus. It is also important to note that the lack of urban content in an NDC does not necessarily mean that there is a lack climate urban policies and actions.

Likewise, the NDCs with urban content, including those with strong urban content (Cluster A), may still require further strengthening and integration of urban climate policies and actions. The strengthening of urban content of the NDCs is instrumental to raise the overall ambition of the NDCs and to strengthen the effective operationalization of climate adaptation and mitigation policies.

Two thirds of the NDCs with urban content are focusing on both mitigation and adaptation. The integration of urban mitigation and adaptation is especially important as cities are responsible for a substantial share of GHG emissions and are also increasingly exposed and vulnerable to the negative effects of climate change. The integration of climate mitigation and adaptation is fundamental to increase the effectiveness of policies and actions, avoiding silo approaches and minimizing rebound effects, and also to maximize the effectiveness of resource utilisation.

NDCs identify more mitigation and adaptation responses than challenges. This may be the case as often NDCs do not include full details on mitigation and adaptation challenges and adaptation hazard but cite or refer to external documents. Moreover, the identification of urban carbon footprints and/or urban climate risk are complex and resource-intensive undertakings, and only a limited number of cities and countries worldwide have been able to develop and systematically report on these in the NDCs.

Only about one fourth of the submitted NDCs mention urban mitigation responses on energy, transport and mobility and waste sectors, and even fewer NDCs mention urban mitigation responses in other sectors, including key sectors like built environment. Only one fourth of the submitted NDCs mention urban adaptation responses on infrastructure and on water. Moreover, urban adaptation responses for all other sectors are referenced in only 13% of the submitted NDCs. This shows that there is ample margin for further

identification of challenges and planning of adequate responses for urban climate mitigation and adaptation, looking also at sector integration.

In relation to urban climate hazards, flooding is the most prominent, although it is found in only 35 NDCs, and all other climate hazards are each included in a maximum of 16 NDCs each. Based on this data, greater focus is needed on urban climate hazards, in particular, through a multi-risk perspective (e.g., water-related risks, including flooding, drought and sea level rise).

Gender is almost not considered at all within urban mitigation and adaptation challenges, and it is minimally considered in urban climate mitigation and adaptation responses, despite being mentioned by over 25% of the NDCs analysed at national level in relation to both mitigation and adaptation. The lack of inclusion of gender considerations at urban level, both in relation to mitigation and adaptation, is a major gap in the NDCs.

The mitigation challenges and responses by sector, and the adaptation challenges and responses by sector are mentioned at national level much more than at urban level. This demonstrates a major gap and opportunity to include greater urban content and to align it to already identified mitigation and adaptation challenges and responses at national level.

The vast majority of NDCs include requests for technology, capacity building and finance, whereas only an extremely limited number of NDCs include these specific requests at urban level. This shows that there is ample space for improving the inclusion of specific urban requests for finance, technology and capacity building in NDCs in an urban context.

There is a major gap between national and urban cross-cutting issues mentioned within the NDCs, e.g., participation is mentioned in 74% of NDCs at national level and 3% of NDCs at urban level. The most frequently mentioned national cross-cutting issues are participation, gender and loss and damage, whereas the least mentioned are informal settlements and public spaces. The most frequently mentioned urban cross-cutting issues are nature-based solutions, ecosystem services, informal settlements and youth, whereas the least mentioned are data availability, multilevel governance, innovation, indigenous, social inclusion and circular economy. This shows an extraordinarily strong need for strengthening urban level

considerations on cross-cutting issues, also in countries with urban content.

Recommendations

Based on the data collected and analysed, recommendations are presented below:

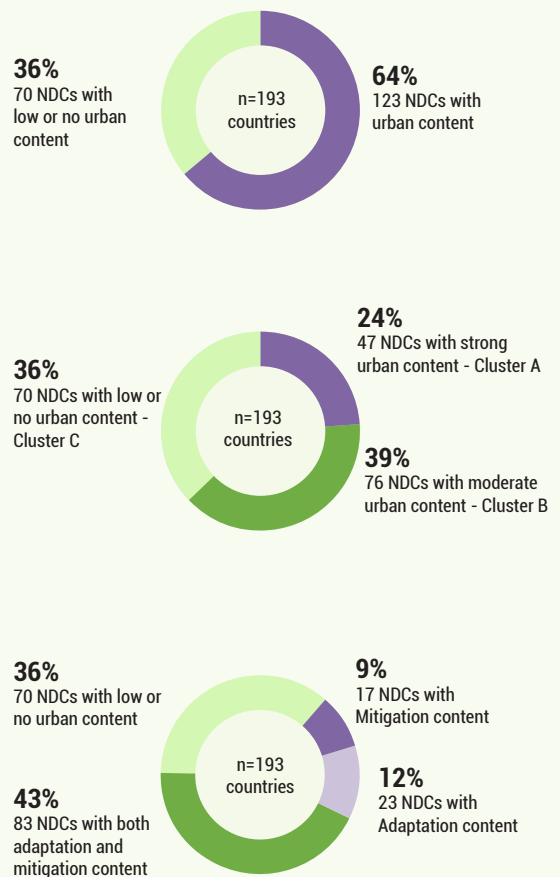
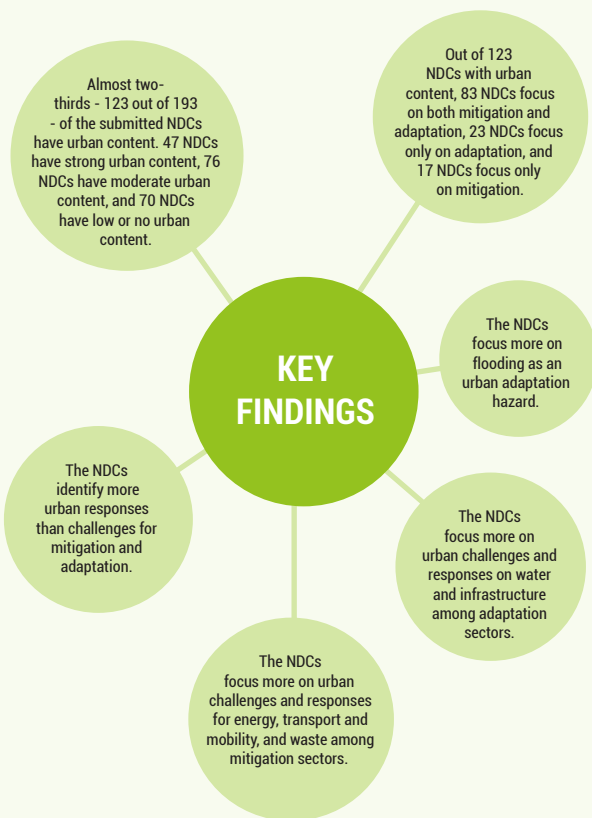
1. Scale up advocacy and support to the Parties for including urban content in their NDCs.
2. Update the guidelines for supporting the inclusion of urban content in the NDCs and develop more systematic and tailored support for the Parties in implementing the guidelines for strengthening their NDCs.
3. Expand the analysis of urban content to other key national urban policies in addition to NDCs, such as National Adaptation Plans (NAPs) and Long-Term Low Emissions Development Strategies (LT-LEDS).
4. Increase the number of country-level analyses to have a more systemic view of the urban content of all urban related national climate policies, also in relation to current urban actions and projects at urban level.
5. Support the integration of mitigation and adaptation for urban climate action.
6. Increase the explicit identification of urban climate challenges to better guide the definition of urban climate responses and track their effectiveness and progress.
7. Climate mitigation responses at urban level should be strengthened by supporting a more concrete identification of urban mitigation responses in key sectors like energy, transport and mobility, waste and built environment, including NDCs that already have urban content.
8. Climate mitigation responses at urban level should be strengthened by supporting a more concrete identification of urban adaptation responses across all adaptation sectors, including in NDCs that already have urban content.
9. Climate adaptation hazards at urban level shall be better identified, both individually and under a multi-risk

perspective, to guide the identification and monitoring of appropriate urban adaptation responses.

- 10. Gender consideration at urban level, related to both mitigation and adaptation challenges and opportunities, should be strengthened.
- 11. Urban level mitigation and adaptation challenges and responses by sector should be expanded in alignment with the national level.

- 12. Requests for technology, finance and capacity building should have greater definition at urban level.
- 13. Cross-cutting issues should be better included and strengthened at urban level.
- 14. More in-depth analysis and research should be undertaken in relation to urban content and cross-cutting issues.

HIGHLIGHTS



FOREWORD



Our planet has already warmed by around 1.2 degrees. The battle to reach net zero by mid-century to avoid the most catastrophic impacts of climate change will be won or lost this decade. In 2022, we have already seen devastating effects of climate change, ranging from oppressive heat waves across Europe and America to floods in South Africa and Pakistan, and severe drought in Brazil and China.

The most recent 2022 UNFCCC report synthesizing current national government commitments, or Nationally Determined Contributions, estimates that, based on current commitments, peak temperatures by 2100 will reach 2.1-2.9 degrees Celsius above preindustrial levels.

As countries roll out their climate strategies to tackle the climate crisis, our ambition must be strengthened using all available resources to limit greenhouse gas emission and to enhance climate resilience and adaptive capacity.

Cities are key to achieve the Paris Agreement targets. Urban areas are major contributors to climate change, accounting for about 78 percent of the world's energy consumption

and emitting more than 70 percent of global greenhouse gas emissions. However, they are also engines of climate innovation and action.

The need for sustainable urbanization is even more urgent when considering the rapid rise in urban population, estimated to reach 68 percent by 2050.

UN-Habitat is responsible for sustainable urbanization and human settlements within the UN system. We support countries to build sustainable, inclusive, safe, and resilient cities and communities. Our vision for a better urban future includes the built and natural environment. We need to improve our urban environment and take more decisive climate action.

This report pushes this vision forward by exploring the linkage between the Nationally Determined Contributions and urban issues. We highlight the many challenges and opportunities to respond to climate change in the context of the urban setting and illustrate country approaches for effective multi-level governance.

UN-Habitat thanks its partners in this critical effort, notably the University of Southern Denmark for the NDCs analysis and leading the drafting of this report, and the partnership with Global Covenant of Mayors for Climate and Energy which made this report possible. We hope this research and analysis will add to the toolbox of resources in support of country efforts to scale up and align urban issues in Nationally Determined Contributions and other important climate policies. Together we provide data to support evidence-based policymaking and identify gaps in the urban climate response for better climate solutions.

Maimunah Mohd Sharif

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United Nations Human Settlements Programme (UN-Habitat)

INTRODUCTION

This report was prepared by United Nations Human Settlement Programme (UN-Habitat) and the UNESCO Chair on Urban Resilience at the University of Southern Denmark (SDU.Resilience). It offers a global analysis of the urban content of Nationally Determined Contributions (NDCs) submitted to the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) before the 19th of June 2022.

The NDCs represent the heart of the Paris Agreement¹. Parties shall prepare, communicate and maintain successive NDCs with increasing ambition. The NDCs combine the focus on mitigation (Article 4.2), by defining clear goals and means to reduce greenhouse gas (GHG) emissions, and adaptation (Article 7.10-11), by communicating needs, plans and actions related to adaptation to climate change.

The Paris Agreement, in its preamble, recognises the importance of the engagement of all levels of government and various actors in addressing climate change; this includes the local governments. Furthermore, the Paris Agreement affirms that support shall be provided to developing country Parties in implementing their NDCs (Article 4.5). In relation to climate adaptation, the Paris Agreement recognises the importance of support for international cooperation (Article 7.6). It notes particularly that United Nations specialised organisations and agencies are encouraged to support the efforts of Parties to implement the actions referred to in the adaptation provisions of the Paris Agreement (Article 7.8).

Moreover, the Conference of the Parties (COP) in Katowice articulated the need to facilitate clarity, transparency and understanding of the NDCs², specifically including human settlements and urban planning as key sectors for reporting specific adaptation projects, measures and activities that contribute to mitigation co-benefits.

The urban sector represents not only the main focus of UN-Habitat's work but also an important area of engagement for several other development partners. The urban sector is central for raising ambitions and operationalizing climate action, given that urbanised

areas account for 70% of GHG emissions, use 78% of the world's energy and account for just 2% of the land footprint. Moreover, cities are also homes to concentrations of people and assets that may be exposed and vulnerable to the impacts of climate change.

There is a clear need for enhancing the vertical integration of multi-level governance, for strengthening the implementation of national climate policies and for empowering local climate action. Both climate change mitigation and adaptation require technical know-how, large financial resources and capacities building.

"It is anticipated that a growing number of South African cities and towns will be exposed to the impacts of weather-induced hazards such as flooding, heatwaves, droughts, wildfires, and storms. This is partly due to the projected increase in the frequency and intensity of weather-related hazards but also due to the high socioeconomic vulnerability inherent within communities, poor land-use practices, growing informality, and a failure to rapidly deploy resilient infrastructure associated with accommodating a growing urbanising population. It is undeniably the poor and vulnerable communities that will experience the most severe setbacks from the impacts of climate change, eroding their livelihoods, and thus threatening their resilience". (South Africa NDC, p. 8)

"The effects of climate change are more pronounced in cities where the movement of urbanization is accelerated by the extensions of urban perimeters. This urban extension is due to a marked periurbanisation, in addition to the formal modes of land and real estate production, by the proliferation of non-regulatory neighbourhoods and informal occupations on floodingplains and on drainage lines. Added to this is also the lack of infrastructure". (Tunisia NDC, p. 30)

The Paris Agreement specifies that Parties to the UNFCCC should communicate an NDC "every five years" (Article 4.9).

The parties submitted their first 'Intended Nationally Determined Contributions' (INDCs) following the approval of the Paris Agreement. UN-Habitat, Recycling City Network (RECNET), the University of Southern Denmark (SDU. Resilience), the UNESCO Chair on Sustainability at the Technical University of Catalunya and Cologne University of Applied Sciences, analysed the urban content of the initial batch of 164 NDCs submitted in 2016, and publishing the results in 2017³.

1 The Paris Agreement is a "legally binding international treaty on climate change adopted by 196 Parties at COP-21 in Paris on 12 December 2015" and which entered into force on 4 November 2016. 'COP-21' was the 21st Conference of Parties to the UNFCCC. See <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.

2 Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on the third part of its first session, held in Katowice from 2 to 15 December 2018. Addendum Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. FCCC/PA/CMA/2018/3/Add.1

3 Tollin N., Hamhaber J., Grafakos S., Lwasa S., and Morato J. 2017, Sustainable Urbanization in the Paris Agreement Comparative review for urban content in the Nationally Determined Contributions (NDCs). United Nations Human Settlements Programme (UN-Habitat), <https://unhabitat.org/sustainable-urbanization-in-the-paris-agreement>.

One lesson learned from the 2016-17 analysis of the urban content of the NDCs is that a given country may not articulate or even summarise its entire climate change diagnostic or action plan within an NDC. A given NDC may, for example, merely reference or incorporate by reference a small number of other climate laws or policies⁴. Therefore, an analysis focused exclusively on NDCs may miss some important aspects of a given country's urban climate legal/policy framework. For a more thorough understanding of a given country's plans for climate action in urban areas, a more in-depth analysis is required, not only of its NDC but also of other national climate policies.

For this reason, a 2021 review was conducted by UN-Habitat and SDU.Resilience, and it was comprised of two parts, corresponding to two related objectives:

- A preliminary global review of all new or updated NDCs submitted from March 2017 through the end of September 2021, to understand trends in the urban content of NDCs since Parties submitted the first batch of NDCs around the time of the Paris Agreement.
- A trial of an in-depth country review of the most relevant climate laws and policies, including but not limited to NDCs for selected countries (the Republic of Colombia, the Republic of the Philippines, and the Republic of Rwanda) to further understand the perceived challenges as well as programmatic approaches planned for taking climate action in urban areas.

The present analysis thus represents a follow-up and a methodological advancement compared to the previous analyses.

For this report, more than 200 indicators were used to analyse external data (e.g., Human Development Index and income categorisation) and data within the NDCs, including climate mitigation and adaptation challenges and responses, also considering specific sectors. The present review has two main objectives:

- To understand the urban content of NDCs by conducting the following: classifying NDCs into three clusters (A: strong urban content, B: moderate urban content, C: low or no urban content); identifying urban

mitigation challenges and responses and urban adaptation challenges and responses by sector; highlighting specific urban needs on finance, capacity building and technology.

- To highlight (mis)alignment between: General mitigation/adaptation challenges vs Urban mitigation/adaptation challenges; Urban mitigation challenges vs urban mitigation responses; Urban adaptation challenges vs urban adaptation responses; Urban mitigation/adaptation challenges/responses vs request for finance; Urban mitigation/adaptation challenges/responses vs request for technology; Urban mitigation/adaptation challenges/responses vs request for capacity building.

This analysis is instrumental to supporting Parties' efforts in further integrating national climate policies and urban climate actions, which is considered fundamental to raising ambition and developing adequate and timely actions as required by the current climate emergency. This review can be instrumental for advocacy and direct support to countries by partner organisations. The 2022 global analysis is developed on the eve of COP-27 in Sharm el-Sheikh, Egypt⁵, and it will give UN-Habitat and SDU.Resilience the opportunity to discuss the methodology and the key findings with Parties, partners, and the broader climate community before the final release of the publication.

After COP27, further work will be realized, focusing on the country level and including the analysis of other relevant national climate policies for more than 15 countries; moreover, allowing the development of more in-depth thematic analyses, focusing particularly on selected cross-cutting issues.

Following the present Introduction, Section (1) proceeds with a summary of the methodology and approach, and Section (2) offers a global review of the current NDCs' urban content, also giving an overview of the 2016-17 and 2021 analyses. Section (3) shows the key findings and recommendations on providing a more accurate representation of the urban content in national climate change policies and strategies. It lays the foundation for conclusions and the way forward.

⁴ Indeed, other types of climate policies such as National Adaptation Plans (NAPs) and Nationally Appropriate Mitigation Actions (NAMAs) have emerged from the UNFCCC negotiation process. The NAP is explicitly referenced in the Paris Agreement; see Article 7.9(b).

⁵ The 27th Conference of Parties to the UNFCCC.

01

APPROACH AND METHODOLOGY



This analysis is based on the revision of all the latest NDCs submitted to the Secretariat of the UN Framework Convention on Climate Change (UNFCCC) before 19th June 2022. In accordance with Article 4, paragraph 12 of the Paris Agreement, NDCs communicated by Parties shall be recorded in a public online registry maintained by the Secretariat⁶.

A total of 193 NDCs were analysed, including the 27 NDCs submitted individually by the EU countries but excluding the NDC submitted by the European Union. The NDCs submitted in French, Spanish and English were analysed in their original languages, and the NDCs submitted in other languages were reviewed using the English translation. Only the latest version of all updated NDCs submitted before the 19th of June 2022 was analysed, and due to submission timing, NDCs submitted after that date were not analysed.

The analysis aims to provide a general overview of the urban content of the NDCs, considering both climate mitigation and adaptation and analysing knowledge gaps between challenges and responses at the national and urban levels.

To analyse NDCs' urban content, the methodology was structured in four phases:

- i. Database architecture and indicators. This phase aimed at defining the set of indicators, using as a starting point the indicators used for the analysis of the urban content of the NDCs in 2016-2017, and structuring the database.
- ii. Data collection. This phase aimed at populating the database by analysing the 193 NDCs, and at including data from external datasets.
- iii. Data analysis. This phase aimed at analysing the data collected within the NDCs, also using external data as benchmarks.
- iv. Report writing. This phase aimed at preparing the report and the presentation material with the key highlights.

The work was supported by a group of experts from bilateral and multilateral organisations and academia. Three expert group meetings (EGMs) were convened at the ends of phase i, ii and iii, respectively, and a final peer review was organised for the final report.

⁶ <https://unfccc.int/NDCREG>

1.1 Database architecture and indicators

Starting from the list of indicators used in the 2016-17 review, and after research on similar analyses and databases (e.g., UN databases⁷, Climate Watch⁸ and the World Bank⁹), a set of indicators was defined and structured into fourteen groups (see Figure 1); these indicators were first tested with a small number of NDCs before being finalised and used for the data collection. The database was designed using Microsoft Access to include data collected through the analysis of the NDCs in combination with data from external sources. The database was designed to allow the replication of the data analysis using other national climate policies (e.g., National Adaptation Plans) and to develop more in-depth and/or thematic analyses in future phases of the work.

Figure 1. List of indicators' groups used to analyse the NDCs' urban content.

01. Geographic indicators
02. National context indicators
03. Urban context indicators
04. Emissions indicators
05. Key hazards

06. NDC national indicators - General
07. NDC national indicators - Challenges
08. NDC national indicators - Responses

09. NDC urban indicators - General
10. NDC urban indicators - Challenges
11. NDC urban indicators - Responses

12. Other national climate-related policies, strategies and plans
13. Cross-cutting national-level indicators
14. Cross-cutting urban-level indicators

⁷ <https://unstats.un.org/UNSDWebsite/>

⁸ Climate Data for Action | Climate Watch | Emissions and Policies (climatewatchdata.org)

⁹ World Bank Open Data | Data

The indicators are grouped as follows:

01. Geographic indicators | 5 indicators - External data¹⁰

Including indicators: Country ISO code, Country name, Region name, Sub-region name, and Capital Name.

02. National context indicators | 10 indicators, External data

Including indicators: Total population (2020), Total population (2011), Population density, GDP country (US\$), GDP per capita (US\$), GINI index, Human Development Index, Income categorisation, and Type of party (Annex I or Non-Annex I).

03. Urban context indicators | 6 indicators, External data

Including indicators: Urban population (2021), Percentage urban population (2021), Urbanisation rate (percentage), Urbanisation rate (ranked), Percentage of people living in urban areas in 2050, and Urban land area.

04. Emissions indicators | 18 indicators, External data

Including indicators: CO₂e Total per country, CO₂e by sector (agriculture, bunker fuels, building, electricity/heat, fugitive emissions, industrial processes, land-use change and forestry, manufacturing/constructions, other fuel combustion, total excluding LULUCF, total including LULUCF, transportation, waste), CO₂e per capita, and CO₂e per GDP.

05. Key hazards | 10 indicators, External data

Including indicators: Droughts, Earthquakes, Epidemics, Extreme temperatures, Floodings, Insect infestations, Landslides, Storms, Volcanic activities, and Wildfires.

06. NDC national indicators – General | 14 indicators, NDCs

Including indicators: Last submission date, Title, Language, Mitigation contribution type, GHG target type, GHG target year, GHG target – sector covered, Target quantity, Base year, NDC conditional/unconditional, Share of global GHG emissions, Finance request, Technology request, and Capacity building.

07. NDC national indicators – Challenges | 30 indicators, NDCs

Including indicators:

Mitigation challenges by sector: Energy, Transport and mobility, LULUCF, Built environment, Waste, Water, Industry, Gender, and Others;

Adaptation challenges by sector: Agriculture and food, Ecosystem and biodiversity, Water, Human Health, Industry, Infrastructure, Coastal areas, Gender, and Others;

Climate hazards: Floodings, Droughts, Sea level rise, Storm events, Temperature rise, Storm events, Temperature rise, Heat/cold wave, Vector-borne diseases (air and water), Land degradation, Saltwater intrusion, Water acidification, Wildfire, and Others.

08. NDC national indicators – Responses | 18 indicators, NDCs

Including indicators:

Mitigation responses by sector: Energy, Transport and mobility, LULUCF, Built environment, Waste, Water, Industry, Gender, and Others.

Adaptation responses by sector: Agriculture and food, Ecosystem and biodiversity, Water, Human Health, Industry, Infrastructure, Coastal areas, Gender, and Others.

09. NDC urban indicators – General | 5 indicators, NDCs

Including indicators: NDCs urban content 2021 (White paper 2021), Urban content 2022 (current report), Finance request, Technology transfer request, and Capacity building needs.

10. NDC urban indicators – Challenges | 30 indicators, NDCs

Including indicators:

Urban mitigation challenges by sector: Energy, Transport and mobility, LULUCF, Built environment, Waste, Water, Industry, Gender, and Others;

Urban adaptation challenges by sector: Agriculture and food, Ecosystems and biodiversity, Water, Human Health, Industry, Infrastructures, Coastal areas, Gender, and Others;

¹⁰ External data means data collected outside the NDCs, such as Climate Watch and the World Bank databases (e.g., the Human Development Index, percentage of urban population and income categorisation).

Urban climate hazards: Floodings, Droughts, Sea level rise, Storm events, Temperature rise, Heat/cold wave, Vector-borne diseases (air and water), Land degradation, Saltwater intrusion, Water acidification, Wildfire, and Others.

11. NDC urban indicators – Responses | 18 indicators, NDCs

Including indicators:

Urban mitigation responses by sector: Energy, Transport and mobility, LULUCF, Built environment, Waste, Water, Industry, Gender, and Others;

Urban adaptation responses by sector: Agriculture and food, Ecosystem and biodiversity, Water, Human Health, Industry, Infrastructure, Coastal areas, Gender, and Others.

12. Other national climate-related policies, strategies and plans | 19 indicators, External data

Including indicators: NAP National Adaptation Plans, NDC-SDG linkages (including 17 individual goals), National Long-term Strategies (LTS), and Long-term Goal and Outcomes for Climate Adaptation.

13. Cross-cutting national level indicators | 16 indicators, NDCs and External data

Including indicators: Ecosystem services, Nature-based solutions (green and blue infrastructure), Gender, Public spaces, Circular economy, Social inclusion, Indigenous people, Youth, Innovation, Loss and damages, Multilevel governance, Participation, Data availability and usability (adaptation), Data availability and usability (mitigation), Informal settlements, and Others.

14. Cross-cutting urban level indicators | 16 indicators, NDCs and External data

Including indicators: Ecosystem services, Nature-based solutions (green and blue infrastructure), Gender, Public spaces, Circular economy, Social inclusion, Indigenous, Youth, Innovation, Loss and damages, Multilevel governance, Participation, Data availability and usability (adaptation), Data availability and usability (mitigation), Informal settlements, and Others.

Groups one to five and twelve include data collected from external sources; groups six to eleven include data from the NDCs; groups thirteen and fourteen include data from both

the NDCs and external data. Groups six to eight and thirteen include indicators on the **national content** of the NDC (e.g., national mitigation challenges), and groups nine to eleven and fourteen include indicators on the **urban content** of the NDCs (e.g., urban adaptation challenges).

1.2 Data collection

The data collection phase was structured in four stages: NDCs data collection protocol; NDCs data collection (193 NDCs); NDCs data validation; and external data collection. Firstly, a protocol for the data collection was prepared to guarantee consistency in the NDCs data collection when performed by different persons. The protocol included a clear definition and description of each indicator, with examples and specific instructions to insert the collected data in the Microsoft Access database. The 193 NDCs were thoroughly reviewed using the NDCs' indicators listed in Section 1.1 by a team of researchers at the UNESCO Chair on Urban Resilience at the University of Southern Denmark. The review team had regular meetings to jointly address any issue through the review process and improve the protocol and the review procedure. Final quality control was realised through a series of queries on the filled database to check any issues regarding the coherence of the review process.

In parallel to the NDCs data collection explained above, external data was also collected from external sources such as UN databases¹¹, Climate Watch¹² and the World Bank¹³. These data served to frame national contexts and enrich the information found within the NDCs, enabling future in-depth and/or thematic analyses.

1.3 Data analysis

This phase started with the overall analysis of the explicit urban content of the NDCs to allow a global overview.

The level of urban content was classified into one of three clusters as follows:

- **Strong urban content (Cluster A)**: NDCs with specific urban sections and/or NDCs in which urban areas are identified as priority sectors, excluding NDCs that are

11 <https://unstats.un.org/UNSDWebsite/>

12 [Climate Data for Action | Climate Watch | Emissions and Policies \(climatawatchdata.org\)](#)

13 [World Bank Open Data | Data](#)

not backing the prioritization with a clear identification of specific urban challenges and/or responses.

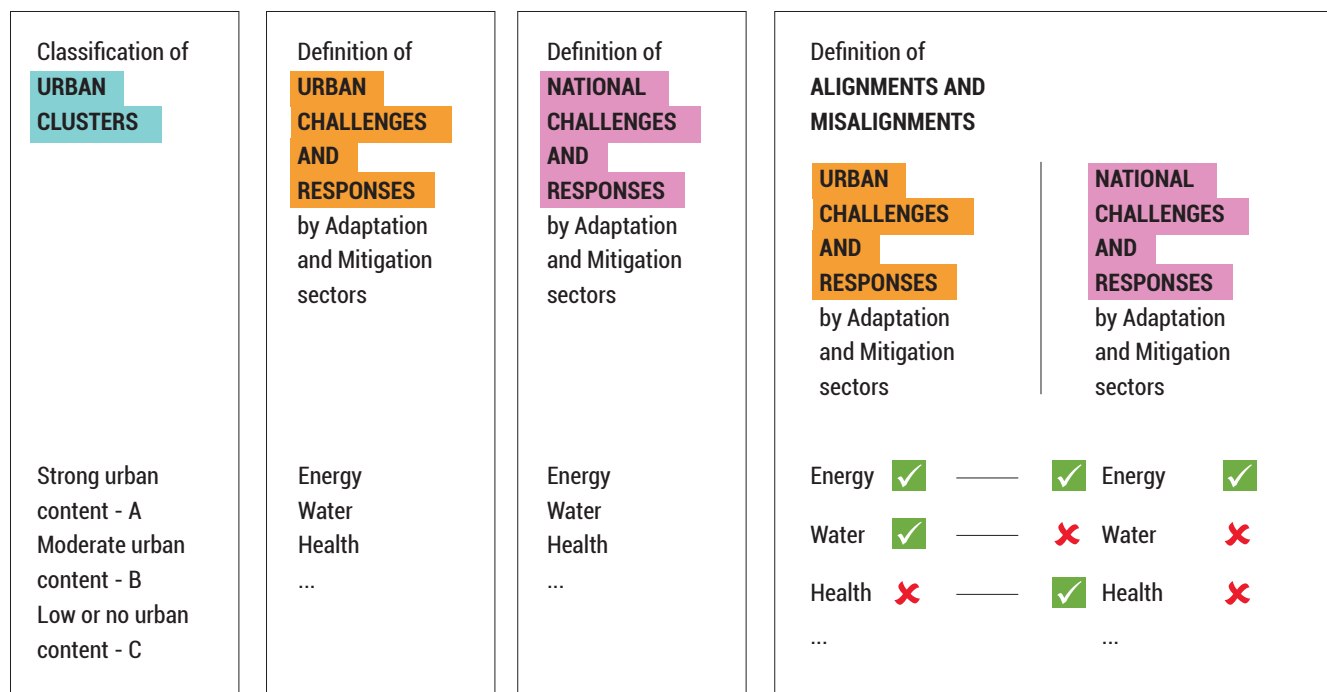
- **Moderate urban content (Cluster B):** NDCs with urban mentions within the body of text.
- **Low or no urban content (Cluster C):** NDCs with low or no explicit urban mention within the text¹⁴.

The methodology considers only “explicit” urban mentions NDCs containing at least one of the three urban keywords (singular and/or plural): urban, town and city. The analysis and clustering were qualitative, thereby NDCs generically mentioning municipal and/or local issues, but without clear differentiation between urban and rural context, and NDCs only generically stating an urban prioritisation, but without a clear identification of specific urban challenges and/or responses were included in Cluster B or C.

The data analysis focuses on identifying alignment and misalignment between climate challenges and responses (see Figures 2 and 3), using the following working definitions:

- **Mitigation challenges** are defined as a high-level of GHG emissions by sector (e.g., transport and energy).
- **Adaptation challenges** are defined as specific climate threats/impacts by sector (e.g., Human health and Infrastructures) and by climate hazard (e.g., floodings and droughts);
- **Mitigation responses** are defined as policies, strategies and actions to reduce GHG emissions by sector.
- **Adaptation responses** are defined as policies, strategies and actions to limit the negative effects of climate change by sector and by climate hazard.

Figure 2. Synthesis of the data analyses made for analysing the urban content of NDCs.



¹⁴ Low refers to the cases where the word “urban” appears but is not addressing challenges or responses (Figure 3): for example, some NDCs mention “urban population”, without addressing urban climate challenges and responses.

An example of alignment is finding challenges in the transport sector both in urban and national analyses. If the mitigation challenge is mentioned only at the national level, it is necessary to highlight the misalignment.

The data analysis also focuses on identifying alignments and misalignments of challenges and responses between the general national and specific urban levels (Figure 2) to provide recommendations for further strengthening the

urban content of the NDCs and the operationalisation of urban climate actions.

The data analysis also focused on understanding the request for financial support, technology transfer and capacity building, both at the national and urban levels; moreover, data were analysed in relation to cross-cutting issues (e.g., Nature-based solutions and Informal settlements).

Figure 3. Scheme of the sectors used to analyse NDCs adaptation and mitigation challenges and responses, both at the national and urban level.

| | Mitigation | Adaptation |
|-----------------|--|---|
| National | <p>Challenges Responses</p> <p>Sectors Energy, Transport and mobility, LULUCF, Built environment, Waste, Water, Industry, Gender, Others</p> | <p>Sectors Agriculture and food, Ecosystem and biodiversity, Water, Human health, Industry, Infrastructure, Coastal areas, Gender, Others</p> <hr/> <p>Climate hazards Floods, Droughts, Sea level rise, Storm events, Temperature rise, Heat/cold waves, Vector-borne diseases (air and water), Land degradation, Saltwater intrusion, Water acidification, Wildfire, others</p> |
| Urban | <p>Challenges Responses</p> <p>Sectors Energy, Transport and mobility, LULUCF, Built environment, Waste, Water, Industry, Gender, Others</p> | <p>Sectors Agriculture and food, Ecosystem and biodiversity, Water, Human health, Industry, Infrastructure, Coastal areas, Gender, Others</p> <hr/> <p>Climate hazards Floods, Droughts, Sea level rise, Storm events, Temperature rise, Heat/cold waves, Vector-borne diseases (air and water), Land degradation, Saltwater intrusion, Water acidification, Wildfire, others</p> |

Urban mitigation challenge | Energy, Built environment

"Half of the total energy consumed in Monaco is attributable to electricity used for private and public uses, mainly homes, commercial and industrial facilities, public buildings and facilities (hospitals, schools, etc.), as well as urban lighting." (Monaco NDC, p. 12)

Urban mitigation response | Human Health

"Public Health [actions]:

- Increase safe water storage measures in households...
- Develop and implement urban heat response plan including urban greening measures". (St. Kitts and Nevis NDC, p. 6)

Urban mitigation response | Agriculture and food security

"Several initiatives are aimed at combining agricultural and forestry activities to improve food security. This circular mitigation strategy aims to strengthen these initiatives to increase tree cover in The Gambia, both in urban and rural areas." (The Gambia NDC, p. 14).

Urban adaptation challenge | Coastal area

"Sea level rise is already affecting coastal towns and communities and is expected lead to coastal erosion and wetlands loss." (Kenya NDC, p. 5).

Urban adaptation response | Water

"As part of the country's efforts to address the challenges associated with the on-going water scarcity, the government is currently planning the Amman Aqaba Water Desalination and Conveyance Project (AAWDCP) which is announced to be the largest water generation scheme to be implemented in the country. The primary objective of the project is to provide a safe and reliable freshwater supply for Amman and other governorates along the project pipelines route from Aqaba to Amman." (Jordan NDC, p. 9).

Urban adaptation response | Infrastructure, coastal area, water, human health

"Action on low-emission transport options remain unsupported: Connecting farmers to markets in rural areas via climate proofed infrastructure; Measures to increase infrastructure coastal defences, climate-resilient physical planning standards and codes; 'Greening' of urban development plans; Stormwater and drainage systems and waste management (sewerage, municipal, industrial) requires improvements (see 'Water and sanitation')" (Papua New Guinea NDC, p. 24).

1.4 Report writing

This report will be presented at the United Nations Climate Change Conference in Sharm El Sheikh (COP27) focusing on the key findings of the global analysis. After COP27, further work will be done focusing on the country level, further developing country pilots, following the initial work conducted in 2021, and including the analysis of other relevant national climate policies for more than 15 countries. The next report will also include more in-depth thematic analyses, focusing particularly on selected cross-cutting issues.

1.5 Methodology improvement and limitations

Before starting the review of the NDCs, the methodology was reviewed to strengthen it further and to maintain consistency with the reviews conducted in 2016-17 and 2021.

In the 2016-17 analysis, the categories "explicit mention" and "implicit mention" were used to indicate when an NDC focused on activities or sectors that are historically urban,

for example, mobility, without an explicit reference to urban. However, these categories and classifications were not always straightforward to understand. Therefore, the current methodology focuses only on explicit urban mentions but also highlights any gap or misalignment of sectors mentioned between the national and urban levels. For example, suppose an NDC shows responses at the national level for mobility. In that case, this does not directly equate to responses at the urban level, misalignment is highlighted, and recommendations are made to fill this gap.

The 2021 analysis was a preliminary semi-quantitative review based on a keyword search, focusing only on assessing the presence/absence of urban content in relation to mitigation and adaptation. As expected, it included some false positive results. The changes in methodology and the passage to a more in-depth qualitative review realised in 2022, imply further differences in comparison with the 2021 results, differences that are explained as follows:

a. Difference in the definition of Clusters

2021 Clusters

Strong urban content (Cluster A): NDCs with urban mentions within text headers/sections/paragraphs.

Moderate urban content (Cluster B): NDCs with urban mention within the body of text.

No evident urban content (Cluster C): NDCs with no urban mention within the text.

2022 Clusters

Strong urban content (Cluster A): NDCs with specific urban sections and/or NDCs in which urban is identified as a priority sector, excluding NDCs that are not backing the prioritisation with a clear identification of specific urban challenges and/or responses.

Moderate urban content (Cluster B): NDCs with generic urban mentions within the body of text.

Low or no urban content (Cluster C): NDCs with low or no explicit urban mention within the text.

The tighter definition of Cluster A led to the need to re-cluster several NDCs from Cluster A to B from 2021 to 2022.

b. The difference in the EU countries' count

European Union countries are submitting the same NDCs. The European Union itself is a member of the Conference of the Parties and therefore entitled to submit its own NDC. For the 2016-17 and the 2021 reviews, only the NDC submitted by the EU was accounted for, excluding the other 27 NDCs submitted by EU countries individually. In the 2022 review, the 27 NDCs submitted by EU countries individually were accounted for, excluding only the NDC submitted by the EU itself. In 2016-17 one EU NDC was included in Cluster C. In 2021 one EU NDC was included in Cluster B, although it was a false positive as the "urban" word was included in the Annex "Information to facilitate Clarity, Transparency and Understanding" but the section dedicated to urban was assessed as "not applicable" (EU NDC, p. 14). That is the only mention of urban content in the EU NDC. In the 2022 review, 27 EU countries' NDCs are included in Cluster C. This methodological change limits the direct comparison of the number of countries within the three clusters between 2016-17 and 2022.

c. The difference in the urban keyword

In the 2021 review, the keyword analysis included six words (urban, town, city, settlements, municipal and local); in the 2022 review, the terms municipal, settlement and local were not alone considered sufficient to classify an NDC with strong or moderated urban content (Cluster A and B), as these words often were not accompanied by a clear urban or rural characterisation and could be potentially misinterpreted.

d. Explicit/implicit urban mention: distinction removed

The methodology considers only "explicit" urban mentions containing one of the three urban keywords (urban, town and city). What in 2016-17 was considered implicit is now rendered through the national versus urban comparison.

The methodology has been modified from the first analysis of the NDCs in 2016 to obtain a more robust analysis of the NDCs' urban content. This methodology is open to suggestions for improvement that can lead to a more accurate analysis of the urban content of the NDCs.

02

**URBAN CONTENT OF
NDCs AT THE GLOBAL
LEVEL**



For this review, 193 NDCs were analysed (see Annex 2), including the latest version of all updated NDCs submitted before 19th June 2022, which are publicly available in the UNFCCC online depository¹⁵.

This report presents the third analysis of urban content in the NDCs. The three analyses are distinguished by an improvement in methodology and by the NDCs analysed, which were mainly updated in the run-up to COP26 (2021).

The three analyses are reported in the following documents:

- “Sustainable Urbanization in the Paris Agreement”¹⁶
- “Accelerated urban climate action. How do the revised Nationally Determined Contributions stack up?”¹⁷
- “Accelerated urban climate action. Review of the urban content of the NDCs 2022” (this report)

2.1. Urban Content of NDCs: The 2016-17 Analysis

The first analysis of the urban content of the NDCs was conducted at the end of 2016 and published in 2017 in the report titled “Sustainable Urbanization in the Paris Agreement”¹⁶. The results of this analysis showed (Figure 4):

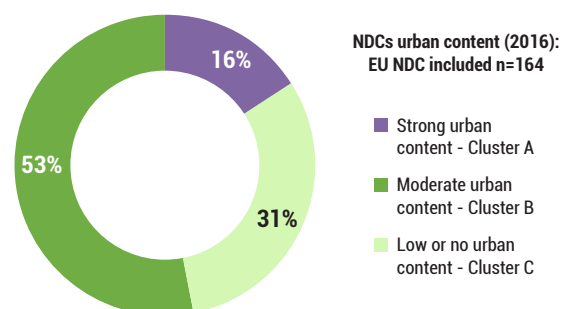
- 113 out of 164 NDCs had urban content, indicating some attention to climate challenges and responses at the urban level.
- There was widespread recognition of the importance of urban challenges and response measures for climate change mitigation and adaptation, as shown by the high number of NDCs with urban content.
- Most of the NDCs with urban content, specifically those with moderate urban content (Cluster B), required further effort to strengthen urban provisions, particularly concerning urban climate actions.

¹⁵ <https://unfccc.int/NDCREG>

¹⁶ <https://unhabitat.org/sustainable-urbanization-in-the-paris-agreement>

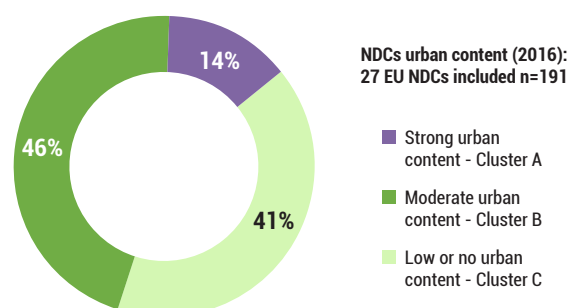
¹⁷ https://unhabitat.org/sites/default/files/2022/08/ndcs_urbancontent_whitepaper_2022.pdf

Figure 4. Global analysis of the NDCs’ urban content (2016), excluding NDCs of the 27 European countries. Cluster A (26); Cluster B (87); Cluster C (51).



Source: Adapted from Tollin N. et al. 2017.

Figure 5. Global analysis of the NDCs’ urban content (2016), including NDCs of the 27 European countries.



Source: Adapted from Tollin N. et al. 2017.

The report acknowledged that the findings represented only a first scan of the subject matter. Thereby, requiring a continuity in the analysis of NDCs to monitor trends, and raising the ambition of urban climate actions. The report also recognized the need for an in-depth analysis at the country level, focusing on the integration of urban content in national climate policies, within and beyond the NDCs.

Moreover, it was evident that there is a need to expand the analysis at the country level to other climate policies to better understand the identification of climate challenges and responses at the urban level that may not have been explicitly included in the NDCs. There is also a need to refine

the quantitative and qualitative global analysis, as some NDCs, particularly the ones with moderate urban content, require a better understanding of the consistency of the urban content.

The 2016-17 report included recommendations for strengthening climate policy coherence in a multi-level governance perspective through horizontal integration of NDCs and other urban and climate policies at the national level, and through vertical integration of national policies and local actions. It also proposed specific recommendations for implementing national strategies at the local level, considered a crucial aspect for successfully implementing the Paris Agreement, and for stating finance, technology and institutional capacity needs within the NDCs.

2.2. Urban Content of NDCs: The 2021 Analysis

The second analysis of the urban content of the NDCs was conducted at the end of 2021 and published in the white paper titled *“Accelerated urban climate action. How do the revised Nationally Determined Contributions stack up?”*. For this review, 157 NDCs were analysed, including the latest version of all updated NDCs submitted between March 2017 and the end of September 2021, which are publicly available in the UNFCCC online depository¹⁸. The 2021 white paper included the analysis based only on a key word search for urban related terms. Moreover, a country-level analysis was piloted for the following countries: the Republic of Colombia, the Republic of the Philippines, and the Republic of Rwanda.

The key findings of the **country analysis** in the three pilots showed that:

- The urban climate responses are not always aligned with the identified urban climate challenges.
- The urban content in the NDCs is not always fully harmonised with the urban content in other national climate policies.
- The urban content referred to climate mitigation and adaptation, including the identified sectors, and may require further integration to fully exploit co-benefits.

¹⁸ NDC Registry <https://unfccc.int/NDCREG>

- The lack of urban content in the NDCs does not necessarily equate with a lack of urban content in other national climate policies.

The report acknowledged that countries that submitted NDCs with no explicit urban content do not necessarily lack climate urban policies and actions, which has become evident through the in-depth country analysis. Likewise, the NDCs with urban content, particularly those with moderate urban content (Cluster B), may still require further strengthening and integration of urban climate policies and actions.

2.3 Urban Content of NDCs: The 2022 Global Analysis

For this review, a total of 193 NDCs were analysed, including the latest version of all NDCs submitted before 19th June 2022, which are publicly available in the UNFCCC’s online depository¹⁹. The NDCs reviewed were grouped into three clusters²⁰ (Figure 7) based on their urban content.

As shown in Tables 1 and 2, a total of 47 submitted NDCs contained strong urban content, identifying the urban sector as a priority. These countries comprise 35% of the world’s urban population and are responsible for 44% of the total CO₂e emissions produced by countries that submitted an NDC.

A total of 76 submitted NDCs with moderate urban content mentioned the urban sector. These countries comprise 35% of the world’s urban population and are responsible for 28% of the total CO₂e emissions produced by the 193 countries that submitted an NDC.

A total of 70 countries submitted NDCs with low or no urban content, without mentioning the urban sector. These countries comprise 30% of the world’s urban population and are responsible for 28% of the total CO₂e emissions produced by the 193 countries that submitted an NDC.

¹⁹ NDC Registry <https://unfccc.int/NDCREG>

²⁰ The urban clusters are defined as follows: Cluster A – Strong urban content describes NDCs with specific sections dedicated to urban and/or NDCs in which urban is identified as priority sector, excluding NDCs that are not backing these prioritizations with significant identification of challenges or responses; Cluster B – Moderate urban content: describes NDCs with urban mentions within the body of text, classified as moderate urban content; Cluster C – Low or no urban content describes NDCs with low or no urban mention within the text and classified to have no explicit urban content.

Table 1. List of Countries with associated CO2e Emissions and Urban Populations.

| Country | Total CO2e emissions per country in 2019 [MtCO ₂ e] | Urban population 2021 [%] | Urban population [%] projection 2050 |
|--|--|---------------------------|--------------------------------------|
| CLUSTER A: Strong urban content | | | |
| Albania | 8,77 | 63% | 78% |
| Bahrain | 54,41 | 90% | 93% |
| Benin | 25,78 | 49% | 65% |
| Bhutan | 0,36 | 43% | 58% |
| Cabo Verde | 0,75 | 67% | 77% |
| Cambodia | 71,77 | 25% | 41% |
| China | 12055,41 | 63% | 80% |
| Colombia | 270,53 | 82% | 89% |
| Congo | 30,07 | 68% | 80% |
| Dominican Republic | 39,76 | 83% | 92% |
| Ecuador | 98,7 | 64% | 75% |
| El Salvador | 13,92 | 74% | 86% |
| Ethiopia | 183,37 | 22% | 39% |
| Gambia | 2,86 | 63% | 77% |
| Honduras | 28,14 | 59% | 74% |
| India | 3363,59 | 35% | 53% |
| Jordan | 36,57 | 92% | 95% |
| Kenya | 73,4 | 28% | 46% |
| Kyrgyzstan | 13,64 | 37% | 54% |
| Lao People's Democratic Republic | 39,42 | 37% | 56% |
| Lebanon | 35,13 | 89% | 93% |
| Liberia | 15,87 | 53% | 68% |
| Malaysia | 396,11 | 78% | 87% |
| Mauritania | 13,21 | 56% | 73% |
| Monaco | 0 | 100% | 100% |
| Morocco | 91,15 | 64% | 77% |
| Mozambique | 106,74 | 38% | 55% |
| Myanmar | 242,95 | 31% | 47% |
| Nepal | 48,37 | 21% | 37% |
| Oman | 100,28 | 87% | 95% |
| Panama | 25,3 | 69% | 80% |
| Papua New Guinea | 63,47 | 13% | 24% |
| Paraguay | 96,6 | 62% | 74% |
| Republic of Moldova | 13,5 | 43% | 57% |
| Rwanda | 7 | 18% | 30% |
| Saudi Arabia | 723,15 | 85% | 90% |
| Sierra Leone | 9,45 | 43% | 60% |
| South Africa | 562,19 | 68% | 80% |
| Sri Lanka | 37,9 | 19% | 32% |

| Country | Total CO2e emissions per country in 2019 [MtCO ₂ e] | Urban population 2021 [%] | Urban population [%] projection 2050 |
|--|--|---------------------------|--------------------------------------|
| State of Palestine | 0 | | 85% |
| Suriname | 13,83 | 66% | 74% |
| Togo | 8,71 | 43% | 61% |
| Tunisia | 37,81 | 70% | 80% |
| Türkiye | 459,86 | 77% | 86% |
| Uruguay | 34,36 | 96% | 97% |
| Venezuela (Bolivarian Republic of) | 299,6 | 88% | 92% |
| Viet Nam | 438,11 | 38% | 57% |
| Cluster B: Moderate urban content | | | |
| Afghanistan | 28,79 | 26% | 41% |
| Algeria | 282,23 | 74% | 85% |
| Andorra | 0,63 | 88% | 90% |
| Angola | 128,29 | 67% | 80% |
| Argentina | 398,91 | 92% | 95% |
| Australia | 608,49 | 86% | 91% |
| Azerbaijan | 52,89 | 57% | 71% |
| Bahamas | 3,18 | 83% | 88% |
| Bangladesh | 237,7 | 39% | 58% |
| Barbados | 3,79 | 31% | 41% |
| Belize | 6,85 | 46% | 57% |
| Bolivia (Plurinational State of) | 138,72 | 70% | 81% |
| Brazil | 1451,63 | 87% | 92% |
| Burkina Faso | 56,31 | 31% | 50% |
| Burundi | 8,04 | 14% | 28% |
| Cameroon | 124,79 | 58% | 73% |
| Canada | 774,29 | 82% | 87% |
| Central African Republic | 46,58 | 43% | 60% |
| Chad | 105,68 | 24% | 39% |
| Chile | 55,33 | 88% | 92% |
| Costa Rica | 8,48 | 81% | 90% |
| Côte d'Ivoire | 51,51 | 52% | 67% |
| Cuba | 38,19 | 77% | 84% |
| Democratic Republic of the Congo | 679,57 | 46% | 64% |
| Djibouti | 1,38 | 78% | 85% |
| Egypt | 351,96 | 43% | 56% |
| Equatorial Guinea | 15,24 | 74% | 83% |
| Eritrea | 6,78 | 36% | 60% |
| Eswatini | 2,69 | 24% | 34% |
| Gabon | 19,68 | 90% | 95% |
| Ghana | 12,75 | 58% | 73% |
| Guatemala | 38,49 | 52% | 67% |

| Country | Total CO2e emissions per country in 2019 [MtCO ₂ e] | Urban population 2021 [%] | Urban population [%] projection 2050 |
|----------------------|--|---------------------------|--------------------------------------|
| Guinea | 40,61 | 37% | 54% |
| Guinea-Bissau | 4,21 | 45% | 57% |
| Guyana | 19,8 | 27% | 36% |
| Haiti | 11,13 | 58% | 75% |
| Indonesia | 1959,71 | 57% | 73% |
| Iraq | 321,31 | 71% | 80% |
| Japan | 1134,45 | 92% | 95% |
| Kiribati | 0,12 | 56% | 71% |
| Kuwait | 136,69 | 100% | 100% |
| Lesotho | 2,53 | 29% | 46% |
| Madagascar | 40,22 | 39% | 58% |
| Malawi | 19,34 | 18% | 32% |
| Maldives | 2,6 | 41% | 54% |
| Mali | 44,16 | 45% | 63% |
| Mauritius | 6,83 | 41% | 49% |
| Mexico | 670,84 | 81% | 88% |
| Mongolia | 59,15 | 69% | 78% |
| Montenegro | 3,86 | 68% | 77% |
| Namibia | 21,22 | 53% | 72% |
| Nauru | 0,07 | 100% | 100% |
| Nicaragua | 38,41 | 59% | 71% |
| Niger | 43,96 | 17% | 28% |
| Nigeria | 354,33 | 53% | 70% |
| North Macedonia | 11,26 | 59% | 73% |
| Pakistan | 439,49 | 37% | 52% |
| Qatar | 114,76 | 99% | 100% |
| Republic of Korea | 652,66 | 81% | 86% |
| Senegal | 33,6 | 49% | 64% |
| Seychelles | 0,78 | 58% | 70% |
| Singapore | 67,26 | 100% | 100% |
| Solomon Islands | 46,36 | 25% | 37% |
| Somalia | 42,51 | 47% | 64% |
| South Sudan | 60,33 | 21% | 36% |
| St. Kitts and Nevis | 0,35 | 31% | 40% |
| St. Lucia | 0,74 | 19% | 27% |
| Sudan | 127,07 | 36% | 53% |
| Syrian Arab Republic | 48,48 | 56% | 72% |
| Tajikistan | 17,38 | 28% | 43% |
| Thailand | 437,18 | 52% | 69% |
| Uganda | 59,15 | 26% | 44% |
| United Arab Emirates | 243,55 | 87% | 92% |

| Country | Total CO2e emissions per country in 2019 [MtCO ₂ e] | Urban population 2021 [%] | Urban population [%] projection 2050 |
|---|--|---------------------------|--------------------------------------|
| United Republic of Tanzania | 154,89 | 36% | 55% |
| Vanuatu | 0,87 | 26% | 34% |
| Zimbabwe | 117,96 | 32% | 46% |
| CLUSTER C: Low or no urban content | | | |
| Antigua and Barbuda | 1,22 | 24% | 31% |
| Armenia | 10 | 63% | 74% |
| Austria | 69,8 | 59% | 71% |
| Belarus | 65,33 | 80% | 88% |
| Belgium | 108,22 | 98% | 99% |
| Bosnia and Herzegovina | 24,5 | 49% | 65% |
| Botswana | 52,34 | 72% | 84% |
| Brunei Darussalam | 9,63 | 79% | 86% |
| Bulgaria | 17,48 | 76% | 85% |
| Comoros | 0,7 | 30% | 41% |
| Cook Islands | 0,1 | | 83% |
| Croatia | 124,79 | 58% | 71% |
| Cyprus | 8,29 | 67% | 74% |
| Czech Republic | 110,77 | 74% | 82% |
| Democratic People's Republic of Korea | 82,69 | 63% | 74% |
| Denmark | 44,06 | 88% | 92% |
| Dominica | 0,22 | 71% | 80% |
| Estonia | 14,83 | 69% | 77% |
| Fiji | -0,16 | 58% | 70% |
| Finland | 58,42 | 86% | 90% |
| France | 352,1 | 81% | 88% |
| Georgia | 17,64 | 60% | 73% |
| Germany | 720,23 | 78% | 84% |
| Greece | 79,91 | 80% | 88% |
| Grenada | 2,39 | 37% | 47% |
| Hungary | 62,48 | 72% | 82% |
| Iceland | 2,77 | 94% | 96% |
| Ireland | 58,68 | 64% | 75% |
| Israel | 87,26 | 93% | 95% |
| Italy | 376,19 | 71% | 81% |
| Jamaica | 10,15 | 57% | 70% |
| Kazakhstan | 271,68 | 58% | 69% |
| Latvia | 8,93 | 68% | 76% |
| Liechtenstein | 0,16 | 14% | 21% |
| Lithuania | 18,3 | 68% | 78% |
| Luxembourg | 10,2 | 92% | 95% |
| Malta | 2,13 | 95% | 97% |

| Country | Total CO2e emissions per country in 2019 [MtCO ₂ e] | Urban population 2021 [%] | Urban population [%] projection 2050 |
|--|--|---------------------------|--------------------------------------|
| Marshall Islands | 0,23 | 78% | 86% |
| Micronesia (Federated States of) | 0,23 | 23% | 32% |
| Netherlands | 173,59 | 93% | 97% |
| New Zealand | 72,59 | 87% | 91% |
| Niue | 0,01 | | 61% |
| Norway | 26,98 | 83% | 90% |
| Palau | 0,29 | 81% | 89% |
| Peru | 190,66 | 79% | 86% |
| Philippines | 236,79 | 48% | 62% |
| Poland | 320,23 | 60% | 70% |
| Portugal | 61,7 | 67% | 79% |
| Romania | 78,36 | 54% | 67% |
| Russian Federation | 1924,82 | 75% | 83% |
| Samoa | 0,79 | 18% | 22% |
| San Marino | 0 | 98% | 99% |
| Sao Tome and Principe | 0,4 | 75% | 85% |
| Serbia | 61,86 | 57% | 69% |
| Slovakia | 37 | 54% | 66% |
| Slovenia | 16,81 | 55% | 69% |
| Spain | 293,08 | 81% | 88% |
| St. Vincent and the Grenadines | 0,34 | 53% | 66% |
| Sweden | 29,87 | 88% | 93% |
| Switzerland | 44,26 | 74% | 81% |
| Timor-Leste | 6,38 | 32% | 44% |
| Tonga | 0,31 | 23% | 30% |
| Trinidad and Tobago | 28,47 | 53% | 63% |
| Turkmenistan | 157,33 | 53% | 69% |
| Tuvalu | 0,03 | 65% | 78% |
| Ukraine | 221,29 | 70% | 79% |
| United Kingdom of Great Britain and Northern Ireland | 429,13 | 84% | 90% |
| United States of America | 5771 | 83% | 89% |
| Uzbekistan | 185,39 | 50% | 62% |
| Zambia | 91,36 | 45% | 62% |

Table 2. Urbanisation and pollution compared with NDCs' urban clusters.

| Country | Urban population 2020 [thousands] | | Total CO2e per country in 2019 [MtCO ₂ e] | |
|---------------------------------------|-----------------------------------|-----|--|-----|
| Strong urban content, 47 countries | 1.508.346,12 | 35% | 20.941,37 | 44% |
| Moderate urban content, 76 countries | 1.498.902,45 | 35% | 13.352,02 | 28% |
| Low or no urban content, 70 countries | 1.308.491,95 | 30% | 13.346,01 | 28% |

The review shows that 123 NDCs, 64% of the NDCs analysed, include urban content (Figure 6). 47 NDCs, 24% of the NDCs analysed, have a strong urban content (Cluster A) with specific sections dedicated to urban and/or NDCs in which urban sector is identified as a priority, excluding NDCs that are not backing these prioritizations with significant identification of challenges or responses. 76 NDCs, 39% of the NDCs analysed, have a moderate urban content (Cluster B) with urban mentions within the body of text. 70 NDCs, 37% of the NDCs analysed, have low or no urban content (Cluster C) with no urban mentions within the body of text.

Figure 6. NDCs urban content: the majority of the NDCs (123 out of 193) have urban content, strong or moderate.

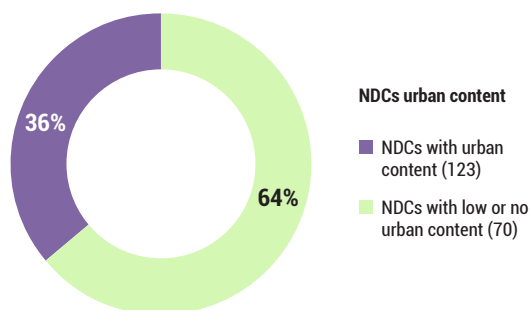
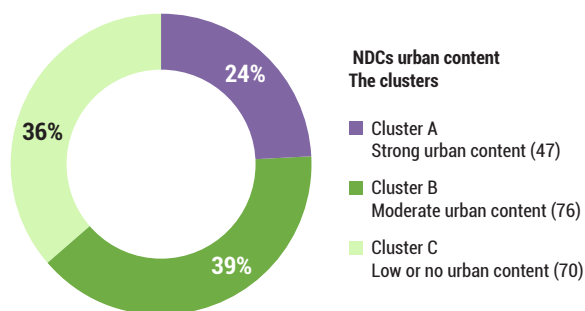


Figure 7. NDCs urban content: Urban clusters (A, B, and C).



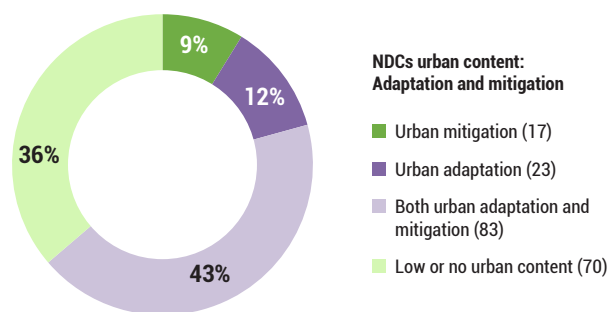
Urban mitigation and adaptation content

The mitigation and adaptation content of the NDCs at the urban level was analysed (Figure 8), showing that 83 NDCs, 43% of the NDCs analysed, focus both on urban adaptation and mitigation, whereas 12% of the NDCs focus on only urban adaptation and 9% of the NDCs focus on only urban mitigation. 70 NDCs, 36% of the NDCs analysed, have low or no urban content and so are not having urban mitigation nor urban adaptation content. The integration of urban mitigation and adaptation is especially important as cities are responsible for a great share of the emissions causing climate change and, at the same time, are increasingly exposed and vulnerable to the negative effects of climate change. Ultimately, cities can and shall address both climate change causes and effects through an urban resilience approach, integrating climate mitigation and adaptation, also considering that the limitation of resources and capacities of local governments require to go beyond silos thinking.



Sustainable architecture in Porta Nuova district, Milan, Italy © Shutterstock

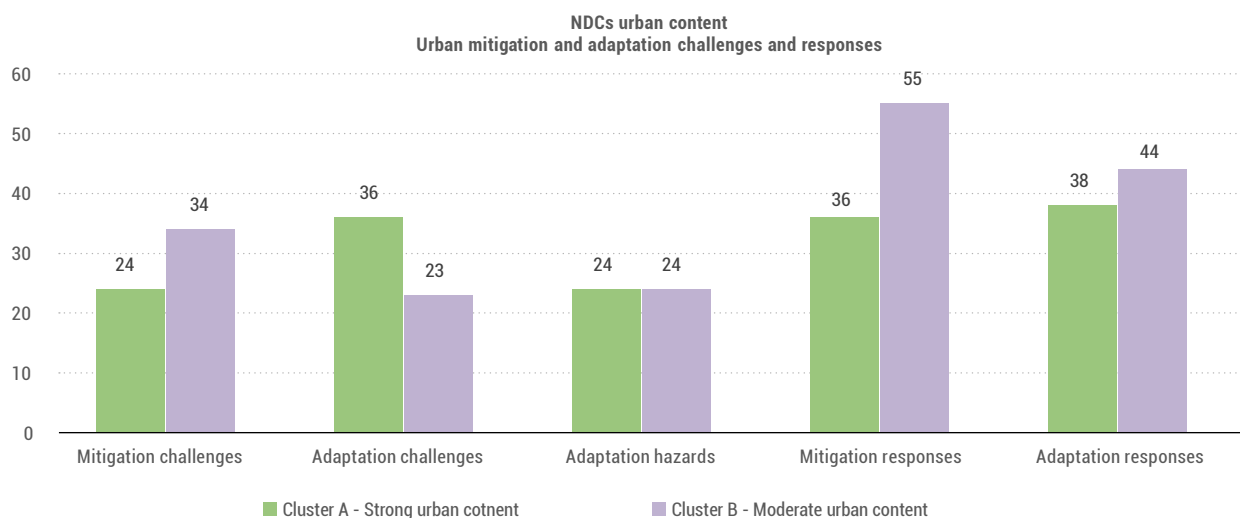
Figure 8. NDCs urban content: Urban mitigation and adaptation content.



Urban climate challenges and responses

Mitigation challenges, defined as a high level of GHG emissions by sector, and adaptation challenges, defined as specific climate threats/impacts by sector, were analysed together with mitigation and adaptation responses, defined as policies, strategies and actions to reduce GHG emissions by sector and to limit the negative effects of climate change by sector and by type of hazard. The analysis of the urban adaptation and mitigation challenges and responses (Figure 9) shows that the NDCs with urban content identify more urban responses than challenges, for both adaptation and mitigation. In some cases, the analysis of mitigation and adaptation challenges is reported in other documents, and cited by the NDCs. Moreover, it shall be noted that the identification of urban carbon footprint by sector and/or urban climate risk by sector and by hazard is a rather complex undertaking. To our knowledge, only a limited number of cities worldwide have been able to develop it, and an even lower number of countries worldwide have a comprehensive carbon footprint and climate risk mapping for all their cities.

Figure 9. NDCs urban content: Urban content in mitigation and adaptation challenges and responses (Clusters A+B).

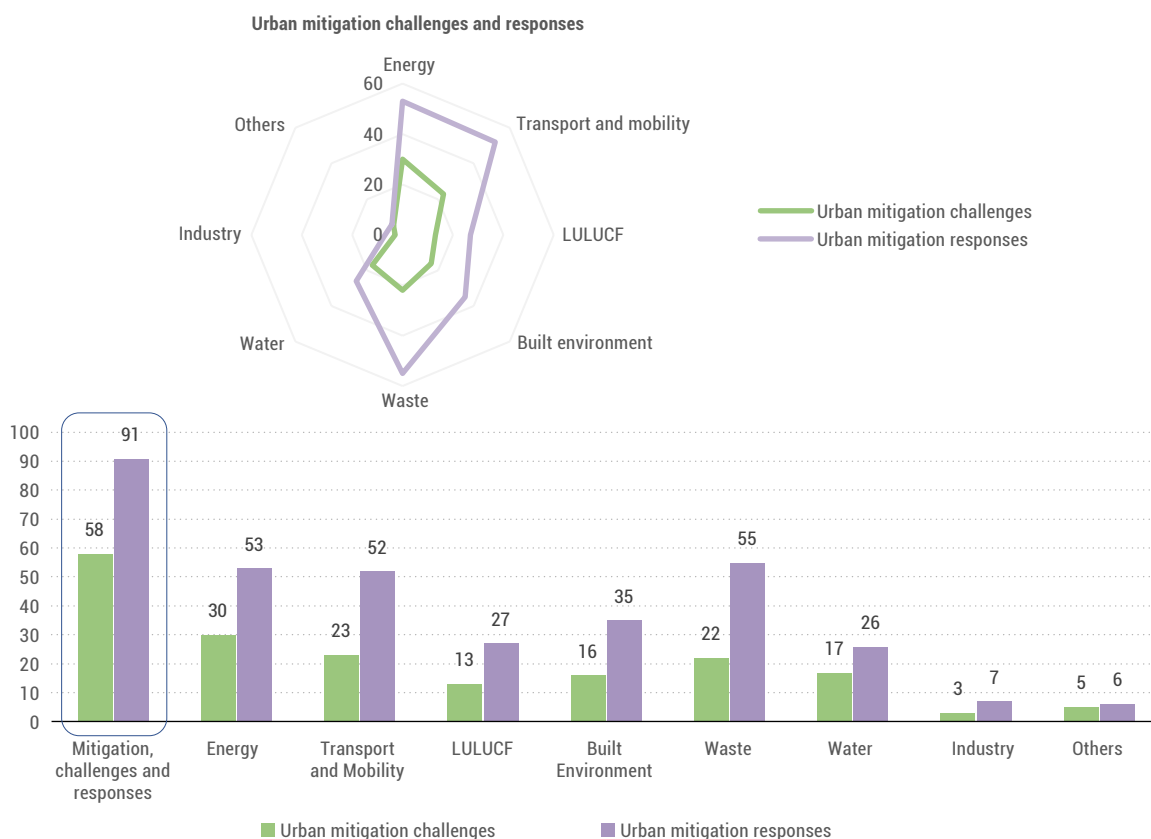


Urban mitigation challenges and responses

The analysis of the mitigation challenges and responses at the urban level (Figure 10) shows that there is a large gap between mitigation responses and challenges: 91 NDCs, or 74% of the NDCs with urban content identify urban mitigation responses and 58 NDCs, or 47% of NDCs with urban content identify urban mitigation challenges. This means that only about half of the NDCs with urban content are explicitly identifying urban mitigation challenges, potentially making it more difficult to track progress and impact of urban mitigation responses, moreover, one quarter of the NDCs with urban content do not include clearly identified urban mitigation responses. The analysis of urban mitigation challenges and responses shows that there is a remarkably high potential for raising national

climate mitigation ambitions at urban level and on the operationalization of more ambitious urban climate mitigation actions. Urban mitigation challenges and responses are aligned for most sectors, for instance, energy, transport and mobility and waste are the most mentioned sectors in urban mitigation challenges and responses. Although only about one out of four NDCs mentions responses on specific urban mitigation sectors like: energy, transport and mobility and waste; and very few NDCs mention urban mitigation responses in other sectors, including sectors like built environment, which are having an extremely high emission profile. This shows that there is ample margin for developing urban climate mitigation actions across all sectors, both individually and through a systemic approach combining multiple sectors.

Figure 10. NDCs urban content: Urban mitigation challenges and responses.



Urban mitigation challenge | Built environment

"It is anticipated that a growing number of South African cities and towns will be exposed to the impacts of weather-induced hazards such as flooding, heatwaves, droughts, wildfires, and storms. This is partly due to the projected increase in the frequency and intensity of weather-related hazards, but also due to the high socioeconomic vulnerability inherent within communities, as well as poor land-use practices, growing informality, and a failure to rapidly deploy resilient infrastructure associated with accommodating a growing urbanising population. It is undeniably the poor and vulnerable communities that will experience the most severe setbacks from the impacts of climate change, eroding their livelihoods, and thus threatening their resilience". (South Africa NDC, p. 8)

Urban mitigation response | Transport and mobility

"With more than two thirds of the population living in and around the capital, Paramaribo, the combined challenge of increasing resilience of urban infrastructure and reducing transport emissions defines Suriname's approach to the sector. A combination of investment and regulation is included as a contribution." (Suriname NDC, p. 3)

Urban adaptation challenges and responses

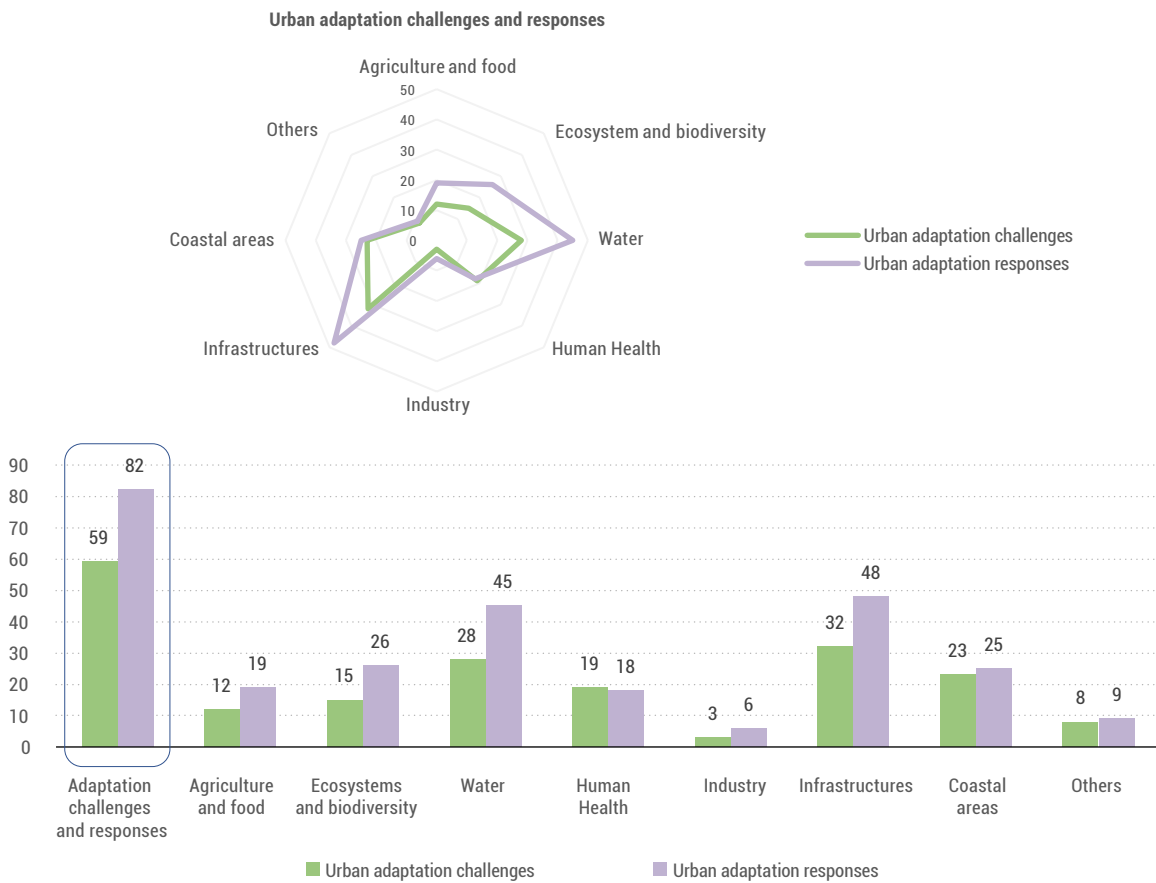
The analysis of the adaptation challenges and responses at the urban level (Figure 11) shows that responses are more frequently mentioned in the NDCs than challenges: 83 NDCs, or 67% of NDCs with urban content, identify urban adaptation responses and 59 NDCs, or 48% of NDCs with urban content identify urban adaptation challenges. This means that only about half of the NDCs with urban content are explicitly identifying urban adaptation challenges, potentially making the assessment of effectiveness and impact of urban adaptation responses more difficult; moreover, circa one third of NDCs with urban content do not include clearly identified urban adaptation responses.

The analysis of urban adaptation challenges and responses shows that there is an exceedingly high potential and need for increased identification of adaptation challenges and operationalization of actions at urban level. Infrastructure and water are the two sectors most mentioned in the NDCs for both urban adaptation challenges and responses, although it shall be noted that only about one of four submitted NDCs mention urban adaptation responses in these sectors. Urban adaptation responses for all other sectors are mentioned in only 13% of the submitted NDCs, even for coastal areas, which are facing increasing urban climate risks. This shows that there is ample margin for developing identification of challenges and planning of adequate responses for urban climate adaptation, looking also at sector integration.



Solar and wind power station © Shutterstock

Figure 11. NDCs urban content: Urban adaptation challenges and responses.



Urban adaptation challenge | Water

“Water supply and sanitation was affected by cyclone IDAI in 2019 and according to assessment by the expert team, 705 water supply boreholes and wells were destroyed affecting about 211,500 people, 47 water supply systems of cities and secondary towns were paralyzed which created restriction in water supply to 1,639,244 people” (Mozambique NDC, p. 15)

Urban adaptation response | Ecosystem and biodiversity

“Future planning for waste and wastewater infrastructures will take into account its sustainability, efficiency and effectiveness whilst avoiding areas that are environmentally sensitive, flooding-prone and categorised as water catchments. Adopting nature-based solutions such as constructed wetlands in facilitating wastewater treatments will be a priority.” (Malaysia NDC, p. 11)

Urban adaptation response | Coastal areas

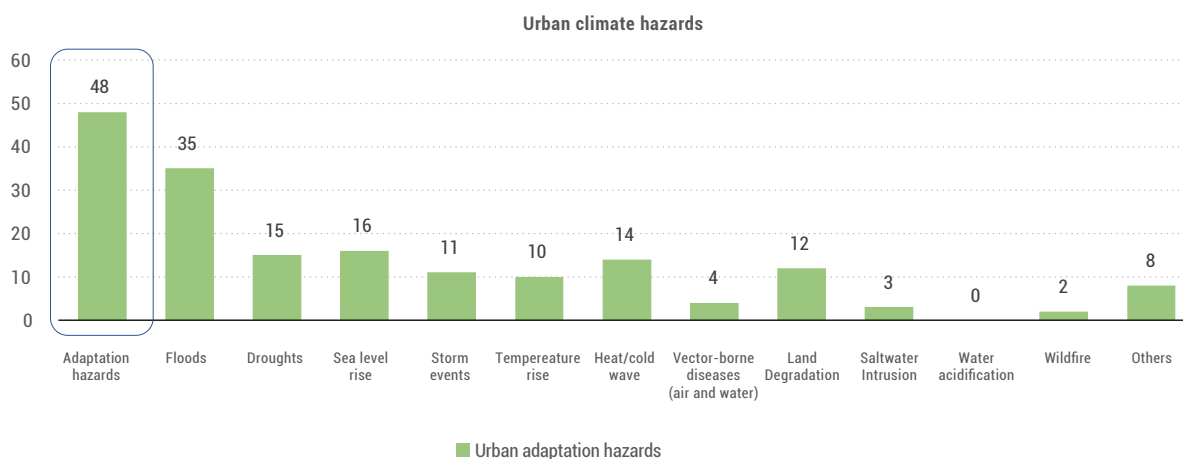
“Protection of the coastal dune belt, fight against coastal erosion and establishment of a monitoring system on the risks of flooding of coastal towns. Implementation of a monitoring system on the risks of flooding in coastal cities.” (Mauritania NDC, p. 57)

Urban climate hazards

The analysis of urban climate hazards (Figure 12) shows that only 48 NDCs, or 39% of the NDCs with urban content, identify urban climate hazards. Flooding is the most prominently identified urban climate hazard, although it is only included in 35 NDCs. All other climate hazards are each included by 16 NDCs, or 8% of the total NDCs analysed. Moreover, wildfire, saltwater intrusion and vector-borne

disease are barely mentioned, whereas water acidification is never mentioned as an urban hazard. It is important to note that many urban climate hazards are water related, including floodings, droughts, sea level rise, water vector borne diseases and salt-water intrusion. This is requiring more attention for both integrated identification of multi-climate risk related to water excess and scarcity, as well as a systematic approach to respond to these combined urban climate hazards.

Figure 12. NDCs urban content: Urban adaptation hazards.



Urban adaptation hazards | Storm events

"The increase in intensity and frequency of extreme events under the effect of climate change (torrential rains in a limited time, waves of extreme heat, marine submersion, storms, etc.) have shown the limits of the traditional conception of urban spaces in Tunisia". (Tunisia, NDC p. 31)

Urban adaptation hazards | Drought, Temperature increase, Flooding, Land degradation

"Although the growing season is projected to become longer, the Albanian agricultural sector is vulnerable to climate change because of its dependence on water resources, the increased risks of drought and extreme temperatures, and floodings and erosion due to SLR. This could affect food security" (Albania NDC, p. 48)

Gender and urban adaptation challenges and responses

The NDC review focused also on the analysis of gender in relation to mitigation and adaptation challenges and responses at urban level. Gender is minimally considered within urban mitigation and adaptation challenges, and also in urban climate mitigation and adaptation responses (Figure 11).

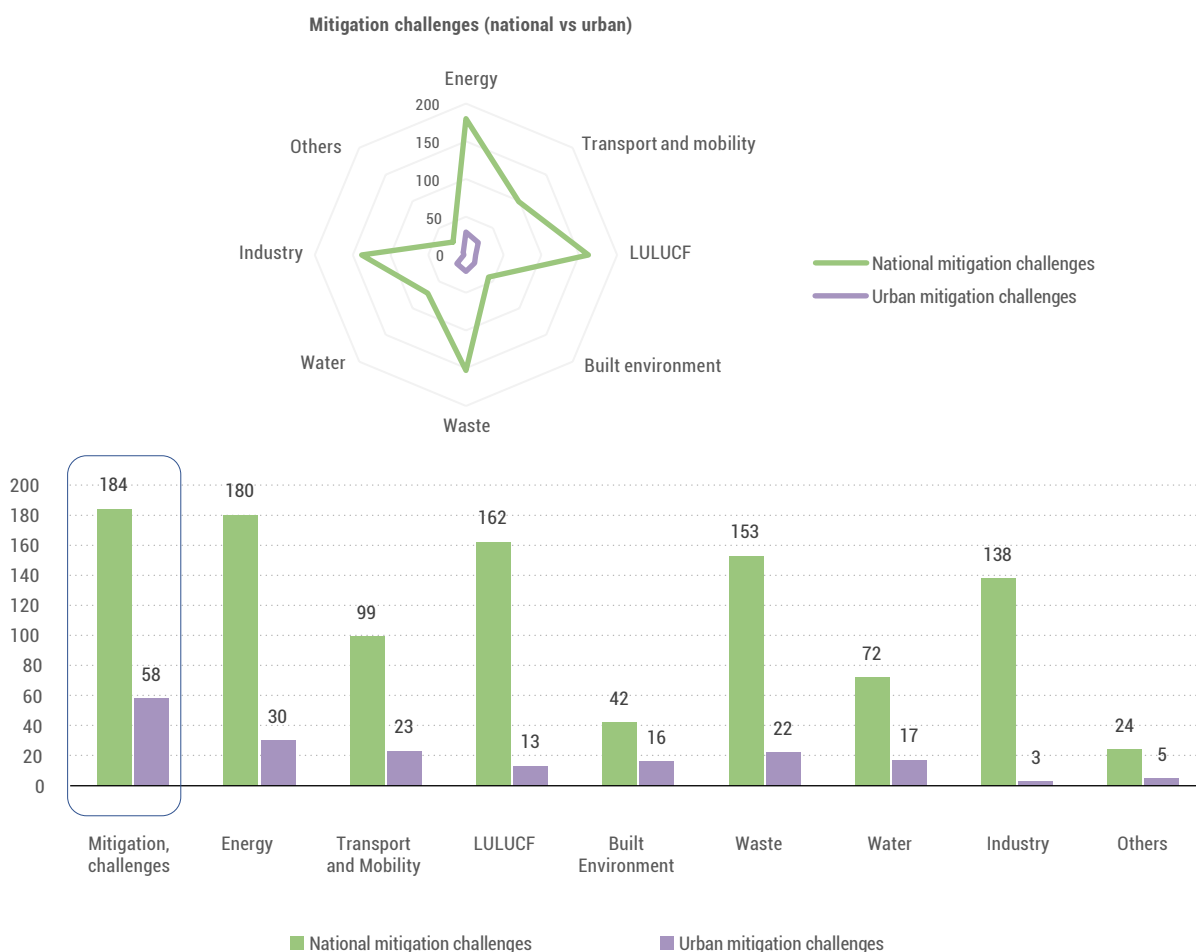
Moreover, there is a substantial gap between national and urban level regarding gender. Gender is mentioned in conjunction with mitigation challenges at national level in 51 NDCs and at urban level by 0 NDCs. Gender is also mentioned in conjunction with mitigation responses at national level by 68 NDCs and at urban level only by 3 NDCs (Figure 19). Gender is mentioned in conjunction with

adaptation challenges at national level by 77 NDCs and at urban level by 1 NDC, and it is mentioned in conjunction with adaptation responses at national level by 112 NDCs, and at urban level by 6 NDCs (Figure 24).

Mitigation challenges (national vs urban)

The comparison between national and urban mitigation challenges (Figure 13) shows that mitigation challenges are not as frequently mentioned at the urban level as at the national level: 184 NDCs, or 95% of the total NDCs reviewed, identify national mitigation challenges; and 58 NDCs, 30% of the total NDCs reviewed and 47% of the NDCs with urban content, identify urban mitigation challenges.

Figure 13. NDCs urban content: Mitigation challenges (national vs urban).



The misalignment on the identification of mitigation challenges between national and urban level is more evident analysing specific sectors. In general, there is a limited number of NDCs mentioning specific urban mitigation challenges by sector compared to the NDCs mentioning mitigation challenges by sector at national level. For example, energy sector challenges are mentioned by the highest number of NDCs both at national, 180 NDCs, and at urban level, 30 NDCs, but the gap between the two is still remarkably high. A similar gap is evident also for the other sectors with the highest number of entries at national level: LULUCF, waste, industry, followed by transport and mobility, and water. For mitigation challenges related to built environment the gap is lower, but only because the number of NDCs recognizing its importance at national level is also lower. This indicates that there is ample margin to increase the inclusion of urban mitigation challenges by sector in the NDCs, particularly in sectors that are of urban relevance, such as energy, transport and mobility, built environment, waste and water.

National mitigation challenge | Energy

"These are key variables that account for the greatest changes in the level of GHG emissions in the different sectors of the country. These include population, gross domestic product, energy demand and supply, cattle stock, agricultural production, and land use change." (Argentina NDC, p. 12)

National mitigation challenge | Industry

"Currently, emission standards are not in place for emissions in the brick and cement industries." (Nepal NDC, p. 5)

mitigation response misalignment is lower than that of mitigation challenges. In general, there is a limited number of NDCs mentioning specific urban mitigation responses by sector compared to the NDCs mentioning mitigation responses by sector at national level. Energy, waste, transport, and mobility are among the sectors included in most NDCs for both national and urban mitigation responses, despite a still evident gap having only about one third of the NDCs at urban level compared to national level. LULUCF and industry are included in a considerable number of NDCs including national mitigation responses, but a significant lower number of NDCs mentioning urban mitigation responses. The gap between national and urban level is much reduced for built environment and water, also due to a considerably lower number of NDCs including national mitigation responses, despite also a lower number of NDCs with urban mitigation responses.

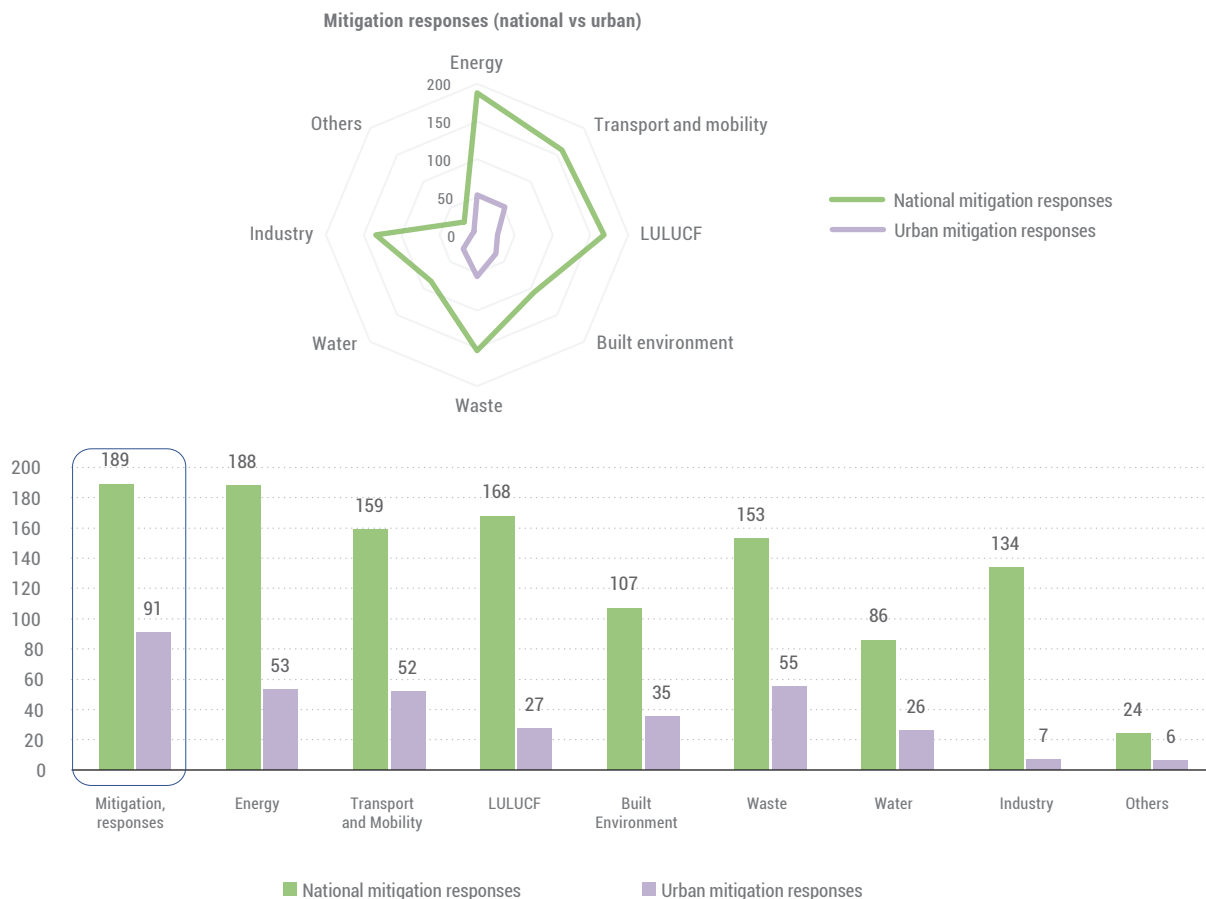
This indicates that there is ample margin to increase the inclusion of urban mitigation responses by sector in the NDCs, particularly in sectors that are of urban relevance, such as energy, transport and mobility, built environment, waste and water, also in NDCs with urban content (Cluster A+B)

Mitigation responses (national vs urban)

The analysis comparing the national and urban mitigation responses (Figure 14) shows that mitigation responses are more frequently mentioned at the national level than at the urban level: 189 NDCs, 98% of the total NDCs analysed, identify mitigation responses, and 91 NDCs, 47% of the total NDCs analysed and 74% of the NDCs with urban content, identify urban mitigation responses.

The misalignment between the identification of mitigation responses between national and urban level is still very evident during the analysis of specific sectors, although

Figure 14. NDCs urban content: Mitigation responses (national vs urban).



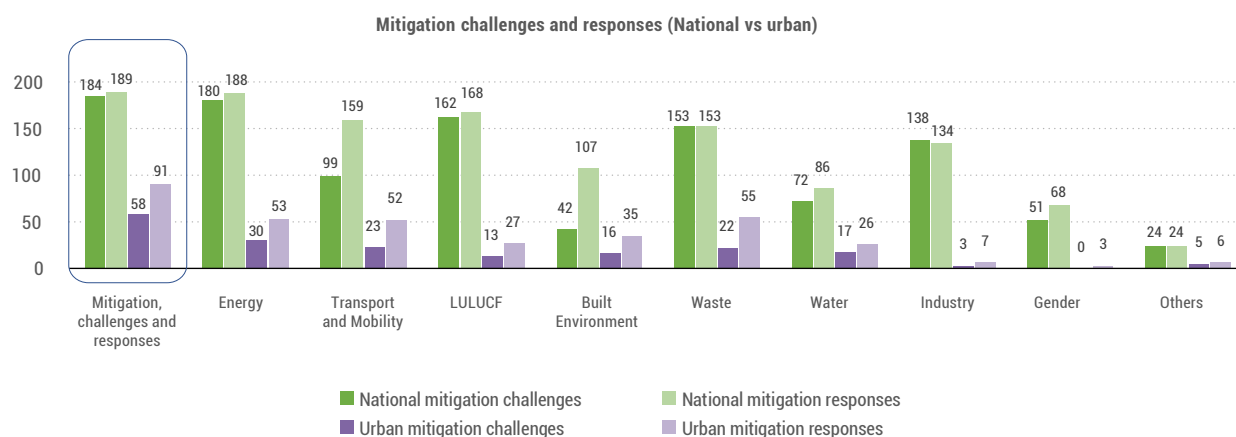
National mitigation response | Gender

“Mitigation priority actions, including energy, waste, and transport, all have linkages to gender equality and social inclusion and the potential to contribute to several gender-based indicators.” (Cambodia NDC, p. 49)

Urban mitigation response | Transport and mobility

“Foster urban low-carbon transportation system. As of 2019, urban rail transit lines with an operating mileage of 6,100 km have been open in 41 cities. Urban public transportation has steadily increased the mobility sharing rate while providing an increasing level of comfort. Urban slow traffic system has also developed rapidly. Online bicycle rental services have been available in more than 360 cities, with more than 300 million registered users. Vigorous efforts have been made to promote clean and low-carbon urban traffic. By the end of 2019, the number of new energy buses in the country has exceeded 400,000. All buses in Shenzhen and taxis in Taiyuan have adopted pure electric vehicles.” (China NDC, p. 18)

Figure 15. NDCs urban content: Mitigation challenges and responses (national vs urban).



Mitigation challenges and responses (national vs urban)

The analysis comparing the national and urban mitigation challenges and responses (Figure 15) shows that mitigation responses are more frequently mentioned at the national level than at the urban level; however, the mitigation responses gap is smaller than the mitigation challenges gap. The sectors with the higher number of mitigation challenges and responses identified both at the national and urban levels are energy, transport and mobility, and waste.

Adaptation challenges (national vs urban)

The comparison between national and urban adaptation challenges (Figure 16) shows that adaptation challenges are not as frequently mentioned at the urban level as at the national level: 171 NDCs, or 89% of the total NDCs reviewed, identify national adaptation challenges; while 59 NDCs, 30% of the total NDCs reviewed and 48% of the NDCs with urban content, identify urban adaptation challenges.

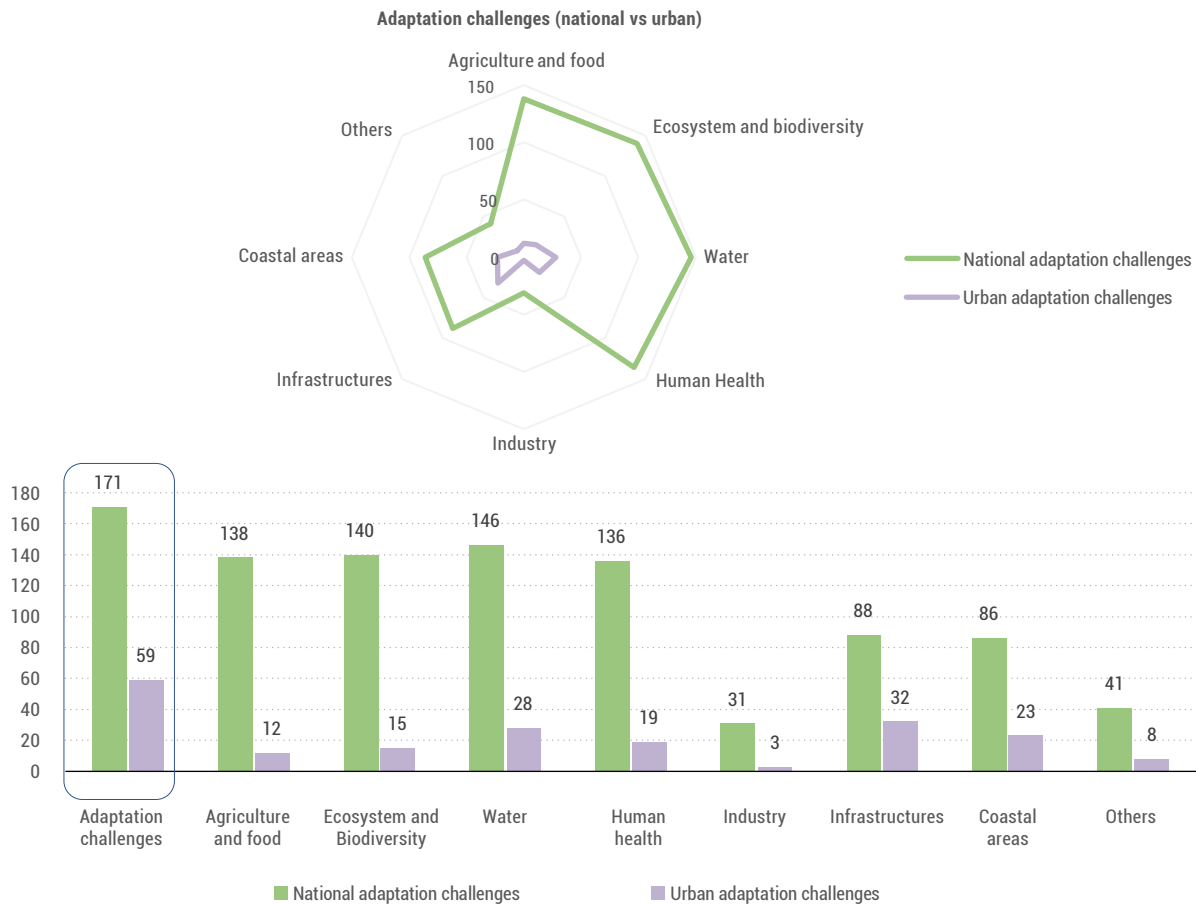
The misalignment on the identification of adaptation challenges, between national and urban level, is very evident analysing specific sectors.

In general, an extremely limited number of NDCs mention specific urban adaptation challenges by sector, also in comparison with the number of NDCs that mention adaptation challenges by sector at national level.

Agriculture and food, ecosystem and biodiversity, water and human health sectors are mentioned by the highest number of NDCs at the national level, but by an extremely limited number of NDCs at the urban level. Water, infrastructure and coastal areas sectors are mentioned by the highest number of NDCs at the local level, while the last two sectors are mentioned by a lower number of NDCs at the national level.

This indicated that there is a very ample margin to increase the inclusion of urban adaptation challenges by sectors in the NDCs, also in NDCs with high urban content (Clusters A+B)

Figure 16. NDCs urban content: Adaptation challenges (national vs urban).



National adaptation challenge | Infrastructure

“The effects of climate change, manifested in the form of frequent natural disasters, disease, destruction of infrastructure and the reduction of water resources as a source for energy generation and irrigation, can jeopardize Kyrgyzstan’s achievements in sustainable development.” (Kyrgyzstan NDC, p. 3)

Urban adaptation challenge | Water, Human health, Coastal area

[8. Water and Sanitation] “Cities & Climate Change Papua New Guinea is experiencing an increase in rural to urban migration. Climate change exacerbates existing urban development challenges and vulnerabilities, such as poor health, inadequate housing, and lack of access to infrastructure, basic services, and social safety nets. Urban areas on the coast are under threat of storm surge and sea-level rise, and, in PNG, cities are often located in hazard-prone areas in the coastal zone. This priority area is linked to the transport, infrastructure, health, urban development, and water and sanitation sectors.” (Papua New Guinea NDC, p. 22)

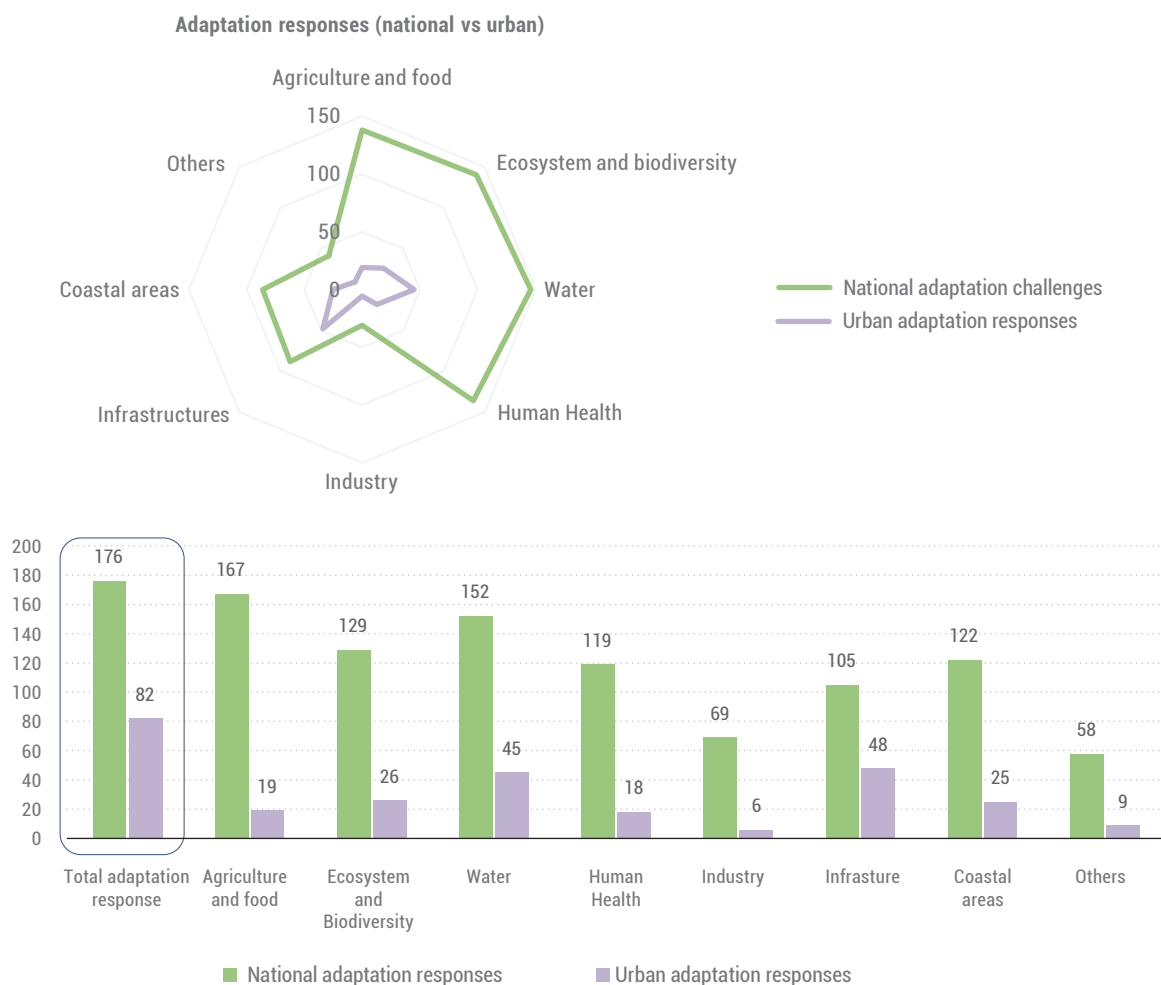
Adaptation responses (national vs urban)

The analysis comparing the national and urban adaptation responses (Figure 17) shows that adaptation responses are more frequently mentioned at the national level than are at the urban level: 176 NDCs, the 91% of the total NDCs analysed, identify national adaptation responses while 82 NDCs, the 42% of the total NDCs analysed and the 67% of the NDCs with urban content, identify urban adaptation responses. The misalignment on the identification of adaptation responses between the national and the urban

level is very evident analysing specific sectors, although lower in comparison to adaptation challenges.

Agriculture and food, water, ecosystem and biodiversity and coastal areas are the sectors included in most NDCs for national adaptation responses, whereas infrastructure and water are the sectors included in most NDCs for urban adaptation responses. This indicates that there is a need to increase the inclusion of urban adaptation responses by sector in the NDCs, also in NDCs with urban content (Cluster A+B).

Figure 17. NDCs urban content: Adaptation responses (national vs urban).



Urban adaptation response | Sectors: Water

"Malaysia continues to ensure water security against the impact of prolonged dry spell by increasing water supply reserve margin with the reduction of non-revenue water and implementation of the off-river storage structural forms. Malaysia plans to increase diversification and exploration of alternative water sources such as urban scale rainwater harvesting system, groundwater, recycled and reclaimed water for conjunctive use. Prioritisation of water demand management to reduce stress on water supply is high on the agenda." (Malaysia NDC, p. 10)

Urban adaptation response | Sectors: Coastal areas

"Protection of the coastal dune belt, fight against coastal erosion and establishment of a monitoring system on the risks of flooding of coastal towns. Implementation of a monitoring system on the risks of flooding in coastal cities." (Mauritania NDC, p. 57)

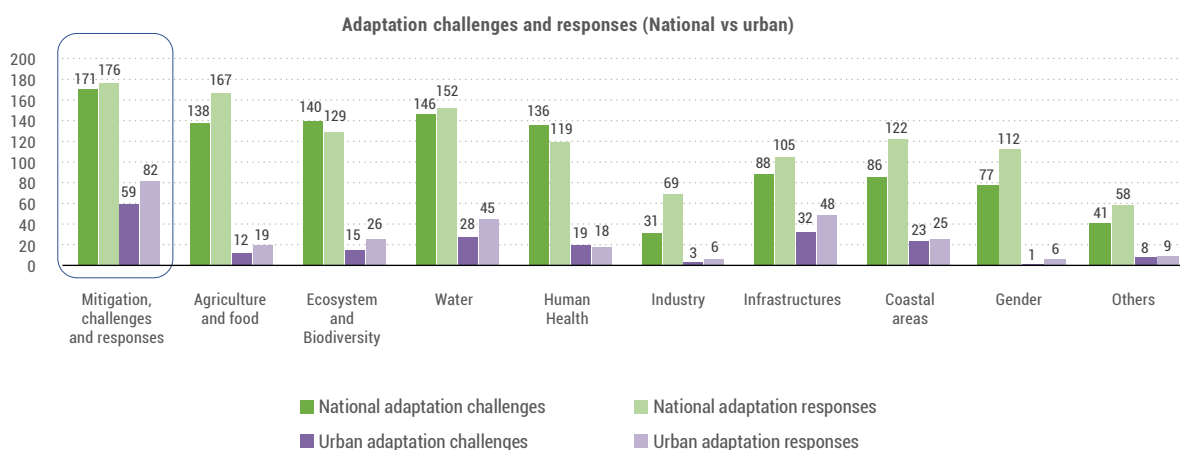
Urban adaptation response | Infrastructure

"The place of the tree in the city wants to be reinforced with a major planting program. An increase of at least 20% in the number of individuals, which represents the planting of 2,400 additional trees on the territory, is envisaged by 2030, in addition to the 12,000 trees already present on the territory. In addition, the development of green infrastructure on buildings, such as intensive roofs and modular green walls, will be favoured to "wild" the city with the aim of bringing together a large number of plant species (sown, planted, but also spontaneous), different strata (shrubs, herbaceous, muscinal) adapted to local climatic and microclimatic conditions (temperature, humidity, light, wind)." (Monaco, p. 31)

Adaptation challenges and responses (national vs urban)

The analysis comparing the national and urban adaptation challenges and responses (Figure 18) shows that adaptation responses are more frequently mentioned at the national level than at the urban level; however, urban adaptation responses are in general mentioned in more NDCs compared to urban adaptation challenges.

Figure 18. NDCs urban content: Adaptation challenges and responses (national vs urban).



Adaptation hazards (national vs urban)

The analysis comparing national and urban adaptation hazards (Figure 19) shows that adaptation hazards are more frequently mentioned at the national level than are at the urban level: 116 NDCs, 87% of the total NDCs analysed, identify national adaptation hazards, and that 48 NDCs, or 25% of the total NDCs analysed and the 39% of the NDCs with urban content, identify urban adaptation hazards.

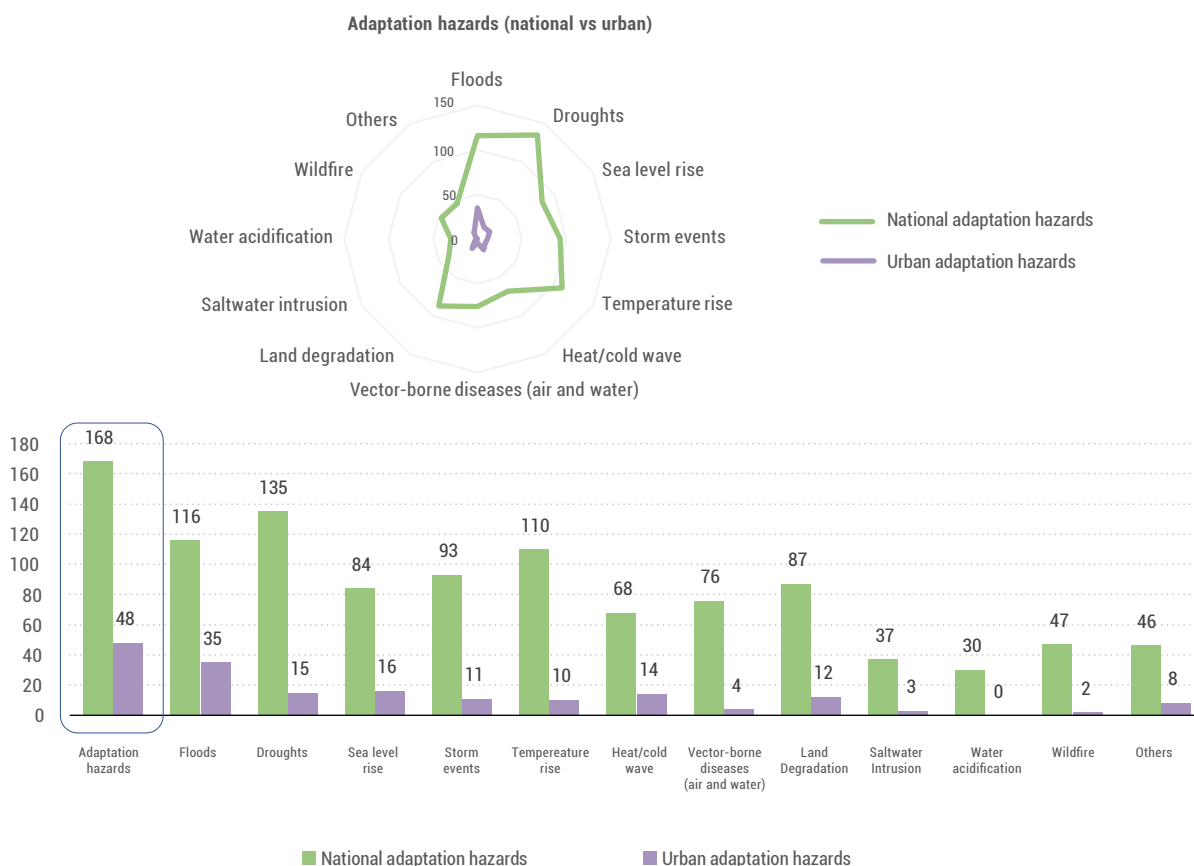
Droughts, floodings and temperature rise are the adaptation hazards included in most NDCs at national level, followed by a lower inclusion of other national adaptation hazards: sea level rise, storm events, heat/cold waves, vector-borne diseases, and land degradation. Whereas flooding is the single adaptation hazard included in most NDCs at

urban level, followed by a limited inclusion of other urban adaptation hazards: droughts, sea level rise, storm events, temperature rise, heat/cold waves, and land degradation.

Saltwater intrusion, water acidification and wildfires are the adaptation hazards least included in the NDCs at the national level, whereas vector-borne diseases, saltwater intrusion and wildfire are the adaptation hazards least included in the NDCs at the urban level, with no NDCs mentioning water acidification as adaptation hazard at the urban level.

This indicates that there is an extraordinarily strong need to increase the inclusion of adaptation hazards in the NDCs, particularly at urban level, also in NDCs with urban content (Cluster A+B).

Figure 19. NDCs urban content: Adaptation hazards (national vs urban).

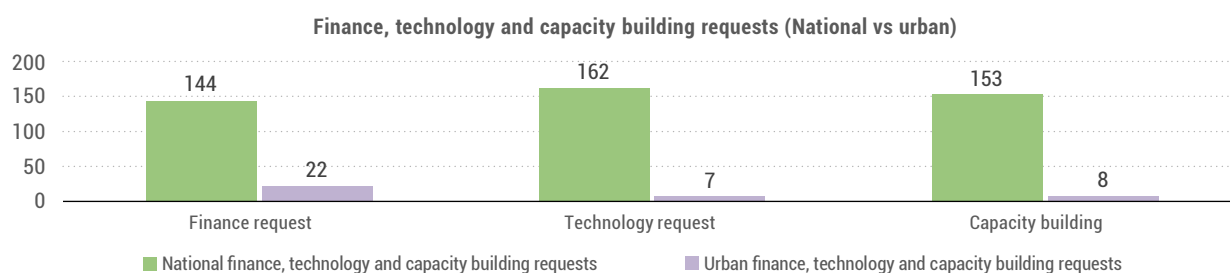


Finance, technology, and capacity building request (national vs urban)

The analysis of the requests for finance, technologies, and capacity building (Figure 20) shows that the vast majority of NDCs identify needs and include requests for technology, 162 NDCs, capacity building 153 NDCs and

finance 144 NDCs. Only an extremely limited number of NDCs include specific requests at urban level for finance, 22 NDCs, capacity building, 8 NDCs, and technology, 7 NDCs. This shows that there is an ample space for improving the inclusion of specific urban requests for finance, technology, and capacity building in the NDC, including in NDCs with urban content (Cluster A+B)

Figure 20. NDCs urban content analysis 2022: Finance, technology, and capacity building requests (national vs urban).



"It is estimated that to achieve the set target of 15% GHG emission reduction by 2030, the country would require approximately USD18.4 billion" (Botswana NDC, p. 3).

[Finance needs] "From earlier analysis, it is estimated that the incremental financial resources Cabo Verde would need for implementing the updated NDC amount to a minimum of 2 bn Euros for 10 years of climate action, half of the amount being earmarked for mitigation, and half for adaptation." (Cabo Verde NDC, p. 10)

"The increased coastal erosion, droughts, storms, floodings and landslides of the last decade have severely impacted livelihoods and government have neither the financial or technical resources to address these challenges." (St. Vincent and the Grenadines NDC, p. 2)

"Metodología para la estimación de necesidades de financiamiento climático para la adaptación a nivel nacional (de arriba hacia abajo) [...] Esta aproximación ofrece un resultado relativo al PIB nacional. El estudio, que aún se encuentra en proceso de revisión y ajuste, indica que la inversión anual en adaptación al cambio climático debe ser del 0.2% del PIB nacional hasta el 2030, para cerrar la brecha entre el crecimiento económico potencial y el crecimiento económico bajo los impactos del cambio climático. En pesos colombianos (COP) del 2019, esto corresponde a aproximadamente 2 billones de pesos anuales (aproximadamente USD 600 millones¹²) hasta 2030. Esta cifra debe tomarse como valor mínimo, pues considera la inversión en capital humano y físico, pero no otras medidas que son también cruciales para la adaptación efectiva en el país (por ejemplo, medidas de capital natural).²¹" (Colombia NDC, p. 26)

Urban finance request

"To increase mitigation co-benefits in this sector, Myanmar will need international support for institutional strengthening, technical assistance and capacity building. For example, to build key GIS capacities, support is needed for Myanmar's Resilient Cities Development plans by strengthening the Urban Research and Development Institute, established in 2012." (Myanmar, p. 49)

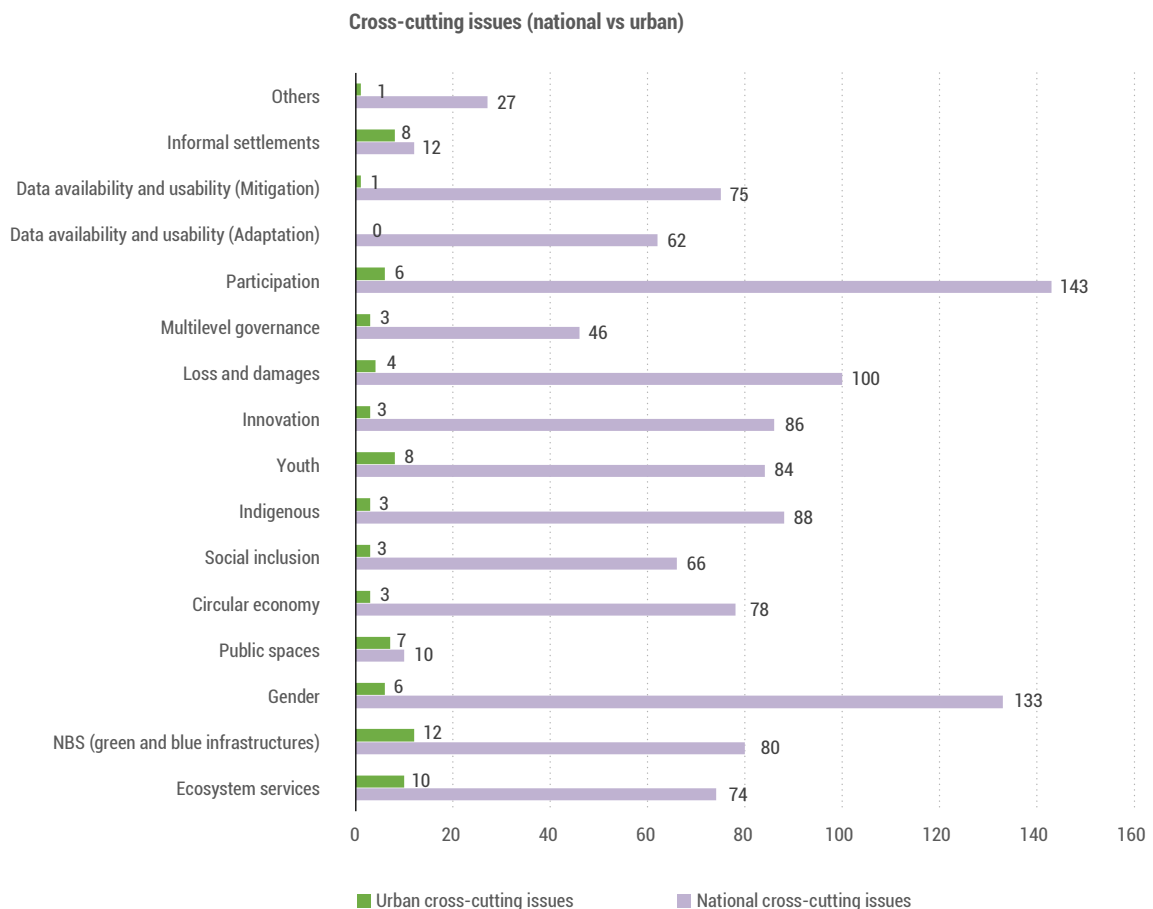
21 English translation: "Methodology for estimating climate finance needs for adaptation at the national level (top-down) [...] This approach provides a result relative to national GDP. This approach provides a result relative to national GDP. The study, which is still under review and adjustment, indicates that annual investment in climate change adaptation should be 0.2% of national GDP until 2030, to close the gap between potential economic growth and economic growth under climate change impacts. In 2019 Colombian pesos (COP), this corresponds to approximately 2 trillion pesos per year (approximately USD 600 million¹²) until 2030. This figure should be taken as a minimum value, as it considers investment in human and physical capital, but not other measures that are also crucial for effective adaptation in the country (e.g., natural capital measures)." (Colombia, p. 26)

“An Asian Development Bank study on assessing the costs of climate change adaptation in South Asia indicates that approximate adaptation cost for India in energy sector alone would roughly be about USD 7.7 billion in 2030s. [...] Estimates by NITI Aayog (National Institution for Transforming India) indicate that the mitigation activities for moderate low carbon development would cost around USD 834 billion till 2030 at 2011 prices. [...] While this would evolve over time, a preliminary estimate suggests that at least USD 2.5 trillion (at 2014-15 prices) will be required for meeting India's climate change actions between now and 2030. “ No specific urban finance request. (India NDC, p. 31)

Cross-cutting issues (national vs urban)

The analysis of the national and urban cross-cutting issues (Figure 21) shows a major gap between national and urban cross-cutting issues mentioned within the NDCs. The most mentioned national cross-cutting issues are participation, gender and loss and damages, whereas the least mentioned are informal settlements and public spaces. The most mentioned urban cross-cutting issues are nature-based solutions, ecosystem services, informal settlements, and youth, whereas the least mentioned are data availability, multi-level governance, innovation, indigenous, social inclusion, and circular economy. This demonstrates a need for strengthening the urban level considerations on cross-cutting issues, also in countries with urban content (Cluster A+B). Moreover, a more in-depth analysis and research shall be undertaken in relation to cross-cutting issues.

Figure 21. NDCs urban content: Cross-cutting indicators (national vs urban).



Urban cross-cutting issues | Informal settlements

This urban extension is due to a marked peri urbanisation, in addition to the formal modes of land and real estate production, by the proliferation of non-regulatory neighbourhoods and informal occupations on floodingplains and on drainage lines." (Tunisia NDC, p. 30)

Urban cross-cutting issues | Nature-based solutions

[Climate-sensitive urban design / green infrastructure and increase green spaces] "Complementing the point above, some municipalities show the potential to increase green spaces through planting trees and through implementing neighbourhood-level solutions to address better walkability and use of non-motorized forms of transportation, use of urban design, and adoption of more greenery/green/nature-based infrastructure/solutions that not only helps with issues such as flooding, but can also mitigate heat islands and energy load etc. at an urban design scale." (Jordan NDC, p. 30)

National cross-cutting issues | Data availability and usability

"This updated NDC updates and strengthens the first NDC for both the mitigation and adaptation contributions, informed by improved data collection, in-depth technical analysis and extensive stakeholder engagement. [...] These sources may be included within future contributions, subject to improved data availability and ongoing development in the accuracy of their quantification within the national GHG inventory." (Rwanda NDC, pp. 20-23)

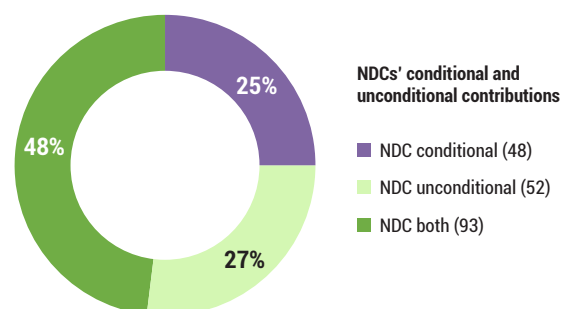
National cross-cutting issues | Gender

"Climate change affects gender minorities disproportionately, including women and girls. The areas where women play a central role - food security, nutrition, energy, livelihoods, health, natural resource management, among others - are those most directly impacted by climate change." (Cambodia NDC, p. 48)

NDC conditional/unconditional contribution

The analysis of the conditional and unconditional contributions mentioned within the NDCs (Figure 29) shows that 27% of the NDCs mention only an **unconditional** contribution, meaning what countries could implement based on their own resources and capabilities; 25% of NDCs mention only a **conditional** contribution, meaning what countries would undertake if international means of support are provided, or other conditions are met. About half of the NDCs (48%) mention both conditional and unconditional contributions. It should be noted the importance of clearly identifying requests for technology, finance and capacity building, both at the national and the urban level, for countries that are listing their nationally determined contribution as conditional, partially or in full.

Figure 22. NDCs' conditional and unconditional contributions.



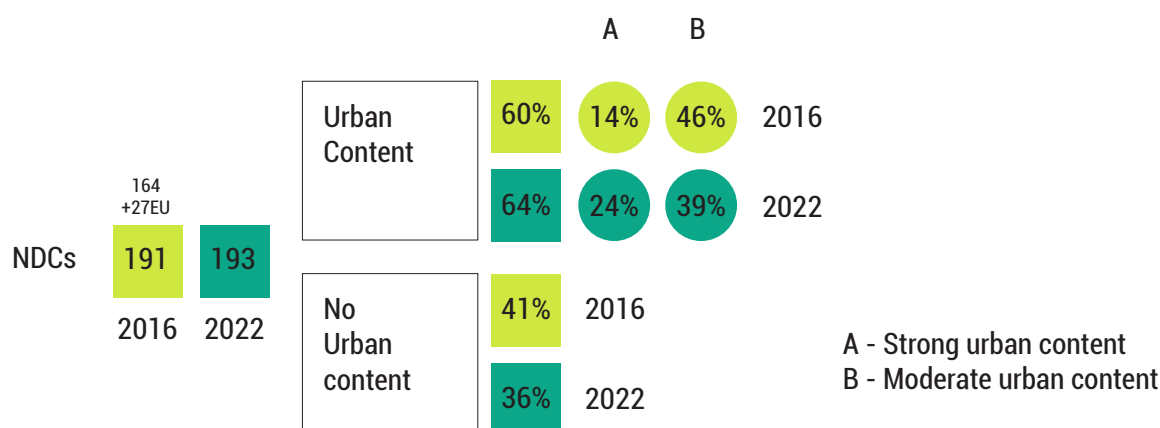
"Sri Lanka commits to reducing its GHG emissions. In these NDCs, the country presents an enhanced ambition which includes 4% unconditional and 10.5% conditional emission reduction commitments with respect to Business-As-Usual (BAU) scenario." (Sri Lanka NDC, p. iii)

"The Kingdom of Bahrain recognizes that the extent to which it will meet its obligations under the UNFCCC, PA will depend highly on the level of international support in means of implementation" (Bahrain NDC, p. 8)

2.4 Urban Content of NDCs: Trends Based on the 2016- 17 and 2022 Analyses

The comparison between the analysis of the urban content of the NDCs in 2016-17 and in 2022, the percentage of NDCs with low or no urban content (Cluster C) has decreased from 41% in 2016 to 37% in 2022, and NDCs with strong or moderate urban content (Clusters A+B) have increased from 60% in 2016, to 63% in 2022).

Figure 23. NDCs urban content analysis: comparing 2016 and 2022 results.



03

KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS



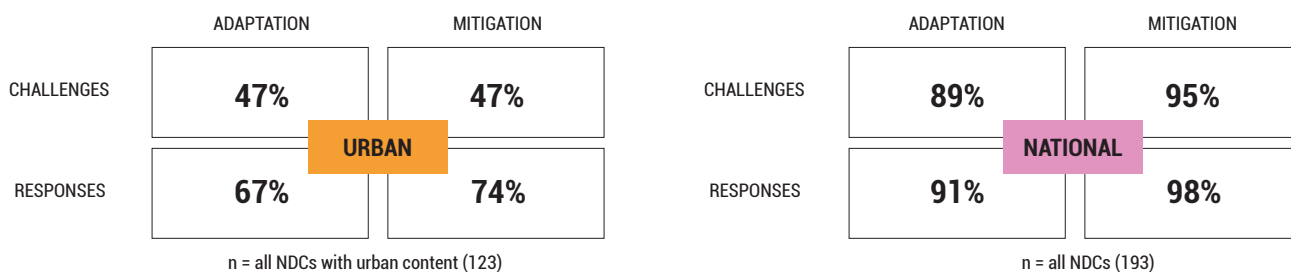
Mangrove reforestation project in Samutsakorn, Thailand © Shutterstock

3.1 Key Findings

The key findings of the 2022 global analysis of the urban content of the NDCs are:

- 47 of 193 NDCs have a strong urban content (Cluster A), 76 NDCs have a moderate urban content (Cluster B) and 70 NDCs have low or no urban content (Cluster C).
- 64% of the NDCs analysed have a strong or moderate urban content (Cluster A+B).
- The percentage of NDCs with urban content (Cluster A+B) has increased in comparison with 2016-17, from 60% in 2016-17 to 63% in 2022.
- The NDCs with strong urban content (Cluster A) have significantly increased in number in comparison with the 2016 analysis, passing from 14% in 2016-17 to 24% in 2022.
- The NDCs with urban content (Cluster A+B) originate from Parties that account for 70% of the world's urban population and 72% of CO2e emissions of the total submitted NDCs.
- 83 NDCs, or 43% of the NDCs analysed, focus both on urban adaptation and mitigation, whereas 12% of the NDCs focus on only urban adaptation. 9% of the NDCs focus on only urban mitigation.
- NDCs with urban content (Cluster A+B) identify more urban responses than challenges. 74% of NDCs with urban content identify urban mitigation responses and 47% identify urban mitigation challenges. 67% identify urban adaptation responses and 47% urban adaptation challenges. Results are shown in Figure 24.
- Energy, transport and mobility and waste are the most mentioned sectors in urban mitigation challenges and responses.
- Infrastructure and water are the two most mentioned sectors in urban adaptation challenges and responses.
- 48 NDCs, or 39% of the NDCs with urban content, identify urban climate hazards. Flooding is the most prominently identified urban climate hazard, although it is only included in 35 NDCs. All other climate hazards are each included with a relatively low maximum 8% of the total NDCs analysed.
- Gender is almost not considered at all within urban mitigation and adaptation challenges, and it is minimally considered in urban climate mitigation and adaptation responses.
- Mitigation responses by sector are more frequently mentioned at the national level than at the urban level. The sectors with the higher number of mitigation challenges and responses identified both at the national

Figure 24. NDCs urban content analysis: adaptation and mitigation content, in challenges and responses, looking at urban and national level.



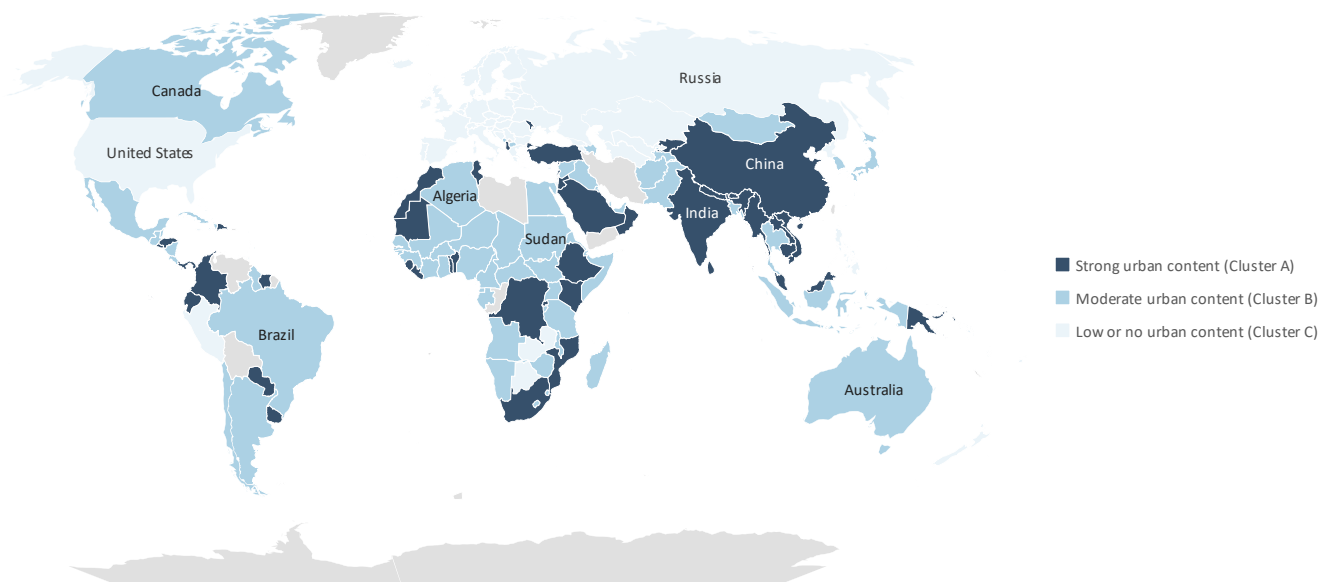
and urban levels are energy, transport and mobility and waste.

13. Adaptation responses by sector are more frequently mentioned at the national level than at the urban level; however, urban adaptation responses are in general mentioned in more NDCs than urban adaptation challenges.
14. Adaptation hazards are more frequently mentioned at the national level than the urban level: 116 NDCs, or 87% of the total NDCs analysed, identify national adaptation hazards; and 48 NDCs, of the 25% of the total NDCs analysed and 39% of the NDCs with urban content, identify urban adaptation hazards. Droughts, floodings and temperature rise are the adaptation hazards included in most NDCs at national level, followed by a lower inclusion of other national adaptation hazards, notably sea level rise, storm events, heat/cold waves, vector-borne diseases and land degradation. Flooding is the adaptation hazard included in most NDCs at

urban level, followed by limited inclusion of several other hazards.

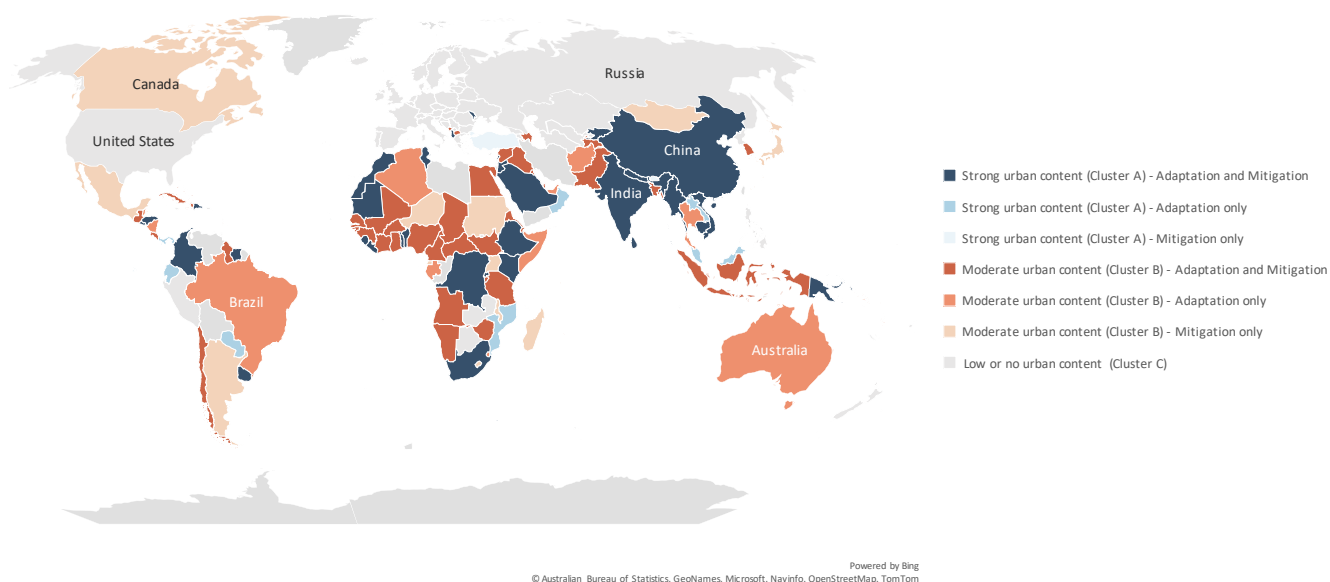
15. The vast majority of NDCs identify requests: 162 NDCs include requests for technology, 153 NDCs request capacity building and 144 NDCs request finance. Only an extremely limited number of NDCs include specific requests at urban level for finance (22 NDCs), capacity building (8 NDCs) and technology (7 NDCs).
16. NDCs show most of the national cross-cutting issues for the topics: participation, gender and loss and damage. Informal settlements and public spaces are the least mentioned among the cross-cutting issues within the NDCs. In the urban context, NDCs show most cross-cutting issues related to nature-based solutions, ecosystem services, informal settlements and youth; whereas data analysis, multilevel governance, innovation, indigenous, social inclusion and circular economy are the least mentioned cross-cutting issues within the NDCs in an urban context.

Map 1: Map of Urban Content, Cluster A, B and C.



Powered by Bing
© Australian Bureau of Statistics, GeoNames, Microsoft, Navinfo, OpenStreetMap, TomTom

Map 2: Map of Urban Content, Adaptation and Mitigation, Adaptation Only, Mitigation Only.



3.2. Conclusions and Recommendations

The number of NDCs with urban content increased in a very limited manner among the most recent submissions compared to 20116-17, but there has been a substantial increase of the number of NDCs with strong urban content. It is very positive to acknowledge that almost two out of three NDCs have an urban focus. It is also important to note that the lack of urban content in an NDC does not necessarily mean that there is a lack climate urban policies and actions.

Likewise, the NDCs with urban content, including those with strong urban content (Cluster A), may still require further strengthening and integration of urban climate policies and actions. The strengthening of urban content of the NDCs is instrumental to raise the overall ambition of the NDCs and to strengthen the effective operationalization of climate adaptation and mitigation policies.

Based on the data collected and analysed, recommendations are provided below.

Recommendation 1: Scale up advocacy and support to the Parties for including urban content in their NDCs.

Recommendation 2: Update the guidelines for supporting the inclusion of urban content in the NDCs and develop more systematic and tailored support for the Parties in implementing the guidelines for strengthening their NDCs.

Recommendation 3: Expand the analysis of urban content to other key national urban policies in addition to NDCs, such as National Adaptation Plans (NAPs) and Long-Term Low Emissions Development Strategies (LT-LEDS).

Recommendation 4: Increase the number of country-level analyses to have a more systemic view of the urban content of all urban related national climate policies, also in relation to current urban actions and projects at urban level.

Two thirds of the NDCs with urban content are focusing on both mitigation and adaptation. The integration of urban mitigation and adaptation is especially important as cities are responsible for a substantial share of GHG emissions and are also increasingly exposed and vulnerable to the negative effects of climate change. The integration of climate mitigation and adaptation is fundamental to

increase the effectiveness of policies and actions, avoiding silo approaches and minimizing rebound effects, and also to maximize the effectiveness of resource utilisation.

NDCs identify more mitigation and adaptation responses than challenges. This may be the case as often NDCs do not include full details on mitigation and adaptation challenges and adaptation hazard but cite or refer to external documents. Moreover, the identification of urban carbon footprints and/or urban climate risk are complex and resource-intensive undertakings, and only a limited number of cities and countries worldwide have been able to develop and systematically report on these in the NDCs.

Only about one fourth of the submitted NDCs mention urban mitigation responses on energy, transport and mobility and waste sectors, and even fewer NDCs mention urban mitigation responses in other sectors, including key sectors like built environment. Only one fourth of the submitted NDCs mention urban adaptation responses on infrastructure and on water. Moreover, urban adaptation responses for all other sectors are referenced in only 13% of the submitted NDCs. This shows that there is ample margin for further identification of challenges and planning of adequate responses for urban climate mitigation and adaptation, looking also at sector integration.

In relation to urban climate hazards, flooding is the most prominent, although it is found in only 35 NDCs, and all other climate hazards are each included in a maximum of 16 NDCs each. Based on this data, greater focus is needed on urban climate hazards, in particular, through a multi-risk perspective (e.g., water-related risks, including floodings, drought and sea level rise).

Recommendation 5: Support the integration of mitigation and adaptation for urban climate action.

Recommendation 6: Increase the explicit identification of urban climate challenges to better guide the definition of urban climate responses and track their effectiveness and progress.

Recommendation 7: Climate mitigation responses at urban level should be strengthened by supporting a more concrete identification of urban mitigation responses in key sectors like energy, transport and mobility, waste and built environment, including NDCs that already have urban content.

Recommendation 8: Climate mitigation responses at urban level should be strengthened by supporting a more concrete identification of urban adaptation responses across all adaptation sectors, including in NDCs that already have urban content.

Recommendation 9: Climate adaptation hazards at urban level shall be better identified, both individually and under a multi-risk perspective, to guide the identification and monitoring of appropriate urban adaptation responses.

Gender is almost not considered at all within urban mitigation and adaptation challenges, and it is minimally considered in urban climate mitigation and adaptation responses, despite being mentioned by over 25% of the NDCs analysed at national level in relation to both mitigation and adaptation. The lack of inclusion of gender considerations at urban level, both in relation to mitigation and adaptation, is a major gap in the NDCs.

The mitigation challenges and responses by sector, and the adaptation challenges and responses by sector are mentioned at national level much more than at urban level. This demonstrates a major gap and opportunity to include greater urban content and to align it to already identified mitigation and adaptation challenges and responses at national level.

The vast majority of NDCs include requests for technology, capacity building and finance, whereas only an extremely limited number of NDCs include these specific requests at urban level. This shows that there is ample space for improving the inclusion of specific urban requests for finance, technology and capacity building in NDCs in an urban context.

There is a major gap between national and urban cross-cutting issues mentioned within the NDCs, e.g., participation is mentioned in 74% of NDCs at national level and 3% of NDCs at urban level. The most frequently mentioned national cross-cutting issues are participation, gender and loss and damage, whereas the least mentioned are informal settlements and public spaces. The most frequently mentioned urban cross-cutting issues are nature-based solutions, ecosystem services, informal settlements and youth, whereas the least mentioned are data availability, multilevel governance, innovation, indigenous, social inclusion and circular economy. This shows an extraordinarily strong need for strengthening urban level

considerations on cross-cutting issues, also in countries with urban content.

Recommendation 10: Gender consideration at urban level, related to both mitigation and adaptation challenges and opportunities, should be strengthened.

Recommendation 11: Urban level mitigation and adaptation challenges and responses by sector should be expanded in alignment with the national level.

Recommendation 12: Requests for technology, finance and capacity building should have greater definition at urban level.

Recommendation 13: Cross-cutting issues should be better included and strengthened at urban level.

Recommendation 14: More in-depth analysis and research should be undertaken in relation to urban content and cross-cutting issues.

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UNFCCC 2015, The Paris Agreement, <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>, last accessed: 10 October 2022.

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ANNEXES

A.1. LIST OF INDICATORS USED FOR THE NDCS' URBAN CONTENT ANALYSIS 2022

A.2. LIST OF COUNTRIES WHOSE NDCS' URBAN CONTENT WAS ANALYSED

A.1. LIST OF INDICATORS USED FOR THE NDCs' URBAN CONTENT ANALYSIS 2022

| N. | Indicator | Source | Link |
|----------|--|-----------------|---|
| 1 | Geographic Indicators | External | |
| 1.1 | Country ISO code | External | https://unstats.un.org/unsd/methodology/m49/ |
| 1.2 | Country Name | External | https://unstats.un.org/unsd/methodology/m49/ |
| 1.3 | Region name | External | https://unstats.un.org/unsd/methodology/m49/ |
| 1.4 | Sub-region name | External | https://unstats.un.org/unsd/methodology/m49/ |
| 1.5 | Capital name | External | https://www.countries-ofthe-world.com/capitals-of-the-world.html |
| 2 | National context indicators | | |
| 2.1 | Total Population (2020) | External | https://data.worldbank.org/indicator/SP.POP.TOTL?end=2020&start=1960&view=chart |
| 2.2 | Total population in (2011) | External | https://data.worldbank.org/indicator/SP.POP.TOTL?end=2011&start=2000&view=chart |
| 2.3 | Population density | External | https://data.worldbank.org/indicator/EN.POP.DNST |
| 2.4 | GDP Country (US\$) | External | https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2020&start=1960 |
| 2.5 | GDP per capita (US\$) | External | https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2020&start=1960&view=chart |
| 2.6 | GINI index | External | https://data.worldbank.org/indicator/SI.POV.GINI |
| 2.7 | Human Development Index (2019) | External | https://hdr.undp.org/data-center/human-development-index#/indicies/HDI |
| 2.8 | Human Development Index - category | Calculate | |
| 2.9 | Income categorization | External | https://datahelpdesk.worldbank.org/knowledgebase/articles/906519 |
| 2.10 | Type of party (Annex I / Non-Annex I) | External | https://unfccc.int/process/parties-non-party-stakeholders/parties-convention-and-observer-states |
| 3 | Urban context indicators | | |
| 3.1 | Urban population (2021) | External | https://data.worldbank.org/indicator/SP.URB.TOTL?view=chart |
| 3.2 | Percentage urban population (2021) | External | https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?view=chart; https://databank.worldbank.org/source/world-development-indicators |
| 3.3 | Urbanization rate (percentage) | External | https://data.worldbank.org/indicator/SP.URB.GROW |
| 3.4 | Urbanization rate (ranked) | External | https://www.statista.com/statistics/270221/ranking-of-the-30-countries-with-the-highest-degree-of-urbanization/ |
| 3.5 | Percentage of people living in urban areas, 2050 | External | https://ourworldindata.org/urbanization |
| 3.6 | Urban land area (2010) [sq. Km] | External | https://data.worldbank.org/indicator/AG.LND.TOTL.UR.K2 |
| 4 | Emissions indicators | | |
| 4.1 | CO2e: TOTAL per country | External | https://www.climatewatchdata.org/ |
| 4.1.1 | CO2e sectors: Agriculture | External | https://www.climatewatchdata.org/ |
| 4.1.2 | CO2e sectors: Bunker fuels | External | https://www.climatewatchdata.org/ |
| 4.1.3 | CO2e sectors: Building | External | https://www.climatewatchdata.org/ |
| 4.1.4 | CO2e sectors: Electricity/heat | External | https://www.climatewatchdata.org/ |

| N. | Indicator | Source | Link |
|----------|---|----------|---|
| 4.1.5 | CO2e sectors: Energy | External | https://www.climatewatchdata.org/ |
| 4.1.6 | CO2e sectors: Fugitive emissions | External | https://www.climatewatchdata.org/ |
| 4.1.7 | CO2e sectors: Industrial Processes | External | https://www.climatewatchdata.org/ |
| 4.1.8 | CO2e sectors: Land-Use Change and Forestry | External | https://www.climatewatchdata.org/ |
| 4.1.9 | CO2e sectors: Manufacturing/constructions | External | https://www.climatewatchdata.org/ |
| 4.1.10 | CO2e sectors: Other fuel combustion | External | https://www.climatewatchdata.org/ |
| 4.1.11 | CO2e sectors: Total excluding LUCF | External | https://www.climatewatchdata.org/ |
| 4.1.12 | CO2e sectors: Total including LUCF | External | https://www.climatewatchdata.org/ |
| 4.1.13 | CO2e sectors: Transportation | External | https://www.climatewatchdata.org/ |
| 4.1.14 | CO2e sectors: Waste | External | https://www.climatewatchdata.org/ |
| 4.2 | CO2e: per capita | External | https://www.climatewatchdata.org/ |
| 4.3 | CO2e: per GDP | External | https://www.climatewatchdata.org/ |
| 4.4 | Compatibility of climate targets with a 2° C scenario | External | https://www.climatewatchdata.org/ |
| 5 | Key hazards | | |
| 5.1 | Droughts | External | https://www.climatewatchdata.org/ |
| 5.2 | Earthquakes | External | https://www.climatewatchdata.org/ |
| 5.3 | Epidemics | External | https://www.climatewatchdata.org/ |
| 5.4 | Extreme temperatures | External | https://www.climatewatchdata.org/ |
| 5.5 | Floodings | External | https://www.climatewatchdata.org/ |
| 5.6 | Insect infestations | External | https://www.climatewatchdata.org/ |
| 5.7 | Landslides | External | https://www.climatewatchdata.org/ |
| 5.8 | Storms | External | https://www.climatewatchdata.org/ |
| 5.9 | Volcanic activities | External | https://www.climatewatchdata.org/ |
| 5.10 | Wildfires | External | https://www.climatewatchdata.org/ |
| 6 | NDC national Indicators - General | | |
| 6.1 | Latest submission date | External | https://www.climatewatchdata.org/ndcs-explore |
| 6.2 | Title | NDC | |
| 6.3 | Language | External | https://unfccc.int/NDCREG |
| 6.4 | Mitigation Contribution Type | External | https://www.climatewatchdata.org/ |
| 6.5 | GHG Target type | External | https://www.climatewatchdata.org/ |
| 6.6 | GHG target year | External | https://www.climatewatchdata.org/ |
| 6.7 | GHG target - sector covered | External | https://www.climatewatchdata.org/ |
| 6.8 | Target quantity | NDC | |
| 6.9 | Base year | NDC | |
| 6.10 | NDC conditional/unconditional | NDC | |
| 6.11 | Share of Global GHG emissions | External | https://www.climatewatchdata.org/ |
| 6.12 | Finance request | NDC | |
| 6.13 | Technology request | NDC | |
| 6.14 | Capacity building | NDC | |

| N. | Indicator | Source | Link |
|----------|---|--------|------|
| 7 | NDC national Indicators - Challenges | | |
| 7.1 | Mitigation challenges | NDC | |
| 7.1.1 | Energy | NDC | |
| 7.1.2 | Transport and mobility | NDC | |
| 7.1.3 | LULUCF | NDC | |
| 7.1.4 | Built environment | NDC | |
| 7.1.5 | Waste | NDC | |
| 7.1.6 | Water | NDC | |
| 7.1.7 | Industry | NDC | |
| 7.1.8 | Gender | NDC | |
| 7.1.9 | Others | NDC | |
| 7.2 | Adaptation challenges | NDC | |
| 7.2.1 | Agriculture and food | NDC | |
| 7.2.2 | Ecosystem and biodiversity | NDC | |
| 7.2.3 | Water | NDC | |
| 7.2.4 | Human Health | NDC | |
| 7.2.5 | Industry | NDC | |
| 7.2.6 | Infrastructure | NDC | |
| 7.2.7 | Coastal areas | NDC | |
| 7.2.8 | Gender | NDC | |
| 7.2.9 | Others | NDC | |
| 7.3 | Hazards | NDC | |
| 7.3.1 | Floodings | NDC | |
| 7.3.2 | Droughts | NDC | |
| 7.3.3 | Sea level rise | NDC | |
| 7.3.4 | Storm events | NDC | |
| 7.3.5 | Temperature rise | NDC | |
| 7.3.6 | Heat/cold wave | NDC | |
| 7.3.7 | Vector-borne diseases (air and water) | NDC | |
| 7.3.8 | Land degradation | NDC | |
| 7.3.9 | Saltwater intrusion | NDC | |
| 7.3.10 | Water acidification | NDC | |
| 7.3.11 | Wildfire | NDC | |
| 7.3.12 | Others | NDC | |
| 8 | NDC national Indicators - Responses | | |
| 8.1 | Mitigation responses | NDC | |
| 8.1.1 | Energy | NDC | |
| 8.1.2 | Transport and mobility | NDC | |
| 8.1.3 | LULUCF | NDC | |
| 8.1.4 | Built environment | NDC | |
| 8.1.5 | Waste | NDC | |
| 8.1.6 | Water | NDC | |

| N. | Indicator | Source | Link |
|-----------|---|----------|---|
| 8.1.7 | Industry | NDC | |
| 8.1.8 | Gender | NDC | |
| 8.1.9 | Others | NDC | |
| 8.2 | Adaptation responses | NDC | |
| 8.2.1 | Agriculture and food | NDC | |
| 8.2.2 | Ecosystem and biodiversity | NDC | |
| 8.2.3 | Water | NDC | |
| 8.2.4 | Human Health | NDC | |
| 8.2.5 | Industry | NDC | |
| 8.2.6 | Infrastructure | NDC | |
| 8.2.7 | Coastal areas | NDC | |
| 8.2.8 | Gender | NDC | |
| 8.2.9 | Others | NDC | |
| 9 | NDC urban indicators - General | | |
| 9.1 | Urban content - Preliminary analysis 2021 | External | White Paper (UN-Habitat and SDU.Resilience, 2021) |
| 9.2 | Urban content - in-depth analysis (2022) | NDC | |
| 9.3 | Finance request | NDC | |
| 9.4 | Technology request | NDC | |
| 9.5 | Capacity building | NDC | |
| 10 | NDC Urban Indicators - Challenges | | |
| 10.1 | Urban mitigation challenges | NDC | |
| 10.1.1 | Energy | NDC | |
| 10.1.2 | Transport and mobility | NDC | |
| 10.1.3 | LULUCF | NDC | |
| 10.1.4 | Built environment | NDC | |
| 10.1.5 | Waste | NDC | |
| 10.1.6 | Water | NDC | |
| 10.1.7 | Industry | NDC | |
| 10.1.8 | Gender | NDC | |
| 10.1.9 | Others | NDC | |
| 10.2 | Urban adaptation challenges | NDC | |
| 10.2.1 | Agriculture and food | NDC | |
| 10.2.2 | Ecosystem and biodiversity | NDC | |
| 10.2.3 | Water | NDC | |
| 10.2.4 | Human Health | NDC | |
| 10.2.5 | Industry | NDC | |
| 10.2.6 | Infrastructure | NDC | |
| 10.2.7 | Coastal areas | NDC | |
| 10.2.8 | Gender | NDC | |
| 10.2.9 | Others | NDC | |
| 10.3 | Urban hazards | | |
| 10.3.1 | Floodings | NDC | |

| N. | Indicator | Source | Link |
|-----------|---|----------|---|
| 10.3.2 | Droughts | NDC | |
| 10.3.3 | Sea level rise | NDC | |
| 10.3.4 | Storm events | NDC | |
| 10.3.5 | Temperature rise | NDC | |
| 10.3.6 | Heat/cold wave | NDC | |
| 10.3.7 | Vector-borne diseases (air and water) | NDC | |
| 10.3.8 | Land degradation | NDC | |
| 10.3.9 | Saltwater intrusion | NDC | |
| 10.3.10 | Water acidification | NDC | |
| 10.3.11 | Wildfire | NDC | |
| 10.3.12 | Others | NDC | |
| 11 | NDC Urban Indicators - Responses | | |
| 11.1 | Urban mitigation responses | NDC | |
| 11.1.1 | Energy | NDC | |
| 11.1.2 | Transport and mobility | NDC | |
| 11.1.3 | LULUCF | NDC | |
| 11.1.4 | Built environment | NDC | |
| 11.1.5 | Waste | NDC | |
| 11.1.6 | Water | NDC | |
| 11.1.7 | Industry | NDC | |
| 11.1.8 | Gender | NDC | |
| 11.1.9 | Others | NDC | |
| 11.2 | Urban adaptation responses | NDC | |
| 11.2.1 | Agriculture and food | NDC | |
| 11.2.2 | Ecosystem and biodiversity | NDC | |
| 11.2.3 | Water | NDC | |
| 11.2.4 | Human Health | NDC | |
| 11.2.5 | Industry | NDC | |
| 11.2.6 | Infrastructure | NDC | |
| 11.2.7 | Coastal areas | NDC | |
| 11.2.8 | Gender | NDC | |
| 11.2.9 | Others | NDC | |
| 12 | Other national climate-related policies, strategies, and plans | | |
| 12.1 | NAP National Adaptation plans | External | https://www4.unfccc.int/sites/NAPC/Pages/national-adaptation-plans.aspx |
| 12.2 | NDC-SDG linkages | External | https://www.climatewatchdata.org/ |
| 12.2.1 | 1. No poverty | External | https://www.climatewatchdata.org/ |
| 12.2.2 | 2. Zero hunger | External | https://www.climatewatchdata.org/ |
| 12.2.3 | 3. Good health and well-being | External | https://www.climatewatchdata.org/ |
| 12.2.4 | 4. Quality education | External | https://www.climatewatchdata.org/ |
| 12.2.5 | 5. Gender equality | External | https://www.climatewatchdata.org/ |
| 12.2.6 | 6. Clean water and sanitation | External | https://www.climatewatchdata.org/ |

| N. | Indicator | Source | Link |
|-----------|---|----------|---|
| 12.2.7 | 7. Affordable and clean energy | External | https://www.climatewatchdata.org/ |
| 12.2.8 | 8. Decent work and economic growth | External | https://www.climatewatchdata.org/ |
| 12.2.9 | 9. Industry, innovation, and infrastructure | External | https://www.climatewatchdata.org/ |
| 12.2.10 | 10. Reduced inequalities | External | https://www.climatewatchdata.org/ |
| 12.2.11 | 11. Sustainable cities and communities | External | https://www.climatewatchdata.org/ |
| 12.2.12 | 12. Responsible consumption and production | External | https://www.climatewatchdata.org/ |
| 12.2.13 | 13. Climate action | External | https://www.climatewatchdata.org/ |
| 12.2.14 | 14. Life below water | External | https://www.climatewatchdata.org/ |
| 12.2.15 | 15. Life on land | External | https://www.climatewatchdata.org/ |
| 12.2.16 | 16. Peace, justice, and strong institutions | External | https://www.climatewatchdata.org/ |
| 12.2.17 | 17. Partnerships for the goals | External | https://www.climatewatchdata.org/ |
| 12.3 | National Long-term Strategies (LTS) | External | https://www.climatewatchdata.org/ |
| 12.4 | Adaptation: Long-term Goal and Outcomes for Climate Adaptation and Resiliency | External | https://www.climatewatchdata.org/ |
| 13 | Cross-cutting national level indicators | | |
| 13.1 | Ecosystem services | NDC | |
| 13.2 | NBS (green and blue infrastructure) | NDC | |
| 13.3 | Gender | NDC | |
| 13.4 | Public spaces | NDC | |
| 13.5 | Circular economy | NDC | |
| 13.6 | Social inclusion | NDC | |
| 13.7 | Indigenous | NDC | |
| 13.8 | Youth | NDC | |
| 13.9 | Innovation | NDC | |
| 13.10 | Loss and damages | NDC | |
| 13.11 | Multilevel governance | NDC | |
| 13.12 | Participation | NDC | |
| 13.13 | Data availability and usability (Adaptation) | NDC | |
| 13.14 | Data availability and usability (Mitigation) | NDC | |
| 13.15 | Informal settlements | NDC | |
| 13.16 | Others | NDC | |
| 14 | Cross-cutting urban level indicators | | |
| 14.1 | Ecosystem services | NDC | |
| 14.2 | NBS (green and blue infrastructure) | NDC | |
| 14.3 | Gender | NDC | |
| 14.4 | Public spaces | NDC | |
| 14.5 | Circular economy | NDC | |
| 14.6 | Social inclusion | NDC | |
| 14.7 | Indigenous | NDC | |
| 14.8 | Youth | NDC | |

| N. | Indicator | Source | Link |
|-------|---|--------|------|
| 14.9 | Innovation | NDC | |
| 14.10 | Loss and damages | NDC | |
| 14.11 | Multilevel governance | NDC | |
| 14.12 | Participation | NDC | |
| 14.13 | Data availability and usability (Adaptation) | NDC | |
| 14.14 | Data availability and usability (Mitigation) | NDC | |
| 14.15 | Informal settlements | NDC | |
| 14.16 | Others | NDC | |

A.2. LIST OF COUNTRIES WHOSE NDCS' URBAN CONTENT WAS ANALYSED

| ID | Country Name | Cluster of urban content (2022) |
|----|----------------------------------|---------------------------------|
| 1 | Afghanistan | B |
| 2 | Albania | A |
| 3 | Algeria | B |
| 4 | Andorra | B |
| 5 | Angola | B |
| 6 | Antigua and Barbuda | C |
| 7 | Argentina | B |
| 8 | Armenia | C |
| 9 | Australia | B |
| 10 | Austria | C |
| 11 | Azerbaijan | B |
| 12 | Bahamas | B |
| 13 | Bahrain | A |
| 14 | Bangladesh | B |
| 15 | Barbados | B |
| 16 | Belarus | C |
| 17 | Belgium | C |
| 18 | Belize | B |
| 19 | Benin | A |
| 20 | Bhutan | A |
| 21 | Bolivia (Plurinational State of) | B |
| 22 | Bosnia and Herzegovina | C |
| 23 | Botswana | C |
| 24 | Brazil | B |
| 25 | Brunei Darussalam | C |
| 26 | Bulgaria | C |
| 27 | Burkina Faso | B |
| 28 | Burundi | B |
| 29 | Cabo Verde | A |
| 30 | Cambodia | A |
| 31 | Cameroon | B |
| 32 | Canada | B |
| 33 | Central African Republic | B |
| 34 | Chad | B |
| 35 | Chile | B |
| 36 | China | A |
| 37 | Colombia | A |
| 38 | Comoros | C |

| ID | Country Name | Cluster of urban content (2022) |
|----|---------------------------------------|---------------------------------|
| 39 | Congo | A |
| 40 | Cook Islands | C |
| 41 | Costa Rica | B |
| 42 | Côte d'Ivoire | B |
| 43 | Croatia | C |
| 44 | Cuba | B |
| 45 | Cyprus | C |
| 46 | Czech Republic | C |
| 47 | Democratic People's Republic of Korea | C |
| 48 | Democratic Republic of the Congo | B |
| 49 | Denmark | C |
| 50 | Djibouti | B |
| 51 | Dominica | C |
| 52 | Dominican Republic | A |
| 53 | Ecuador | A |
| 54 | Egypt | B |
| 55 | El Salvador | A |
| 56 | Equatorial Guinea | B |
| 57 | Eritrea | B |
| 58 | Estonia | C |
| 59 | Eswatini | B |
| 60 | Ethiopia | A |
| 61 | Fiji | C |
| 62 | Finland | C |
| 63 | France | C |
| 64 | Gabon | B |
| 65 | Gambia | A |
| 66 | Georgia | C |
| 67 | Germany | C |
| 68 | Ghana | B |
| 69 | Greece | C |
| 70 | Grenada | C |
| 71 | Guatemala | B |
| 72 | Guinea | B |
| 73 | Guinea-Bissau | B |
| 74 | Guyana | B |

| ID | Country Name | Cluster of urban content (2022) |
|-----|----------------------------------|---------------------------------|
| 75 | Haiti | B |
| 76 | Honduras | A |
| 77 | Hungary | C |
| 78 | Iceland | C |
| 79 | India | A |
| 80 | Indonesia | B |
| 81 | Iraq | B |
| 82 | Ireland | C |
| 83 | Israel | C |
| 84 | Italy | C |
| 85 | Jamaica | C |
| 86 | Japan | B |
| 87 | Jordan | A |
| 88 | Kazakhstan | C |
| 89 | Kenya | A |
| 90 | Kiribati | B |
| 91 | Kuwait | B |
| 92 | Kyrgyzstan | A |
| 93 | Lao People's Democratic Republic | A |
| 94 | Latvia | C |
| 95 | Lebanon | A |
| 96 | Lesotho | B |
| 97 | Liberia | A |
| 98 | Liechtenstein | C |
| 99 | Lithuania | C |
| 100 | Luxembourg | C |
| 101 | Madagascar | B |
| 102 | Malawi | B |
| 103 | Malaysia | A |
| 104 | Maldives | B |
| 105 | Mali | B |
| 106 | Malta | C |
| 107 | Marshall Islands | C |
| 108 | Mauritania | A |
| 109 | Mauritius | B |
| 110 | Mexico | B |
| 111 | Micronesia (Federated States of) | C |
| 112 | Monaco | A |
| 113 | Mongolia | B |
| 114 | Montenegro | B |

| ID | Country Name | Cluster of urban content (2022) |
|-----|-----------------------|---------------------------------|
| 115 | Morocco | A |
| 116 | Mozambique | A |
| 117 | Myanmar | A |
| 118 | Namibia | B |
| 119 | Nauru | B |
| 120 | Nepal | A |
| 121 | Netherlands | C |
| 122 | New Zealand | C |
| 123 | Nicaragua | B |
| 124 | Niger | B |
| 125 | Nigeria | B |
| 126 | Niue | C |
| 127 | North Macedonia | B |
| 128 | Norway | C |
| 129 | Oman | A |
| 130 | Pakistan | B |
| 131 | Palau | C |
| 132 | Panama | A |
| 133 | Papua New Guinea | A |
| 134 | Paraguay | A |
| 135 | Peru | C |
| 136 | Philippines | C |
| 137 | Poland | C |
| 138 | Portugal | C |
| 139 | Qatar | B |
| 140 | Republic of Korea | B |
| 141 | Republic of Moldova | A |
| 142 | Romania | C |
| 143 | Russian Federation | C |
| 144 | Rwanda | A |
| 145 | Samoa | C |
| 146 | San Marino | C |
| 147 | São Tomé and Príncipe | C |
| 148 | Saudi Arabia | A |
| 149 | Senegal | B |
| 150 | Serbia | C |
| 151 | Seychelles | B |
| 152 | Sierra Leone | A |
| 153 | Singapore | B |
| 154 | Slovakia | C |
| 155 | Slovenia | C |

| ID | Country Name | Cluster of urban content (2022) |
|-----|--------------------------------|---------------------------------|
| 156 | Solomon Islands | B |
| 157 | Somalia | B |
| 158 | South Africa | A |
| 159 | South Sudan | B |
| 160 | Spain | C |
| 161 | Sri Lanka | A |
| 162 | St. Kitts and Nevis | B |
| 163 | St. Lucia | B |
| 164 | St. Vincent and the Grenadines | C |
| 165 | State of Palestine | A |
| 166 | Sudan | B |
| 167 | Suriname | A |
| 168 | Sweden | C |
| 169 | Switzerland | C |
| 170 | Syrian Arab Republic | B |
| 171 | Tajikistan | B |
| 172 | Thailand | B |
| 173 | Timor-Leste | C |
| 174 | Togo | A |
| 175 | Tonga | C |

| ID | Country Name | Cluster of urban content (2022) |
|-----|--|---------------------------------|
| 176 | Trinidad and Tobago | C |
| 177 | Tunisia | A |
| 178 | Türkiye | A |
| 179 | Turkmenistan | C |
| 180 | Tuvalu | C |
| 181 | Uganda | B |
| 182 | Ukraine | C |
| 183 | United Arab Emirates | B |
| 184 | United Kingdom of Great Britain and Northern Ireland | C |
| 185 | United Republic of Tanzania | B |
| 186 | United States of America | C |
| 187 | Uruguay | A |
| 188 | Uzbekistan | C |
| 189 | Vanuatu | B |
| 190 | Venezuela (Bolivarian Republic of) | A |
| 191 | Viet Nam | A |
| 192 | Zambia | C |
| 193 | Zimbabwe | B |



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