



**SUSTAINABLE
URBANIZATION**
IN THE **PARIS**
AGREEMENT

Comparative Review of
Nationally Determined
Contributions for
Urban Content

**SUSTAINABLE
URBANIZATION
IN THE** **PARIS**
AGREEMENT

Comparative Review of
Nationally Determined
Contributions for
Urban Content

Sustainable Urbanization in the Paris Agreement

Comparative review for urban content in the Nationally Determined Contributions (NDCs)

Nairobi, October 2017

All rights reserved ©2017

United Nations Human Settlements Programme (UN-Habitat)
P.O. Box 30030, 00100 Nairobi, Kenya www.unhabitat.org/ccci

HS Number: HS/065/18E

DISCLAIMER

The designations employed and the presentation of material in this report do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the delimitation of its frontiers or boundaries, or regarding its economic system or degree of development. The views expressed in this publication do not necessarily reflect the views of the United Nations Human Settlements Programme or its Governing Council.

ACKNOWLEDGEMENTS

Coordinator:

Marcus Mayr, Climate Change Planning Unit, Urban Planning and Design Branch.

Lead Authors:

Dr. Nicola Tollin, Professor wsr in Urban Resilience, University of Southern Denmark. Executive Director RESURBE International Program on Urban Resilience at RECNET Recycling Cities Network, **Prof. Dr. Johannes Hamhaber**, TH Köln University of Applied Science and Recycling Cities International Network RECNET.

Co-Authors:

Dr. Stelios Grafakos, Institute for Housing and Urban Development Studies (IHS), Erasmus University Rotterdam; **Dr. Shuaib Lwasa**, Makerere University; **Prof. Dr. Jordi Morato** Recycling Cities International Network RECNET and UNESCO Chair on Sustainability at Technical University of Catalunya.

Contributors:

Aline Lusieux Alves de Oliveira, TH Köln; **Elena Ensenado**, IHS Erasmus University Rotterdam; **Julie Greewalt**, Cities Alliance; **Kate Trigg**, IHS Erasmus University Rotterdam; **Lucia Benavides**, TH Köln; **Marcus Mayr**, UN-Habitat; **Matteo Gianotti**, UN-Habitat; **Michelle Wilson**, UN-Habitat; **Richard Orth**, TH Köln; **Robert Kehew**, UN-Habitat; **Teresa Moran**, RECNET; **Ursula Cockburn**, TH Köln.

Supporting Organizations:

AdaptChile, Cities Alliance, Government of Norway, Institute for Housing and Urban Development Studies (IHS) Erasmus University Rotterdam, Makerere University, National Autonomous University of Mexico, Recycling Cities International Network RECNET, RESURBE International Program on Urban Resilience, Swedish International Development Agency (Sida), UNESCO Chair on Sustainability at Technical University of Catalunya Technical University of Cologne.

Design and Layout: **Freddie Maitaria**

Front cover photo: © Shutterstock

TABLE OF CONTENTS

LIST OF MAPS, TABLES AND FIGURES	V
ACRONYMS AND ABBREVIATIONS	VI
FOREWORD	VII
EXECUTIVE SUMMARY	VIII
1. INTRODUCTION	1
1.1. GLOBAL CLIMATE ACTION	1
1.1.1. The Paris Agreement	1
1.1.2. Nationally Determined Contributions	2
1.2. CITIES AND CLIMATE CHANGE	2
1.2.1. Climate Change Mitigation	3
1.2.2. Climate Change Adaptation	3
1.3. FINANCE, TECHNOLOGY AND CAPACITY BUILDING	4
1.3.1. Climate Financing	5
1.3.2. Technology Development and Transfer	5
1.3.3. Capacity Building	6
1.4. REVIEW OBJECTIVES	6
1.4.1. Expected Outcomes	6
1.4.2. Potential for Follow Up	7
1.5. METHODOLOGY	7
1.5.1. Data Analysis	8
1.5.2. Glossary	8
2. ANALYSIS OF NDCS AND MAIN FINDINGS.....	9
2.1. MITIGATION AND ADAPTATION PRIORITIES	12
2.1.1. Mitigation	12
2.1.2. Adaptation	12
2.2. EMISSION & URBANIZATION CLUSTERS	13
3. REGIONAL FINDINGS	17
3.1. AFRICA	17
3.1.1. Mitigation	20
3.1.2. Adaptation	20
3.1.3. Urban Challenges	21
3.1.4. Urban Measures	22
3.1.5. Requests	22
3.2. NORTH AMERICA, LATIN AMERICA AND THE CARRIBEAN	22
3.2.1. Mitigation	23
3.2.2. Adaptation	23
3.2.3. Urban Challenges	23
3.2.4. Urban Measures	24
3.2.5. Requests for Assistance	24

3.3. ASIA	27
3.3.1. Mitigation	27
3.3.2. Adaptation	27
3.3.3. Urban Challenges	28
3.3.4. Urban Measures	28
3.3.5. Requests	29
3.4. OCEANIA	32
3.4.1. Mitigation	32
3.4.2. Adaptation	32
3.4.3. Urban Challenges	33
3.4.4. Urban Measures	33
3.4.5. Requests	34
3.5. EUROPE	36
3.5.1. Mitigation	36
3.5.2. Adaptation	36
3.5.3. Urban Challenges	36
3.5.4. Urban Measures	36
3.5.5. Requests	36
4. CONCLUSION AND RECOMMENDATIONS	39
4.1. POLICY DEVELOPMENT	40
4.1.1. Policy Coherence – horizontal alignment at the national level	40
4.1.2. Policy Coherence - vertical integration	40
4.1.3. Integration of further international agreements: Paris, SDGs and the New Urban Agenda...	40
4.2. IMPLEMENTATION	41
4.2.1. Implementation of national strategy at local level	41
4.2.2. Call for support regarding finance, capacity and technology	41
4.3. SECTORAL ISSUES	42
4.4. RESEARCH RECOMMENDATIONS	43
REFERENCES	44
ANNEX 1	45

LIST OF MAPS, TABLES AND FIGURES

TABLES

Table 1: Africa: List of Countries, associated GHG Emissions and Urban Populations.....	17
Table 2: America: List of Countries, associated GHG Emissions and Urban Populations	25
Table 3: Asia: List of Countries, associated GHG Emissions and Urban Populations	29
Table 4: Oceania: List of Countries and Associated GHG Emissions and Urban Populations	34
Table 5: Europe: List of Countries and Associated GHG Emissions and Urban Populations.....	37
Table 6: World: List of Countries according to Clusters A, B and C.....	45

MAPS

Map 1: Urban Content in NDCs: World Map.....	10
Map 2: Cluster A and B: Urban Mitigation and/or Adaptation Measures.....	14
Map 3: Urban Content in NDCs: Africa	19
Map 4: Urban Content in NDCs: America.....	26
Map 5: Urban Content in NDCs: Asia.....	31
Map 6: Urban Content in NDCs: Oceania.....	35
Map 7: Urban Content in NDCs: Europe	38

FIGURES

Figure 1: Atmospheric CO ₂ at Mauna Loa Observatory	1
Figure 2: Mitigation Priorities	12
Figure 3: Adaptation Priorities	13
Figure 5: Relation between Mitigation & Adaptation challenges and Urbanization	16
Figure 4: Share of GHG emissions (in %) and urban content in NDCs.....	16
Figure 6: Africa: Cluster A and B: Mitigation Priorities	20
Figure 7: Africa: Cluster A and B: Adaptation Priorities	21
Figure 8: Africa: Specific Urban Challenges	22
Figure 9: America: Cluster A and B: Mitigation Priorities.....	23
Figure 10: America: Cluster A & B: Adaptation Priorities.....	23
Figure 11: America: Urban Challenges	24
Figure 12: Asia: Cluster A + B: Mitigation Priorities.....	27
Figure 13: Asia: Clusters A+B: Adaptation Priorities.....	28
Figure 14: Asia: Urban Challenges: Type of Challenges.....	28
Figure 15: Oceania: Cluster A+B: Mitigation Priorities.....	32
Figure 16: Oceania: Cluster B: Adaptation Priorities.....	33
Figure 17: Oceania: Urban Challenges.....	33
Figure 18: Correlation of Mitigation Priorities in all NDCs	42
Figure 19: Correlation of Adaptation Priorities in all NDCs	42

ACRONYMS AND ABBREVIATIONS

AFOLU	Agriculture, forestry and other land use
BUR	Biennial Update Report
COP	Conference of the Parties
Cluster A	Group of NDCs with urban mention within headers
Cluster B	Group of NDCs with urban mention within text
Cluster C	Group of NDCs with no urban mention within header
GDP	Gross Domestic Product
GHG	Greenhouse Gas(es)
HDI	Human Development Index
INDC	Intended Nationally Determined Contributions
NAMA	National Appropriate Mitigation Actions
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NC	National Communications
NDC	Nationally Determined Contributions
PPP	Purchasing power parity
TEP-A	Technical Examination Process on Adaptation
TNA	Technology Need Assessment
UN	United Nations
UNEP	United Nations Environment Programme
UN-Habitat	United Nations Human Settlements Programme
UNFCCC	United Nations Framework Convention on Climate Change
WB	The World Bank
WHO	World Health Organization

FOREWORD



I am delighted to present the final release of “Sustainable Urbanization in the Paris Agreement - Comparative Review of Nationally Determined Contributions for Urban Content”.

The 2016 pre-release of this publication at the Marrakesh Climate Change Conference provided an insight into the urban context of Nationally Determined Contributions (NDCs), in order to better understand how member States included urban climate action as part of their national pledges to the Paris Agreement on Climate Change. The result is very encouraging: over two-thirds - 113 out of 164 - of the submitted NDCs show clear urban references and content, establishing the relationship between sustainable urbanization and climate action. This final version of the paper delves further into mitigation and adaptation measures within the urban context.

The adoption of the New Urban Agenda (NUA) on 20 October 2016, and the entry into force of the Paris Agreement on Climate Change two weeks later, on 4 November 2016, represents strong steps toward the immediate implementation of Agenda 2030 for Sustainable Development.

Through the New Urban Agenda UN-Habitat stands ready to support member states to implement the urban portions of their Nationally Determined Contributions.

Given rapid urban population growth and increasing urbanization, the battle for sustainable development will be won or lost in cities, where 60% of the world's

population will live by 2030. Our cities have become the main drivers of economic development and prosperity, yet past and present urban practices are largely unsustainable. While cities today occupy only 2 per cent of total land, our cities consume 78 per cent of the world's energy, produce a significant portion of all greenhouse gas emissions and consume more resources than needed - with subsequent environmental impacts.

We must address this quickly, and effectively.

The New Urban Agenda offers us the opportunity to turn around and improve the sustainability of our planet by offering a new model of urban development. The Agenda is a blueprint for how we should build and transform our cities, and aims to leverage stakeholders in building prosperous and resilient cities. The New Urban Agenda recognizes that well-planned and integrated urbanization can contribute to the planet's environmental, economic and social sustainability and prosperity.

Sustainable urbanization that promotes compactness, connectivity and efficient low-carbon infrastructure and mobility benefits climate change mitigation and adaptation efforts. Compact, mixed-use and connected urban development results in lower greenhouse gas emissions, because agglomeration and proximity provide enormous opportunities for energy efficiency. Adaptation measures aid in building resilience within the urban environment, minimizing the impact of global changes already set in motion.

Cities are critical in taking action to address the climate change challenge. Let us seize this opportunity to achieve a better urban world for all..

A handwritten signature in black ink, appearing to read 'Joan Clos', with a long, sweeping underline that extends to the left and then curves back under the name.

Dr. Joan Clos

Under-Secretary-General and
Executive-Director of UN-Habitat

EXECUTIVE SUMMARY

A remarkable quote is attributed to the ancient Greek tragedian, Sophocles:

“What an extraordinary condition that of humans, they have been given the capacity to talk, and they are driven with the unstoppable passion of building cities”.

Urbanization seems unstoppable. By 2030, it is forecasted that six in ten people will live in urban areas (UN-Habitat 2013), and by mid-century, three quarters of the world’s population will inhabit our metropolises, cities, and settlements. Our cities are the drivers of economic and social development and prosperity, yet past and present urbanization practices are largely unsustainable, or to stay with Sophocles, are the stages of a modern day tragedy, Climate Change.

Human activities in Cities are a significant contributor to global Greenhouse Gas emissions. According to the 5th Assessment Report by the Intergovernmental Panel on Climate Change (chapter 12, page 927), urban areas “account for between 71% and 76% of CO₂ emissions from global final energy use (medium evidence, medium agreement)”, and “contribution[s] of urban areas globally are estimated at between 37% and 49% of global emissions for the year 2000 (IPCC 2014). Emissions stem primarily from the consumption of fossil fuels for energy supply and transportation, and resource consumption in cities. (UN-Habitat 2011). But not only are our cities contributing to global warming. Urban populations worldwide are already feeling the impacts of the changing climate: rising sea levels, increasing temperatures, changing rainfall patterns and more frequent and extreme weather events. Climate change is no longer a distant threat that requires action to be taken only for future generations. Climate change is one of the most challenging and widest reaching issues that humanity needs to address today because it is impacting the world now..

With this task in mind, Government have negotiated for almost two decades under the United Nations Framework Convention on Climate Change (UNFCCC) how to confront the climate change challenge. The widely known Kyoto Protocol was an early result of these negotiations, and its successor agreement was

finally agreed upon during an intense two weeks in November and December 2015 in Paris, France. The decision FCCC/CP/2015/L.9/Rev.1, approved unanimously by the 194 United Nations member States on 12th of December 2015, would quickly become known as the Paris Agreement on Climate Change. It entered into force through ratification by enough member States less than a year later on 4 November 2016.

At its core are a series of ambitious goals: holding the increase in the global average temperature to well below

2°C above pre-industrial levels, pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, and increasing the ability to adapt to the adverse impacts of climate change (UNFCCC 2015a or b).

Under the Paris Agreement, countries have pledged specific contributions to these ambitious goals. These pledges – formally known as Nationally Determined Contributions (NDCs) – form the heart of this new global climate change agreement. These pledges define key challenges and measures to be taken in order to mitigate causes and adapt to its effects. Member States further commit to share knowledge, technologies, and resources to confront these global challenges.

Given the importance of current NDCs as a tool for national climate policy guidance, it is important to gain a comprehensive overview of the content and structure of NDCs. For UN-Habitat and the wider urban development community, it is imperative to understand how countries have addressed urban issues in their NDCs, in order to increase understanding of support required by member States and other climate actors. The specific objective of this research is to conduct a comprehensive analysis of urban issues included in NDCs submitted prior to 31st August 2016. By analyzing these documents in the context of urbanization and national GHG emissions, the report provides a baseline of the first release of NDCs under the Agreement.

UN-Habitat believes that urbanization poses an opportunity for climate change adaptation and mitigation. In order to realize this opportunity, the New Urban Agenda envisages a model where all urban actors adopt and implement disaster risk reduction and management, reduce vulnerability, build resilience and responsiveness to natural and human-made hazards and foster mitigation of

1 Please see http://unfccc.int/paris_agreement/items/9485.php

and adaptation to climate change. [New Urban Agenda, paragraph 13 (g)] This vision is in line with the shared goals under the Agenda 2030 for Sustainable Development, in particular Goal 11 on sustainable cities and communities, “to ensure safe, inclusive, resilient and sustainable cities”.

This present review and analysis of NDCs for ‘urban content’ intends to provide a modest first overview and contribution to advance the discussion on how sustainable urbanization can be a catalyst of climate action; and at the same time how urban focused climate action not only is good for the climate, but also for the sustainable development of communities. Reviewing such a large library of national climate pledges is challenging, and can never perfectly reflect all details and nuances. The results however, are more than encouraging.

The majority of NDCs, 113 of 164, show strong or moderate urban content. The inclusion of urban related content in NDCs is encouraging given urbanization trends across the world. The most rapidly urbanizing regions of Africa and Asia contain some of the strongest urban content, which is especially encouraging for the future development of inclusive, resilient and sustainable cities, as it is largely those regions that will experience the urban growth in the future. Of the 113 NDCs with strong or moderate urban content, fifty-eight (58) NDCs focus on adaptation, 17 balance mitigation and adaptation, and 4 focus exclusively on mitigation. The review further showed trends and priorities in urban climate challenges and urban climate measures to address climate challenges.

We invite everyone to deepen and complement this present first analysis, and enrich the knowledge base on this important topic.

113 of 164 NDCs show relevant urban key words in the context of national priorities and ambitions for reducing emissions and adapting to climate change.



KEY FINDINGS

Over two thirds - 113 out of 164 - of submitted NDCs indicate specific urban content, and as such establish a clear relation between sustainable urbanization and climate action.

The majority of NDCs contained urban key words within the text (87); an additional 26 dedicate sections to address the urban context. 51 NDCs mentioned no urban key words.

Out of 113 countries with urban content in their NDCs, 58 focus on adaptation, 17 balance adaptation and mitigation, and 4 focus on mitigation.

NDCs from Asia and Africa indicate the strongest urban content. These regions are the most rapidly urbanizing areas, presenting a window of opportunity for future sustainable urban development.

NDCs containing urban key words represent 61% of nationally reported GHG emissions (2011 figures) emitted by 113 countries.

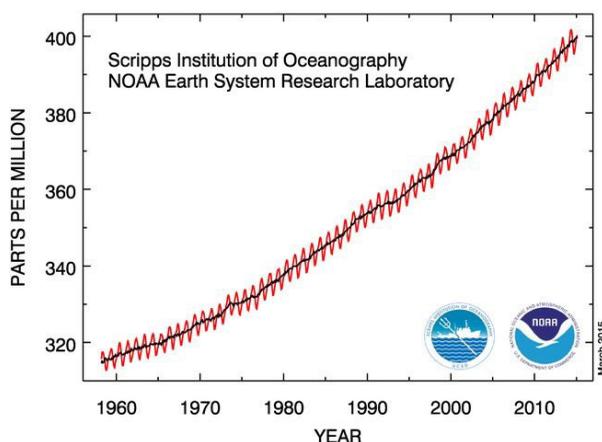
1

INTRODUCTION

1.1. GLOBAL CLIMATE ACTION

Global greenhouse gas emissions from human activity have increased significantly since the preindustrial era, driven by socio-economic progress and population growth. This has led to unprecedented atmospheric concentrations of greenhouse gases (GHGs) recorded over the last 800,000 years (IPCC 2014a). The increase in atmospheric GHG concentrations leads to global warming and climate change. Climate change is increasingly felt around the world, with negative impacts affecting more and more people worldwide. As a result global attention to climate change has increased significantly over the past decades, and more and more countries, businesses and individuals are discussing, demanding, and taking, climate action.

Figure 1: Atmospheric CO₂ at Mauna Loa Observatory



Source: <https://www.acs.org/content/acs/en/education/whatischemistry/landmarks/keeling-curve.html>

1.1.1. The Paris Agreement

The Paris Climate Change Agreement is a universal and legally binding agreement that sets a target of holding the increase in the global average temperature to well below 2°C above pre-industrial levels, pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, and increasing the ability to adapt to the adverse impacts (UNFCCC 2015). These ambitious targets recognize that climate change is a real and unprecedented challenge, requiring urgent global action.

The twenty-first session of the UNFCCC Conference of the Parties (COP-21), held in Paris, France in December 2015, was the largest UN conference ever seen: 37,878 people participated, including 20,000 government/party representatives, 8,000 INGOs/NGOs observers, and 3,000 media representatives.

During the first days of negotiations 150 Heads of State met together to clearly and unequivocally signal that climate change is a real and unprecedented challenge for humanity, requiring urgent, unified global action through the collaboration and contribution of all countries. This was the largest gathering of Heads of States at one place, at the same time, in history. After two weeks of intense negotiations, on the 12th of December 2015, the new Climate Change Agreement, Decision FCCC/CP/2015/L.9/Rev.², was approved by Member States.

The adoption of the Paris Agreement by virtually all countries is a historical achievement. It highlights the global nature and urgency of addressing climate change in the interest of present and future generations, through an ambitious reduction of global emissions and implementation of adaptation actions. The Paris Agreement sets ambitious targets, recognizes

² Please see http://unfccc.int/paris_agreement/items/9485.php

the importance and balance of both mitigation and adaptation, as well as financing, capacity building and technology sharing in meeting the agreed targets. Moreover, the Paris Agreement has a strong inspirational value in terms of international cooperation beyond climate change, indicating that many nations are willing to come together to address global challenges collaboratively.

“The Paris Agreement on climate change is a monumental triumph for people and planet...The agreement demonstrates solidarity. It is ambitious, flexible, credible and durable....Today, we can look into the eyes of our children and grandchildren, and we can finally, after so many years of discussion and delay, tell them that we have joined hands to bequeath a more habitable world to them and to future generation....”.

Ban Ki-moon, 12th December 2015, Paris, France.

The Agreement provides a solid architecture for member States to meet the agreed target of limiting global temperature rise. The Agreement entered into force on the 4th of November 2016, is based on the principle of common but differentiated responsibilities, capabilities and national circumstances. The Agreement builds on other agreements such as the Agenda 2030 for Sustainable Development, through the recognition of other priority actions to eradicate poverty and ensure sustainable development [Article 6: 8 of the Agreement].

1.1.2. Nationally Determined Contributions

Nationally Determined Contributions (NDCs) are a key tool to ensure accountability and commitment to the Paris Agreement. Their role and guidelines are outlined in Article 4 of the Agreement. After a country submits its Intended NDC (INDC) and respective instrument of ratification, accession or approval to join the agreement, the INDC is no longer intentional, and the INDC becomes a Nationally Determined Contribution (NDC). As of June 2017 the number of communicated NDCs reached 164, representing 192 countries, due to the submission of the joint European Union NDC on behalf of the 28 European Union member States. These submissions, as well as supporting communications, are publically available on the NDC interim registry: www4.unfccc.int/ndcregistry/Pages/Home.aspx.

NDCs are the primary means for governments to communicate their nationally identified priorities and pledges. They reflect each Party's capacity and ambitions for climate action, covering mitigation and adaptation,

governance mechanisms for implementation of the Paris Agreement. They also indicate any financial or technological support countries may require or will be able to provide to other countries to enable adoption of low carbon pathways and to build climate resilience.

Implementation of the Paris Agreement will formally begin in 2020. Countries then are encouraged to increase their level of ambition on climate action by submitting updated NDCs every 5 years [Article 4]. It is expected that the current NDCs will be the guiding policy document for climate change action for the next 7-8 years, until their mandated NDC review beginning around 2025. Additionally, a Party may adjust their existing NDC at any time, given changes in technology, finance and capacity.

1.2. CITIES AND CLIMATE CHANGE

The engagement of cities and urban stakeholders under the UNFCCC Process is supported by the New Urban Agenda and the 2030 Sustainable Development Goals, two further key international agreements that recognize the role of cities. In recent years there have been significant action taken by cities, sub-national states and the private sector to address climate change in urban environments (UN-Habitat 2016a). The role cities, often termed 'non-party stakeholders' as they are additional to national delegations, have in addressing climate change is outlined within Section 5 of the COP-21 conference report, herein referred to as the Decision. Cities, alongside civil society, the private sector and financial institutions, are invited to scale up their efforts and support actions to reduce emissions, build resilience and decrease vulnerability to the adverse effects of climate change (UNFCCC 2015b).

Human activities in cities are in large part responsible for the current climate change trends and dynamics; and at the same time human settlements are vulnerable to the increasing impacts attributed to climate change and the direct effect of pollution. Therefore it is only logical that they are also part of the solution to the climate challenge.

In 2016 there were 512 cities with at least 1 million inhabitants; by 2030 this number will grow to 662 (UN-Habitat 2016b). Ten additional megacities with more than 10 million inhabitants, are also projected to emerge by 2030, bringing the total number to 41. While urbanization processes and dynamics are changing across the world, this impact will be felt most strongly by developing countries, where the additional 10 megacities are expected to develop

(UN- Habitat 2016b). The emergence and growth of urban areas will lead to an increase in greenhouse gas emissions, from consumption and land use change, therefore cities will play an integral role in meeting the targets outlined in the Paris Agreement. It is due to this dynamic and future growth, which the Intergovernmental Panel on Climate Change (IPCC 2014) attributes a large opportunity to low-carbon and resilient development in the growing cities of the world. Accounting for trends in declining population densities, and continued economic and population growth, urban land cover is projected to expand by 56–310% between 2000 and 2030. Therefore, according to the IPCC, “the next two decades present a window of opportunity for mitigation in urban areas, as a large portion of the world’s urban areas will be developed during this period”.

Urban stakeholders are called to increase and upscale their efforts for both mitigation and adaptation actions. This involves reducing emissions and building resilience, and adapting to both rapid and slow onset climate events. This will require a greater integration to ensure resilient urban environments are created and maintained.

The Decision also recognizes the need to strengthen knowledge, technologies, practices and efforts of local communities and indigenous peoples, including the exchange of experience and best practices on mitigation and adaptation in a holistic and integrated manner. Moreover, the Decision recognizes the potential for cities to play a central role in the creation of a dedicated platform for exchanging experiences and sharing best practices in climate change action. The Decision also outlines the criteria for NDCs, requires explanations for omissions or removals, and mandates the usage of standardized methodologies and common metrics for reporting as determined by the IPCC.

1.2.1. Climate Change Mitigation

Urban greenhouse gas emissions that are driven by human activity mainly stem from transport, industrial and commercial activities, with buildings and infrastructure, water distribution, consumption and production driving energy demand. Most of these activities are concentrated in cities which are on average consume about 75 per cent of global primary energy and emit a significant portion of the world’s total greenhouse gases.

In order to limit warming to less than 2 degrees, carbon dioxide (CO₂) equivalent emissions must remain below

1,000 Gigatons (Gt). To limit warming to 1.5 degrees, this figure must be halved (IPCC 2014a). Since current global carbon dioxide emissions are approximately 50 GtCO₂ annually this quota will be reached in around 10 years (1.5 degrees Celsius) or 20 years (2.0 degrees Celsius), if emissions continue at the present rate (IPCC 2014a). Actions to reduce annual GHG emissions are to be driven by the emission history of an individual country, with the peaking of emissions allowed to take longer for developing countries [Article 4 of the Agreement].

National mitigation efforts and targets to reduce greenhouse gas emissions and to ensure that warming does not exceed 2.0 degrees Celsius (or the more ambitious 1.5 degrees Celsius) are outlined in NDCs. The details contained within NDCs vary from Party to Party, depending in part on the governance structure for implementation. Cities have a role to play in meeting and exceeding these nationally determined targets.

Given the quantity of emissions associated with urban environments, the scaling up of climate action by cities will likely play a key role in defining and implementing more ambitious mitigation goals. For example, lowering emissions from the transport, waste and energy sectors are critical for achieving the global emission reduction targets, and it is hard to imagine reaching global goals without those measures. Emission reduction will be made possible in cities through the use of appropriate policy mechanisms, tools and in some instances, financial incentives. Work to encourage compact urban development, establish urban forests and green space to reduce cooling, provide access to low carbon/ active transport, approve more sustainable building codes and reduce consumption will aid in meeting national targets. Furthermore, policy measures in the construction sector and efforts to minimize land use change will also lead to emission savings. The development of appropriate urban solutions requires a continued advance from purely sectorial approaches to the more integrated and holistic planning, construction and management of cities, and a policy, legislative and fiscal environment that supports action.

1.2.2. Climate Change Adaptation

Climate change adaptation received increased attention during COP21 and the UNFCCC process in general, due to the recognition of the projected negative impacts of climate change. Unlike the previous Kyoto Protocol, adaptation is treated as an equally important priority to mitigation in the new Agreement [see Article 7 and 8 of the Agreement].

Adaptation is defined by the Agreement as “increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production” (Article 2 of the Agreement).

The impact of climate related extreme events have been seen across the world, such as heat waves, droughts, floods, cyclones and wildfires. These events highlight the significant vulnerability and exposure of human settlements and ecosystems to current climate variability (IPCC 2014b). The impact of climate-related extremes is predicted to be exacerbated through climate change, with more frequent extreme weather events of higher magnitude and duration. These events reduce the functionality of a city and its ability to recover, impacting the economy, infrastructure, livelihoods and quality of life. Therefore ensuring adaptation measures are undertaken in the urban environment is critical in protecting health, safety and livelihoods.

Rapid urbanization and growth of large cities in developing countries has in many areas been accompanied by the expansion of highly vulnerable communities living in informal settlements, many of which are on land exposed to flooding and increased temperatures, and some of which are impacted by food scarcity from drought. Furthermore, climate change also typically impacts towards certain groups within communities more heavily than others (IPCC 2014b).

“Parties acknowledge that adaptation action should follow a country-driven, gender-responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems, with a view to integrating adaptation into relevant socioeconomic and environmental policies and actions, where appropriate”. (Article 7:5 of the Agreement)

Parties’ individual implementation of adaptation actions, undertakings and/or efforts, as well as any associated monitoring and evaluation, may take the form of comprehensive National Adaptation Plans (NAP). Adaptation to climate change is to be comprehensively addressed through NAPs, which are to be used as a reference document for the implementation of policies,

programs and projects in the field of adaptation. These are mandated to be communicated periodically by the Parties, in line with the general adaptation goals, with a communiqué submitted alongside updated NDCs, or in conjunction with other communications or documents.

For cities and the wider urban development community, definition and implementation of adaptation measures will be particularly challenging for a number of reasons. These include the limited predictability of extreme events and their duration, creating and maintaining behavioral change, and maintaining the resilience of key private and social infrastructure.

1.3. FINANCE, TECHNOLOGY AND CAPACITY BUILDING

The Paris Agreement recognizes the need for an urgent and improved provision of finance, capacity-building and technology to be delivered by developed countries in support of developing countries to enhance their capacity for climate action.

“Developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the convention”. (Article 9 of the Agreement).

The Agreement references the Cancun Adaptation Framework (Article 7:7 of the Agreement) for the sharing of information related to science, planning, policies, and implementation in relation to adaptation actions. Institutional arrangements, research, systematic observation and early warning systems are also called out as collaborative approaches to meet targets. In order to make the necessary deep cuts to emissions, a diverse portfolio of such arrangements including multilevel policies will be required. These will differ by sector and by country, highlighting the need for flexibility, rather than a uniform set of policy tools for all Parties to the Agreement. To ensure the delivery of finance, technology and capacity building opportunities there are a number of tools and bodies to ensure these needs are met.

The Paris Committee on Capacity Building, established at COP21, aims to address current and emerging gaps and needs in the implementation of capacity-building in developing country Parties (Paragraph 71 of the Decision).

The Committee aims to encourage cooperation between global, regional, national and subnational stakeholders, ensuring that appropriate tools and methodologies are disseminated and implemented collaboratively (Section III, Paragraphs from 72 to 84 of the Decision and Article 11 of the Agreement).

The development of appropriate tools and methodologies for capacity building is fundamental in order to facilitate ad-hoc education and training, enhance and develop capacity building among all local stakeholders and communities, and favour the development and implementation of appropriate actions for mitigation and adaptation to climate change in the urban context.

1.3.1. Climate Financing

Climate financing is a fraction of total financial flows, but it has a significant impact in helping develop climate compatible industries, implementing adaptation measures, facilitating technology transfer and ensuring capacity building. The role of financing is outlined in the Agreement and the Decision based on common but differentiated responsibilities and the principle of fairness. Parties from developed countries are to provide resources, directly or indirectly, to Parties from developing countries to support full or incremental costs associated with implementing the Agreement. A floor of \$100 billion per year by 2020 is introduced in the Decision to support developing countries (Section III, Paragraphs from 52 to 65 of the Decision and Article 9 of the Agreement). The funding to meet this target will be derived from a variety of public, private, bilateral and multilateral sources of finance. Discussions at COP22 also sought to identify relevant opportunities to enhance the provision and mobilization of support and facilitating enabling environments.

Cities are in a critical position in terms of climate finance. In most cases they cannot autonomously mobilize the necessary financial resources to implement required actions such as to develop climate-resilient infrastructure or facilitate a low-carbon transition. As the same time, investment at the local level is crucial for building adaptive capacity and climate resilience.

Financing urban projects in high-impact sectors can have profound impacts on mitigation efforts, such as investing in public transport, building efficiency and improved waste management facilities. Development in these areas could provide cities with up to USD 17 trillion net savings globally between now and 2050 (based on energy savings alone),

catalyze further reductions in emissions and foster urban resilience (New Climate Economy 2016). According to the climate finance figures provided by both international and national development banks, overall climate finance flows were just under USD 54 billion in 2014, representing 26% of those banks' total commitments. The average portion of climate finance that was channeled to urban areas was 31% (CCFLA 2015).

An additional important source of climate finance is the Green Climate Fund that was established at COP16 as the main operating entity of the Financial Mechanism of the Convention. The Green Climate Fund has begun to approve projects for funding, and is set to disburse much larger quantities by 2020 when total funding is to reach 100 billion USD annually. Access to the Green Climate Fund is a goal for developing countries and their national entities. Provisions for increased access, as well as capacity development in accessing such resources can be found in Article 9 of the Paris Agreement. This states that institutions serving the Agreement should ensure efficient access to financial resources through simplified approval procedures and enhanced readiness support for developing country Parties.

1.3.2. Technology Development and Transfer

The technological capacity of countries and cities to undertake necessary mitigation and adaptation actions is a key enabling factor for the successful implementation of the COP-21 Decision and the Paris Agreements (Section III, Paragraphs from 66 to 71 of the Decision and Article 10 of the Agreement). The Subsidiary Body for Scientific and Technological Advice (SBSTA), of the UNFCCC, plays an important role in the coordination and promotion of technological transfer, as well as producing guidelines for reviewing greenhouse gas emission inventories. SBSTA "works closely with the IPCC, sometimes requesting specific information or reports from it, and also collaborates with other relevant international organizations that share the common objective of sustainable development"³.

The term 'Technology' encompasses not only advanced adaptation and mitigation tools, but also technologies associated with the collection and storage of intangible knowledge and heritage. The Technology Executive Committee and the Climate Technology Centre and Network have received the mandate to further technology

³ Please see <http://unfccc.int/bodies/body/6399.php>

research, development and demonstration, as well as to develop and enhance indigenous capacities and technologies (Paragraph 66 of the Decision). There is an increasing demand for the development of technologies to aid cities in adapting to climate change, particularly those that are undergoing rapid urbanization.

City networks and similar initiatives aim to facilitate city to city cooperation. Through the platform opportunities for dialogue, the exchange of tools, networking and overall support empower urban focused leaders to drive meaningful action on climate change.

Key enabling technologies and processes to address climate change in cities include low-carbon and energy-efficient solutions. These include buildings that are resilient to extreme temperatures and meteorological events, the development and implementation of green and blue infrastructure, and technology to transition away from high-intensity/emission industries. Additionally, in the urban context more and more cities are experimenting with the ‘smart⁴’ usage of data, with the aim of enhancing the quality, performance and interaction of urban services to ensure resource efficiency.

1.3.3. Capacity Building

Capacity building is critical to improving cooperation and collaboration between institutions, as well as the identification and collection of good practices. The Paris Committee on Capacity-Building (PCCB) established at COP21, manages and oversees the implementation of capacity building efforts under the Paris Agreement, ensuring coherence and coordination.

For cities, capacity building is important in mitigation and adaptation, particularly for policy makers and technical staff within the administrations. One important aspect for cities is increasing the technical education and training of planners, architects and environmental staff, in order to aid implementation of climate action, be it through better urban planning, implementation of climate projects or sectoral initiatives. In this regard, the sharing of knowledge on successful planning and project implementation between cities has the potential to increase local climate action, with potential positive

benefits for GHG reduction and local air quality (New Climate Economy 2016).

Moreover, capacity building and the transfer of knowledge and expertise should come not only from developed Parties to developing Parties, but also vice versa, and between developing Parties. Given the emergence of new contexts and interactions between challenges, it is vital to promote the constant pursuit of innovative solutions. By sharing knowledge with and from cities in developing countries, cost effective and minimal technology solutions, as well as successful community engagement, harnessing of indigenous knowledge and behavioral change practice, can be developed and implemented.

1.4. REVIEW OBJECTIVES

Given the importance of the NDCs as a tool for national climate policy guidance, it is important to gain a comprehensive overview of the content and structure of NDCs. For UN-Habitat, and potentially the wider urban development community, it is imperative to understand how countries have addressed urban issues in their NDCs, in order to increase understanding of support required by member States and other climate actors. The specific objective of this research is to conduct a comprehensive analysis of urban issues included in NDCs submitted prior to 31st August 2016. By analyzing these documents in the context of urbanization and national GHG emissions, the report provides a baseline of the first release of NDCs under the Agreement.

1.4.1. Expected Outcomes

The 2016 pre-release of ‘Sustainable Urbanization in the Paris Agreement’ was launched at COP22 in Marrakesh, Morocco in November 2016, following the presentation of preliminary results at the third International Conference on Housing and Urban Development (Habitat III) in Quito, Ecuador in October 2016.

This present final version provides a thorough review of urban content in NDCs, including a greater exploration of urban adaptation and mitigation priorities and measures in NDCs. The design of the analysis with accompanying database may allow for data to be updated when it becomes available, therefore the results contained within this final version will provide a baseline to monitor urban priorities in NDCs going forward, particularly as they appear in the five year reviews.

4 Please <https://www.ericsson.com/assets/local/about-ericsson/sustainability-and-corporate-responsibility/documents/151203-un-habitat-ericsson-climate-report.pdf>

It is anticipated that continued dissemination of information and knowledge on the role of urban environments in member States' approaches to climate change will increase awareness and prioritization, as well as help to identify the potential roles of UN-Habitat and other urban partners in supporting NDC implementation.

1.4.2. Potential for Follow Up

At present (2017), the NDC support architecture for Parties is emerging through various coalitions, both outside and within the UNFCCC process. The upcoming COP23 conference will provide a platform for the continued consideration of urban climate action. UN-Habitat continues to distribute and communicate the present findings to a wider audience, and will continue to reach out to potentially interested partners, considering how the analysis can inform NDC implementation and potentially inform the process of setting up adequate support mechanisms for Parties. The data, analysis and knowledge on the urban content of NDCs is made transparently available for the wider urban development community to build upon, to review, critique and complement. The analysis and findings present an entry point for supporting countries and cities on urban climate actions, according to their needs and published contributions to the Paris Agreement.

1.5. METHODOLOGY

The review and analysis is based on the revision of all (I) NDCs submitted prior to 31 August 2016. As per the Agreement these submissions are publically available through the UNFCCC's online depository. A total of 160 NDCs representing 188 countries were analyzed in depth in their original languages including, French, Spanish, Portuguese and English. Those that were submitted in other languages were reviewed in the archived English translation. Additionally, four other NDCs, from Cuba, South Africa, Iraq and Lebanon were given a limited (but not detailed) analysis, bringing the total up to 164 NDCs analyzed for urban content. It must be noted that Uzbekistan and Timor Leste were not analyzed in depth during this study due to submission timing, after August 2016. Furthermore, the European Union has submitted one NDC on behalf of the 28 member States. Therefore the document provides an outline of total climate action in the region rather than specific, individual country measures, which may have skewed the results.

A set of indicators was defined and structured into six groups; these indicators were first listed, then tested with a small number of NDCs and refined in the final analysis.

The sets of indicators used are as follows:

(i) Geographic Indicators

Including indicators on: Country ISO code, Country and Region name, Income categorization.

(ii) General Indicators

Including indicators on: Population, GDP and Human Development Index.

(iii) National plans/strategies indicators

Including indicators on the submission of, National Appropriate Mitigation Actions (NAMA), National Adaptation Plans (NAP), National Adaptation Programme of Action (NAPA), Technical Examination Process on Adaptation (TEP-A), Technology Need Assessment (TNA), Technology Action Plan (TAP), National Communications (NC), Biennial Update Report (BUR), GHG inventories, Climate-related Urban National Plans.

(iv) Emissions indicators

Compilation of publically available data on CO₂ and other GHG emissions. Due to data availability 2011 was used as the comparative year.

(v) NDC's Generic Indicators

Indicators based on 1) Mitigation Priorities: energy production; transport; Agriculture, Forestry and other Land Use; other usages (AFOLU); building sector; waste management; water management; industry efficiency; reduction of non CO₂; improved governance and other; and 2) Adaptation Priorities: food security, land use management, vulnerability and disaster, biodiversity, water management, health, specific industry, governance and other.

(vi) NDC Urban Indicators

Indicators produced in reference to two categories, urban challenges and urban measures with additional sub categories focusing on the micro sectors, namely the type of measure of challenge identified. Additionally, assistance requests were also analyzed in reference to finance, technical or institutional capacity requirements. A text search was performed on all NDCs to shortlist those containing urban related words. The search words included, 'urban', 'city', 'cities', 'settlement', housing', and 'municipal'.

Groups from one to four include indicators and data collected from United Nations and World Bank databases; groups five and six include indicators and data collected from the NDCs.

Results were then grouped into three clusters:

Cluster A: NDCs with urban mentions within text headers, classified as **strong urban content**.

Cluster B: NDCs with urban mention within the body of text, classified as **moderate urban content**.

Cluster C: NDCs with no urban mention within the text, and classified to have **low or no urban content**.

This classification is intended to be preliminary and indicative, as it is not based on a full statistical analysis of the urban related keyword incidence within the text (i.e., urban keywords weighted on total words). Specifically Cluster B may include countries that, although they mention urban key words in the text, they are not actually addressing urban issues directly through urban measures, but rather through related mitigation or adaptation measures mentioned in the NDC.

An instruction manual was prepared to support and to harmonize and ensure consistency of analysis by the NDCs' reviewers. This analysis began with the complete analysis of the NDCs and their subsequent categorization. After this indicators five and six were completed, beginning with cluster A and B and followed by cluster C. The data were collected primarily in a quantitative way, namely, determining if the reference to a specific challenge or measure was direct/explicit or indirect/implicit, and included the extraction of significant quotes from the NDC's text, to flesh out and contextualize the data points.

1.5.1. Data Analysis

All of the collected data was housed in an Excel dashboard, then filters were added to group data by region and cluster, as well as adaptation and mitigation priorities. A system was established to facilitate the management and visualization of the data at country or regional level. It is important to note that the dashboard was designed to enable future addition of other datasets for possible correlation and cross-reference analysis, updating data on national GHG emissions and urban emission from local government emission reporting platforms, as it becomes available.

After the review of all NDCs, tables and graphs were produced to undertake a baseline analysis of urban content. Ongoing use of such will allow for monitoring of NDC implementation, urban growth and GHG emissions at

the national level. Overall, 26 NDC were categorized into Cluster A, 84 into Cluster B and 50 into Cluster C; see Map 1 for global geographic distribution.

1.5.2. Glossary

The following terms are used in the analysis:

Mitigation priorities: It refers to generic priorities found in NDCs with urban content. Those priorities are not necessarily explicitly urban but bear relevance for urban environments and can be more generally focused on one of the following sectors: energy production, transport, building sector, waste management, water management, industrial efficiency, reduction of non CO₂ GHG, improved governance.

Adaptation priorities: It refers to priorities found in NDCs with urban content, both generic and specific. While specific priorities do appear with clear and direct reference to cities, generic priorities are not necessarily urban related, and include the sectors food security, land use management, vulnerability and disasters, biodiversity and/ or ecosystems conservation, water management, health/ health care, specific industry, improved governance, further adaptation priorities.

Direct and indirect urban references: For some indicators, as the ones listed below, the urban references may be direct (e.g. explicit use of urban related words) or indirect (e.g. a challenge or a measure, that does not use an explicit urban related word, but refers to a country or a part of a country highly urbanized).

Urban challenges: It refers to urban challenges, both direct and indirect, found in the following standard NDC content areas: mitigation; adaptation; institutional capacity; technical capacity; financial capacity, and others.

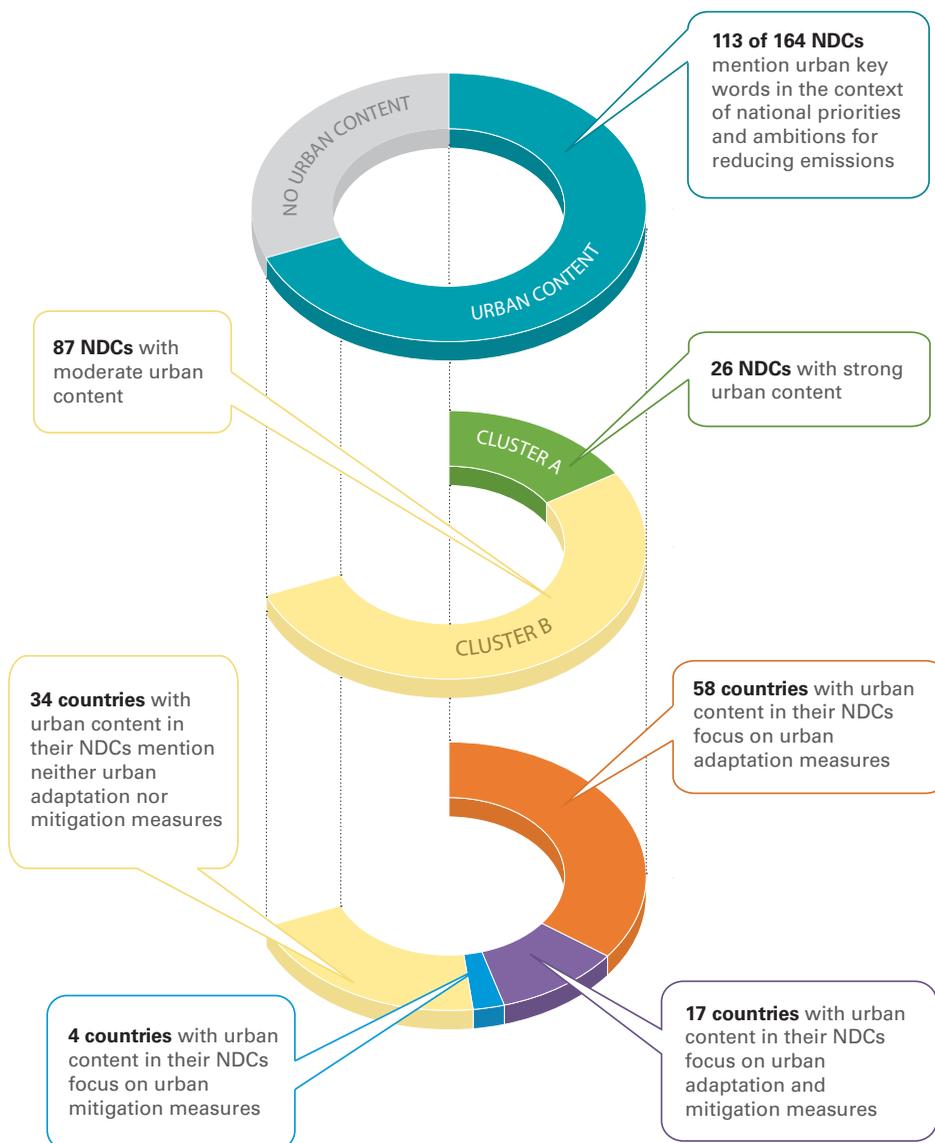
Urban measures: It refers to urban measures, responding to challenges, found in the following standard NDC content areas mitigation, adaptation, institutional capacity, technical capacity, financial capacity, others.

Urban challenges: It refers to specific urban challenges, found and categorized in the following areas Floods and/ or flash floods, droughts, sea level rise, storm events, temperature rise, heatwaves, vector-borne diseases, land degradation, salt water intrusion, others.

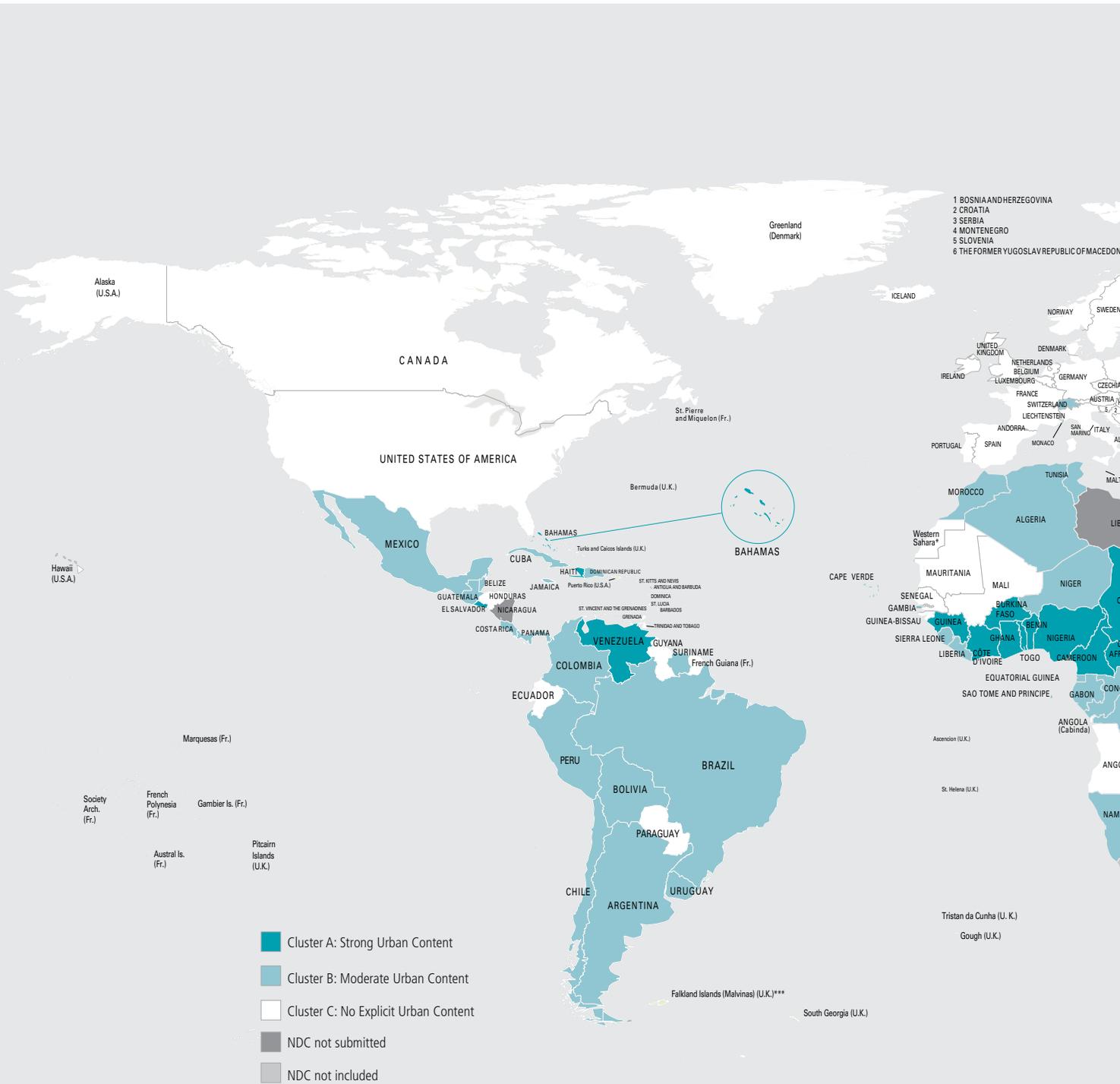
2

ANALYSIS OF NDCs AND MAIN FINDINGS

GLOBAL FINDINGS



Map 1: Urban Content in NDCs: World Map





2.1. MITIGATION AND ADAPTATION PRIORITIES

The NDCs in Clusters A and B were analyzed for urban adaptation and mitigation challenges and priorities in order to understand the regional prioritization of adaptation and mitigation measures. The results for mitigation measures can be seen in Figure 2, and for adaptation priorities in Figure 3.

A total of 79 NDCs mentioned specific mitigation and/or adaptation measures within the urban context. It was revealed that significantly more countries within Clusters A and B focus solely on adaptation (54 NDCs) compared to 4 NDCs that focus solely on mitigation. An additional 17 NDCs outline measures to both mitigate and adapt: see Map 2.

The primary focus on adaptation measures within these clusters is largely driven by the presence of developing nations, which generally have low per capita emissions but may have strong adaptation concerns. The Parties that submitted those 79 NDCs also generally have significantly high urbanization rates, increasing the need for adaptation measures.

2.1.1. Mitigation

NDCs from all three clusters were analyzed for adaptation and mitigation priority sectors Figure 2 highlights the key mitigation priorities identified.

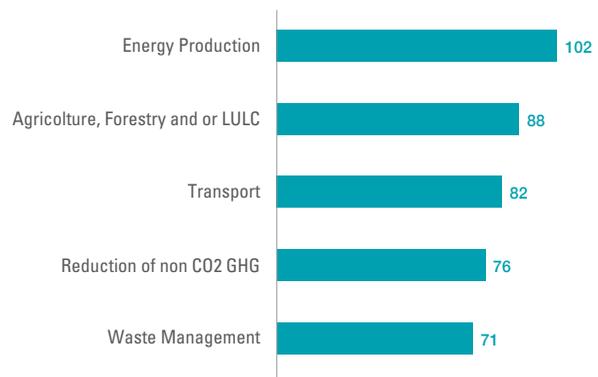
Energy and energy production is a key focus in the NDCs that contain urban content, with 102 out of 113 NDCs outlining mitigation priorities in this sector.

“Costa Rica will continue to promote renewable energies, integral environment management through agro-forestry systems and watershed management, as well as municipal land use planning as tools to lower long term vulnerabilities of its population, enhance its food security and the resilience of its infrastructure.” (NDC: Costa Rica. pg. 5)

The prioritization of reducing non-CO₂ GHG emissions reflects the holistic approach required to meet the targets of the Paris Agreement, and recognizes the warming potential of other associated pollutants such as Methane and Nitrous Oxide. These pollutants are typically mentioned in the national targets.

For example Tonga identifies non-CO₂ GHG reductions primarily in their national target of 70% electricity generation from renewable energy sources by 2030, as well

Figure 2: Mitigation Priorities



as through additional emission reduction targets in Transport, Agriculture, Environmentally Friendly Waste Management, and Reforestation (NDC: Tonga, pg. 11). There are only a small number of Parties within Cluster A and B that identify water management, improved governance, building sector and industry efficiency as mitigation priorities.

2.1.2. Adaptation

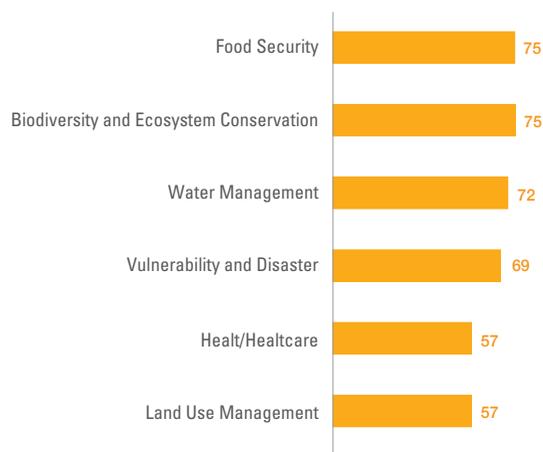
Figure 3 highlights the key adaptation priority sectors identified in NDCs across the three clusters.

Capacity building, particularly locally oriented knowledge sharing and training, is identified as an integral factor in implementing successful adaptation measures.

The medium- term goal of Indonesia’s climate change adaptation strategy is to reduce risks on all development sectors (agriculture, water, energy security, forestry, maritime and fisheries, health, public service, infrastructure, and urban system) by 2030 through local capacity strengthening, improved knowledge management, convergent policy on climate change adaptation and disaster risks reduction, and application of adaptive technology.(NDC: Indonesia. pg 4).

The integration of adaptation measures also emphasizes the role of local and indigenous knowledge systems. Local solutions are integral to a significant portion of adaptation measures within these clusters. At the same time the role of modern technologies and technological transfer is also recognized; furthering highlighting the need for capacity building.

Figure 3: Adaptation Priorities



2.2. EMISSION & URBANIZATION CLUSTERS

Human activities in Cities are a significant contributor to global Greenhouse Gas emissions. According to the 5th Assessment Report by the Intergovernmental Panel on Climate Change (chapter 12, page 927), urban areas “account for between 71% and 76% of CO₂ emissions from global final energy use (medium evidence, medium agreement)”, and “contribution[s] of urban areas globally are estimated at between 37% and 49% of global emissions for the year 2000. Using Scope1 accounting, urban share of global CO₂ emissions is about 44% (limited evidence, medium agreement)” (IPCC 2014).

While urbanization levels increased, from 29 percent to 49 percent between 1950 and 2005, global carbon emissions from fossil-fuel burning have increased by almost 500 percent during this period. Despite this, the present analysis has found no correlation between the country's NDCs the overall level of urbanization and the likelihood of an urban reference in their NDC. However, a correlation

between the rate of urbanization and ‘urban content’ has been found, meaning that countries that are urbanizing at a rapid pace have a higher probability to include ‘urban content’ into their NDCs.

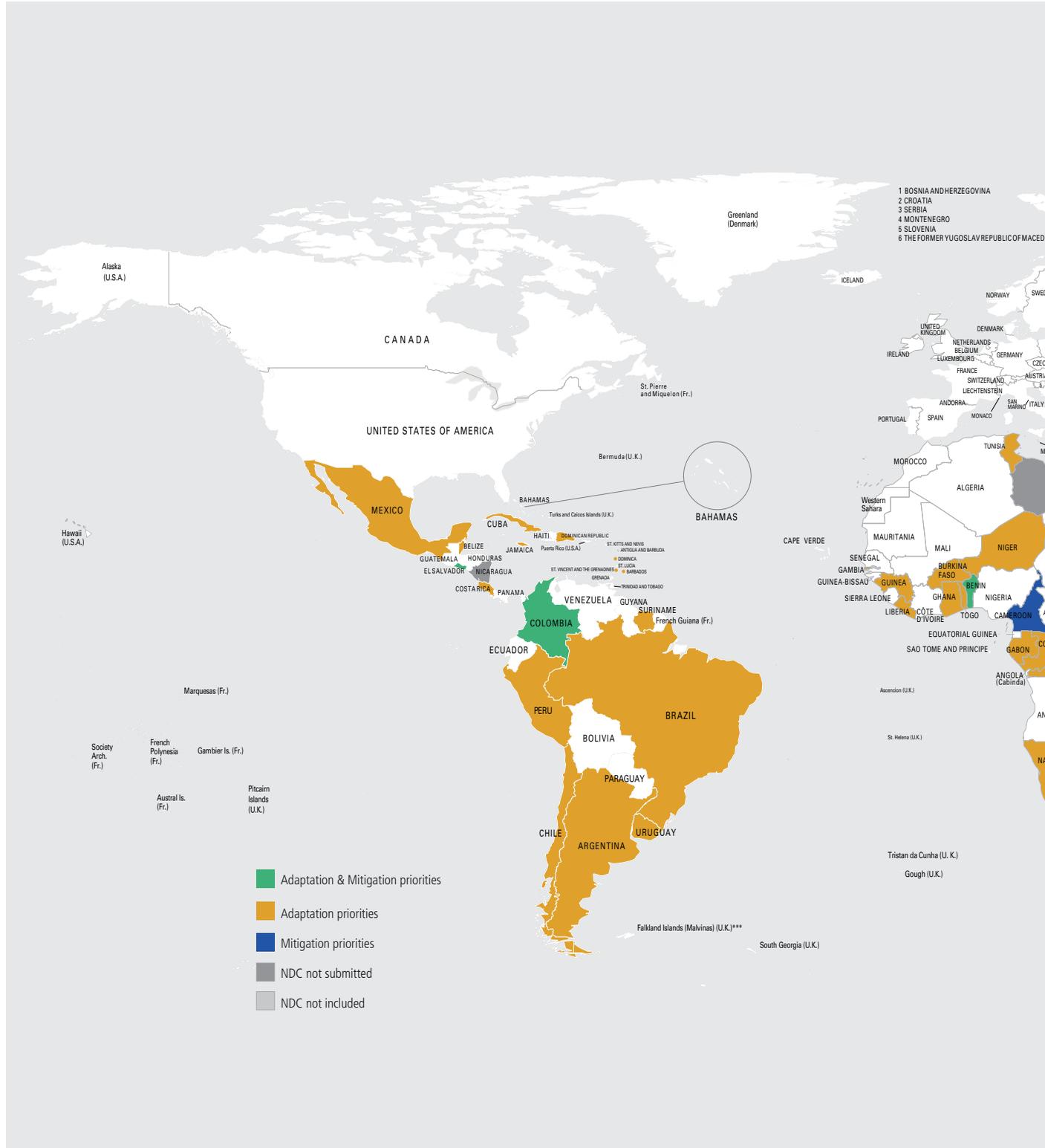
A comparison of emission rates per capita and mitigation priorities indicates Energy and Transport are the key sectors for mitigation in high per capita income countries; lower per capita income countries tend to have a broader range of mitigation measures. While they still prioritize energy and transport, they tend to balance those priorities with Agriculture, Forestry, and other Land Use (AFOLU), waste management and the reduction of non CO₂ GHG emissions. This broad range of overall mitigation measures is encouraging given the aforementioned link between urbanization and increasing emissions.

When looking at NDCs within Clusters A and B, a trend exists between the urbanization level and the identification of urban challenges and associated measures. Countries that are experiencing low levels of urbanization more likely to identify specific urban challenges and measures (see Figure 5). This is particularly true when we compare countries with ‘very low’ levels of urbanization with all other countries. This significant finding highlights the importance of capacity building and knowledge sharing of experiences between Parties, as those countries tend to have high rate of urbanization.

Overall, as Parties become more urbanized they are less likely to identify urban related mitigation and adaptation challenges.

Urban adaptation and mitigation measures follow a similar trend alongside changes in urbanization rates, however the two graphs are more closely aligned indicating a relationship between the two.

Map 2: Cluster A and B: Urban Mitigation and/or Adaptation Measures



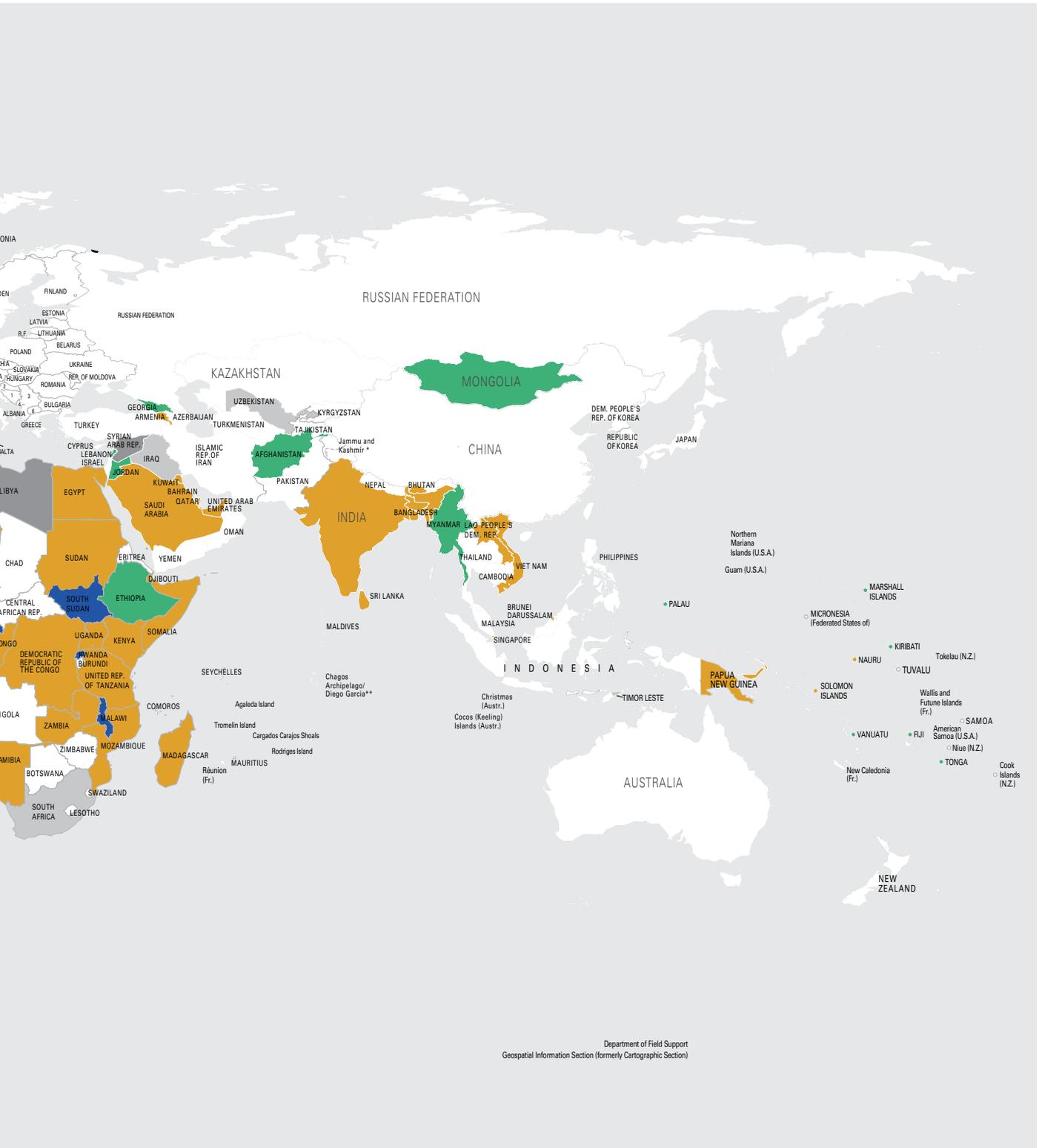


Figure 4: Share of GHG emissions (in %) and urban content in NDCs

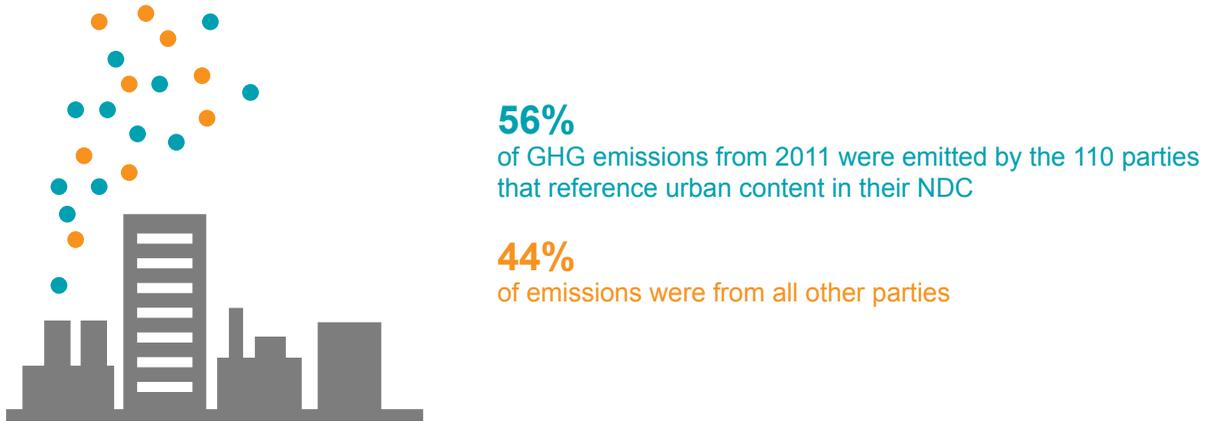
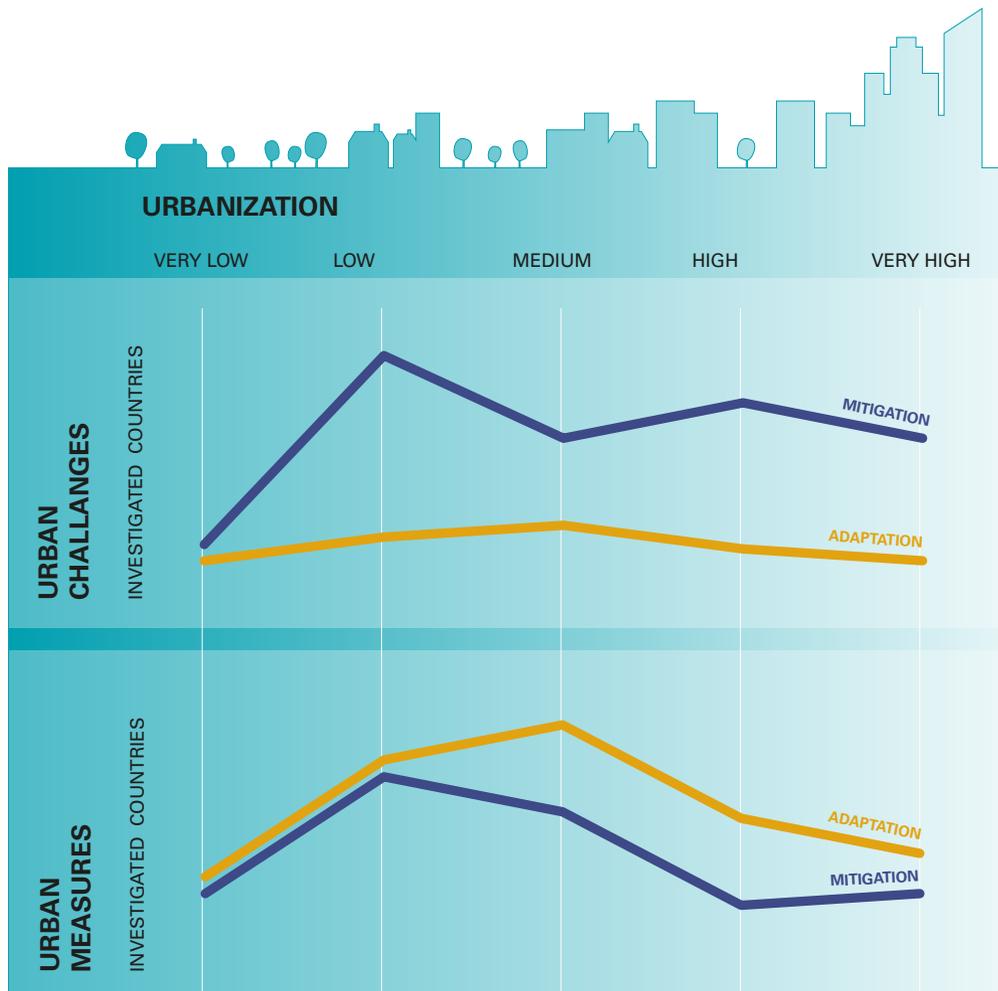


Figure 5: Relation between Mitigation & Adaptation challenges and Urbanization



3

REGIONAL FINDINGS

3.1. AFRICA

Sixteen percent of the world population lives in Africa, a total of 1.2 billion people (UN DESA 2015). Over the past two decades the center of gravity for urban growth has shifted from the developed to the developing world. While Africa remains the least urbanized continent, Africa has some of the highest urban growth rates, much of this growth is happening in small and medium sized cities. But the continent is rapidly developing some large and mega cities as well: examples are Cairo, Lagos, Kinshasa, Johannesburg, Luanda and Dar es Salaam (UN DESA,

2014). Alongside urban growth, the number of urban residents living in informal settlements and the challenges of providing urban services are becoming very visible in Africa.

The majority of the NDCs from Africa are categorized in Cluster B (29), followed by Cluster A (12) and Cluster C (11); see Table 1 and Map 3. Cluster A countries in general show a larger focus on adaptation and a comparably lower attention to urban areas' mitigation potential and related challenges.

Table 1: Africa: List of Countries, associated GHG Emissions and Urban Populations

Country	Total GHG emissions per country in 2011 [kt CO ₂ eq]	Urban population [%] most recent data	Urban population [%] projection 2050
CLUSTER A			
Benin	33,289.55	43.95	61.32
Burkina Faso	43,660.15	29.86	52.04
Cameroon	100,386.55	54.38	69.97
Central African Republic	513,289.52	40.04	56.90
Chad	109,463.64	22.47	37.12
Côte d'Ivoire	33,027.48	54.18	70.85
Ethiopia	184,045.88	19.47	37.60
Gambia	3,505.92	59.63	71.28
Ghana	107,126.22	54.04	70.49
Guinea	100,814.39	37.16	56.26
Nigeria	296,799.95	47.78	67.10
Togo	22,760.64	39.96	57.87
CLUSTER B			
Algeria	172,303.51	70.73	82.14
Burundi	6,152.00	12.06	26.32
Cabo Verde	403.67	65.53	77.56
Congo	35,504.46	65.38	77.23

Country	Total GHG emissions per country in 2011 [kt CO ₂ eq]	Urban population [%] most recent data	Urban population [%] projection 2050
Democratic Republic of the Congo	800,756.94	42.49	60.44
Djibouti	2,701.62	77.34	82.65
Egypt	288,287.83	43.14	56.54
Equatorial Guinea	6,243.10	39.92	50.92
Eritrea	4,912.88	20.95	42.12
Gabon	34,324.76	87.16	90.98
Kenya	53,513.99	25.62	43.88
Lesotho	3,449.41	27.31	46.71
Liberia	2,797.37	49.70	65.18
Madagascar	117,586.22	35.11	54.99
Malawi	21,525.76	16.27	30.19
Morocco	78,381.40	60.20	73.97
Mozambique	380,073.24	32.21	49.12
Namibia	37,855.65	46.67	67.81
Niger	11,342.12	18.73	35.39
Rwanda	6,620.25	28.81	52.60
Sao Tome and Principe	109.74	65.10	75.50
Sierra Leone	11,731.17	39.95	57.24
Somalia	21,690.27	39.55	57.85
South Sudan	0.001	18.80	33.94
Sudan	489,798.21	33.81	49.77
Tunisia	38,741.14	66.84	76.63
Uganda	80,318.97	16.10	32.06
United Republic of Tanzania	234,762.03	31.61	52.98
Zambia	32,0024.70	40.92	58.27
CLUSTER C			
Angola	40,878.65	44.05	63.83
Botswana	81,891.04	57.44	69.86
Comoros	554.34	28.30	38.19
Guinea-Bissau	7,571.18	49.33	64.73
Mali	77,134.18	39.92	60.29
Mauritania	13,153.86	59.86	74.07
Mauritius	3,441.62	39.67	46.30
Senegal	23,810.06	60.46	43.72
Seychelles	883.83	53.89	64.96
Swaziland	3,430.02	21.31	28.80
Zimbabwe	71,561.95	32.38	43.72

¹ No Data Available

3.1.1. Mitigation

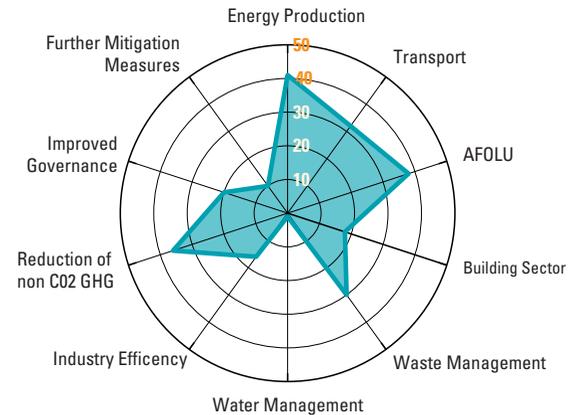
Mitigation priorities in the African focus on energy production, the reduction of non CO₂ GHG, the agriculture, forestry and/or AFOLU sector, Transport and waste management. This can be seen in Figure 6, which indicates the focus of NDCs from Cluster A & B using the ten most frequently found mitigation priorities. This array of mitigation sectors is encouraging given emissions accounted for in these sectors. This is particularly important in the Transport and AFOLU sector given increasing urbanization. The AFOLU sector is particularly important in this region due to the experienced and predicted expansion of smaller and medium sized cities, namely those under 1 million inhabitants (UN-Habitat 2016b).

Measures to mitigate GHG emissions within the energy sector are outlined in most NDCs from the region. Action is focused on addressing the energy infrastructure deficit through renewable energy. Energy consumption by and in cities is significant, as rural electrification levels remain low levels and increasing such represents a clear development priority. As energy systems develop, so do opportunities for low-carbon development. Investing in renewable energy, like hydropower, geothermal, and solar energy, are high on the agenda of some African countries, as their NDCs show. For example, Chad's focus on the energy sector as a mitigation priority is highlighted in their NDC as an opportunity to also diversify the energy mix with sources of hydro, wind and bioenergy ensuring resilience. Their NDC also outlines an explicit strategy, along with unconditional and conditional funding requirements, to combine efforts with Cameroon due to trans-boundary water systems that would enable hydropower generation.

"There are 5 projects related to energy production on the mitigation strategy: Interconnection of Chad-Cameroon power grids to supply Chad with hydro-generated energy of 500 GWh. [...] Construction of a national 225 kv line to interconnect all cities, cross-country power grid (between adjacent cities) ..." (NDC: Cameroon. pg 8).

The building sector remains among the least prioritized amidst increasing rates of urbanization – from an average of 40% to 70% in the region by 2050. Considering informal communities the focus of national governments may be on closing the housing stock and infrastructure gap before prioritizing this sector for climate change mitigation. Produced in less quantity, but with higher

Figure 6: Africa:
Cluster A and B: Mitigation Priorities



potency, industrial GHG emissions are one of the lowest priorities for countries in the region. However, some of these emissions are covered under the non-CO₂ emissions that are highly prioritized by NDCs in this region.

3.1.2. Adaptation

Adaptation is a key priority within NDCs from this region, seen with the uniform distribution of priority sectors in Figure 7. This holistic approach to adaptation recognizes the impact of climate change in the region and the necessity to provide solutions to ensure sustainable livelihoods and overall resilience.

The adaptation priorities that are identified in the NDCs from the region emphasize rural areas and agriculture, mirroring their importance for respective national economies. Such considerations also drive the prioritization of land-use management, water management, vulnerability and disaster, and ecosystem conservation. The need for broad adaptation measures is highlighted by Liberia.

"Building of coastal defence walls to reduce the vulnerability of urban coastal areas. Develop and implement Coastal Zone policy, strategy and management plan. As 70% of the population and thus the major human concentration are on the coast, this planning measure involves cities." (NDC: Liberia. pg. 14f)

While there is a significant focus on impacts on the agricultural sector, there are also significant number of NDCs outlining urban adaptation measures. Uganda and Malawi

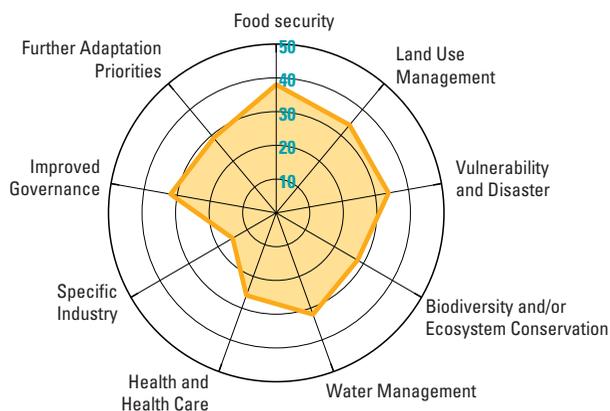
outline measures to develop and implement climate related building codes and revise existing building standards to ensure that new and existing buildings are resilient to climate change, as well as having additional mitigation benefits.

“Ensuring that land use plans and building codes reflect the need to make public and private buildings more climate-resilient” (NDC: Uganda. pg. 6)

“Increase use of soil-cement stabilized block and rice husk ash blended cement to around 10% of current cement production...develop and implement climate related building codes/standards. Revise existing building standards in line with climate change” (NDC: Malawi. pg 8 & 10).

It is encouraging to note that references to improved governance occur in 32 out of 41 NDCs within Clusters A and B. The range of improvements include, more streamlined approaches and management at the national level (e.g. Benin & Côte d’Ivoire), integration between local and national governments (e.g. Cameroon), as well as the integration of community (e.g. Burundi) and private stakeholders (e.g. Ethiopia & Cabo Verde). Financing from the private sector for adaptation measures is also noted as a benefit from improved governance systems through the demonstration of a clearer business case (e.g. Sierra Leone).

Figure 7: Africa:
Cluster A and B: Adaptation Priorities



3.1.3. Urban Challenges

An analysis of the standard, or generic, urban challenges mentioned in the NDC sections, namely, (i) adaptation, (ii) mitigation, (iii) institutional capacity, (iv) technical capacity, (v) finance and (vi) ‘other’, indicates that adaptation challenges are more frequently outlined in NDCs with urban content, than mitigation challenges. This further emphasizes the focus on adaptation in the region, due to the anticipated impacts.

Approximately one in three of NDCs with urban content refer to technical and finance capacity challenges. There are a small number of NDCs that also point towards institutional capacity challenges. Togo however makes direct reference to financial challenges, requesting assistance to implement human settlement related measures, estimated at 540 million USD. (NDC: Togo. pg.18). Malawi’s NDC also makes an explicit request for financial, technical and technological assistance with mitigation and adaptation measures. Furthermore, Malawi requests specific assistance in addressing uncontrolled urbanization.

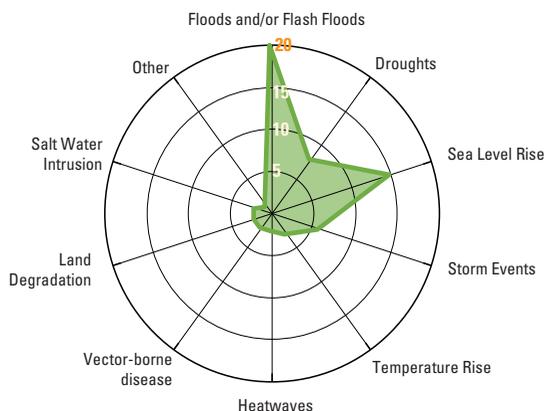
“The rate of urbanization in cities and town centres, estimated at 5.2%, is among the world’s fastest growing. The high urbanisation rate and lack of designated plots have resulted in the expansion of informal settlements in its towns and cities, which are characterised by lack of access to basic services, including waste collection and disposal.” (NDC: Malawi. pg. 7)

Figure 8 provides an overview of both the direct and inferred challenges identified in NDCs with urban content. The figure indicates that (i) flooding, (ii) sea level rise, (iii) droughts and (iv) storms are the most prevalent issues.

There are also patterns within the references to urban challenges between Clusters A and B. A higher proportion of NDCs from Cluster A make direct references to floods and/or flash floods, thereby indicating an area of needed adaptation support and assistance.

“An expected sea level rise may reach 0,81m in 2100 which will trigger coastal flooding and salt water intrusion into aquifers. This can affect human settlements’ health and fisheries”. (NDC: Benin pg. 11).

Figure 8: Africa:
Specific Urban Challenges



3.1.4. Urban Measures

Urban measures are those that seek to address the urban challenges outlined in NDCs (see 3.1.3). Within the region there is a largely even spread of specific sectors identified as areas for action. The Transport, Building, Land use and Planning, Water, Waste, Industry, Energy, and Food Production sectors are the most frequently mentioned sectors in the NDCs. The Food Production and Industry sectors are however largely absent from NDCs. This broad approach within NDCs further highlights the need for a holistic approach identified for effective climate action in the region.

“A reduction in the specific consumption of the transport, residential and public administration sectors brought about by improving the quality of the transport fleet; promoting public transport; disseminating solar streetlamps and low-energy lamps and electrical appliances; and implementing efficiency standards in building design”. (NDC: Guinea. pg.11).

The transport sector is the most commonly referred to in regards to urban climate action, with NDCs outlining a range of responses. These include improved roads, more efficient and reliable public transport, the construction of mass transit systems, as well as the construction of railway lines for the transportation of goods.

The recognition of the waste sector, second to transport, is particular encouraging, with many NDCs making reference to requests for landfill management support in response to rising urbanization and associated consumption. Additionally, waste management refers to the recycling of waste water

into potable water, as noted by Namibia. The recycling of water is critical to the minimization of energy emissions associated with transporting water, as well as creating a more resilient water supply, in a region susceptible to drought.

3.1.5. Requests

Few countries make specific requests for urban related financial, technical or institutional capacity assistance in their NDCs. Malawi is an exception (see below). This could be related to the recent development of urban specific climate action plans for cities within the region, either as a response to the Adaptation Fund or bilateral and multilateral arrangements for mitigation actions. Prior to COP22 and COP23, several city-specific proposals and strategies were presented from the region.

The implementation of mitigation and adaptation actions indicated as “with requirements” will require availability of financial resources, technology development and transfer, and capacity building from the international community”. (NDC: Malawi pg.7).

Countries that do make specific requests for urban related financial, technical or institutional assistance requests within their NDCs include Togo, Burkina Faso, Benin, Niger and Eritrea. Benin and Burkina Faso make direct requests in all three categories.

3.2. NORTH AMERICA, LATIN AMERICA AND THE CARRIBEAN

A total of 33 countries submitted NDCs from this region, four of which have been categorized into Cluster A (strong urban content), twenty into Cluster B (moderate urban content) and nine within Cluster C (no urban content). Please see Table 2 and Map 4 for more information on the regional distribution.

Countries within the region currently experience high levels of urbanization, with 20 out of 33 countries having a high (60-80%) to very high (80-100%) urbanization levels. An additional six countries are expected to join these highly urbanized countries by 2050 (See Table 2).

Projections of 2050 urbanization levels for the region indicate continued growth with most countries reaching urban populations over 75%. The majority of these countries are categorized as Cluster B - specifically, Uruguay (97.5), Argentina (94.7), Chile (93.1), Brazil (91), Dominican Republic (90.1). Countries with urbanization levels lower than 50%

are mainly the small island states in the Caribbean, such as Trinidad and Tobago, Barbados and Grenada.

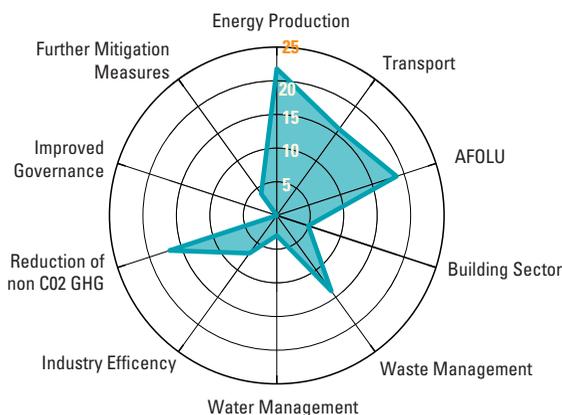
As shown in Table 2, GHG emissions across the region are heterogeneous, ranging from small island nations that are amongst the world's lowest emitters, such as Saint Kitts and Nevis (187 kt CO₂eq), to very high, such as the United States of America (6,571,654 kt CO₂eq). The NDC of the United States indicates no specific urban content, along with Canada, the third largest emitter in the region. However Brazil, the second highest emitter, has included urban content and is categorized into Cluster B.

3.2.1. Mitigation

NDCs that contain urban content prioritize mitigation efforts within the energy sector, AFOLU, transport and non-CO₂ GHG area, as seen in Figure 9.

The focus on transport is encouraging, as efficient low-carbon transport has a high mitigation potential. The building, industry and water sectors are among the least prioritized. Given the continued high urbanization in the region the omission of the building sector is surprising and may present a missed opportunity for urban emission reductions in NDCs.

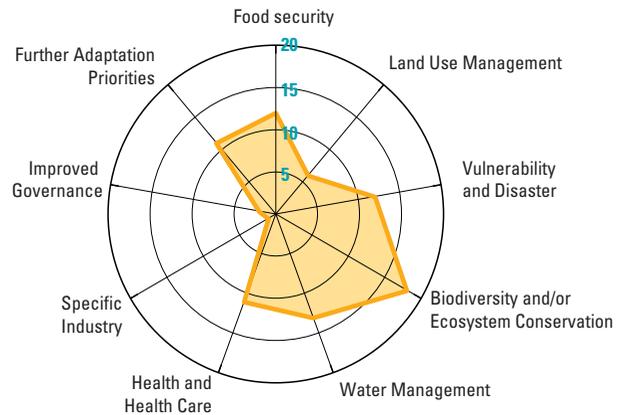
Figure 9: America: Cluster A and B: Mitigation Priorities



3.2.2. Adaptation

A number of adaptation sectors are identified in NDCs with urban content (Clusters A and B), as seen in Figure 10. Biodiversity and/or ecosystem based adaptation are the most common within these NDCs, which is particularly encouraging given the biological diversity within this region (Secretariat of the Convention on Biological Diversity 2012).

Figure 10: America: Cluster A & B: Adaptation Priorities



Water management, vulnerability and disaster, health, food security, and 'further adaptation measures' are, on average, equally prioritized. However, land use management, specific industry and improved governance are mentioned only in a small number of NDCs.

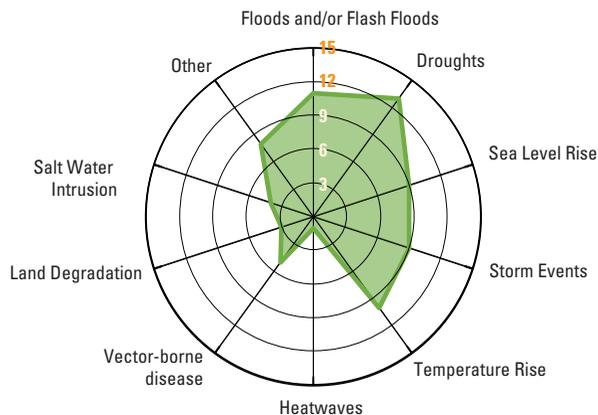
3.2.3. Urban Challenges

The key challenges identified in NDCs with urban content reveal that adaptation challenges dominate, with 17 out of 24 NDCs outlining direct or indirect urban adaptation challenges. By comparison, only two NDCs refer to mitigation challenges within the urban sector, suggesting that more assistance is required for adaptation measures. In comparison to the Africa region, institutional, technological and financial challenges are largely absent from NDCs. The Bahamas NDC makes references all three of these urban challenges.

"The Bahamas will require international support in the form of finance, investment, technology development and transfer and capacity-building in its efforts to capitalize on greater utilization of renewable sources of energy and adapt to the negative impacts of climate change that affect various sectors of the economy". (NDC: Bahamas. pg. 9).

An analysis of the types of urban challenges identified by countries indicates that floods and/or flash floods, and droughts are the most commonly identified challenges (see Figure 11). Sea level rise, storm events and temperature rise are also identified in a number of NDCs across different sub regions; however these are predominately indirectly referenced. The interconnected nature of adaptation challenges are outlined in a number of NDCs.

Figure 11: America: Urban Challenges



“Vulnerability of human settlements in Dominica to existing weather and climate change can be viewed in terms of risks from coastal processes, inland flooding, and landslides. A consistent feature of human settlements in Dominica is the vulnerability of roads and buildings to storm surge flooding and landslides”. (NDC: Dominica. pg. 5).

Addressing the challenge of salt water intrusion is directly mentioned in four NDCs, including Barbados, Cuba, Dominica and Jamaica. The challenge of heat waves is only identified as an issue by Argentina.

3.2.4. Urban Measures

Key urban measures to address challenges within the urban environment are limited. Five NDCs reference urban mitigation measures, while seven refer to urban adaptation measures. Costa Rica, Dominica, Suriname and Uruguay reference urban adaptation challenges and also outline provisions in their NDCs to address these issues.

“Territorial approach to urban growth management would help minimize environmental impact caused by human activity, reduce disaster risk, and enhance resilience to climate change, as well as, providing participative instruments for informed decision making at the local, municipal level. This Territory and Urban Planning Organization will constitute a tool to reduce vulnerability over the long term. Under this approach, Costa Rica commits to having in every city, by 2020, and every coastline county in the country, a land use plan which considers vulnerabilities to climate change and measures for increasing adaptation and mitigation”. (NDC: Costa Rica. pg. 17).

The specific sectors, in which the largest number of measures are to be found is transportation, with a number of specific projects outlined. These range from the development of Bus Rapid Transit networks (e.g., Uruguay) to policy measures, such as the reduction in import duties paid on low emission vehicles (e.g. Saint Vincent and Grenadines).

Measures within the energy sector are also prevalent, with actions outlined to diversify the energy mix and build more resilient energy systems. Direct strategies include waste-to-energy and biomass generation plants, wind, distribution and centralized solar photovoltaic panels. Barbados, for example, intends to produce energy from landfill gas capture (NDC: Barbados, pg. 5).

There are minimal urban actions outlined within the food production, land use and planning and industry sectors, despite the number of references to drought, floods and temperature rise adaptation challenges. This is perhaps driven by the already high rates of urbanization within the region.

Additional actions outlined include the resettlement of populations away from areas affected by sea level rise and floods (e.g., Bahamas & Uruguay), as well as the development of education and awareness programs at the school level and for the general public (NDC: Dominica, pg. 12).

3.2.5. Requests for Assistance

There are a range of requests for assistance across the region. Surinam, Barbados, Cuba, Guatemala, and Saint Kitts and Nevis make urban-related requests for assistance across the three categories of finance, technology and institutional capacity.

“A key assumption made in this INDC is that support from the international community, and in particular the ANNEX 1 countries, will be forthcoming in a timely manner in areas such as finance, technology transfer, renewable energy and training, and capacity building”. (NDC: Suriname. pg. 11-12).

El Salvador requests assistance for effective access to financing mechanisms such as the Green Climate Fund (GCF), presenting an opportunity for capacity building (NDC: El Salvador, pg. 14). Chile and Argentina each request urban related technical and institutional capacity assistance, Mexico makes specific requests for both technical and instructional capacity assistance.

Table 2: America: List of Countries, associated GHG Emissions and Urban Populations

Country	Total GHG emissions per country in 2011 [kt CO ₂ eq]	Urban population [%] most recent data	Urban population [%] projection 2050
CLUSTER A			
Bahamas	4,726.38	82.90	87.02
El Salvador	12,293.61	66.73	78.49
Haiti	8,695.43	58.65	76.20
Venezuela	275,683.76	88.99	91.95
CLUSTER B			
Argentina	372,873.14	91.75	94.74
Barbados	1,497.65	31.48	38.94
Belize	1,536.24	43.97	51.00
Bolivia	620,982.96	68.51	79.38
Brazil	2,953,040.52	85.69	90.97
Chile	117,661.68	89.53	93.11
Colombia	170,199.58	76.44	84.34
Costa Rica	11,994.69	76.82	88.58
Cuba	51,170.75	77.07	83.40
Dominica	217.38	69.54	77.79
Dominican Republic	32,578.16	78.98	90.11
Guatemala	30,950.25	51.57	67.32
Jamaica	15,053.51	54.79	67.66
Mexico	652,861.29	79.25	86.37
Panama	15,860.46	66.59	77.27
Peru	73,289.70	78.61	86.18
Saint Kitts and Nevis	189.78	32.05	42.53
Saint Vincent and the Grenadines	310.88	50.55	61.93
Suriname	2,598.26	66.04	71.70
Uruguay	33,773.77	95.31	97.48
CLUSTER C			
Antigua and Barbuda	537.81	23.77	26.33
Canada	1,033,481.98	81.83	87.59
Ecuador	51,593.66	63.74	74.52
Grenada	705.68	35.59	44.04
Guyana	6,042.58	28.6	38.53
Honduras	20,084.14	54.73	70.43
Paraguay	50,445.12	59.67	71.52
Trinidad and Tobago	59,776.58	8.45	10.67
United States of America	6,571,653.98	81.62	87.40

Map 4: Urban Content in NDCs: America



3.3. ASIA

Sixty percent of the global population lives in Asia - a total of 4.4 billion people in 2015 (UN DESA 2015). Countries in this region are among the most rapidly urbanizing and, like Africa, the exact rates of urbanization are often blurred due to the rapid nature of change, as well as the proliferation of informal settlements, which are not often captured in official statistics (Ellis & Roberts 2016).

The majority of mega cities, those with ten million inhabitants or more, are concentrated in the global south with a predominance in Asia. China alone was home to six mega cities in 2016, while India had five. It is predicted that by 2030, an additional two megacities will develop in India; Ahmedabad and Hyderabad. Chengdu is also expected to become a megacity by 2030 bringing China's total number of megacities to seven. Existing megacities will also continue to grow, with New Delhi, India expected to gain nearly 10 million people between 2016 and 2030 (World Cities Report 2016).

Five countries within the region have current urbanization levels over 90%. Singapore, an island city-state, is already 100 percent urbanized, followed by Qatar (99.2%), Kuwait (98.3%), Japan (93.5%), and Israel (92.1%). These Parties all outline urban content in their NDCs.

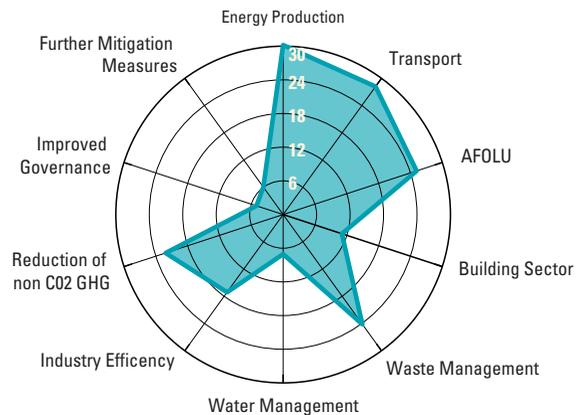
The distribution of urbanization levels across Cluster A is highly varied, ranging from the least urbanized in the region, 18.4% in Sri Lanka, to amongst the highest, 88.8% in Bahrain. This range of urbanization levels is seen across the three Clusters. Similarly, GHG emissions per country are highly varied within the Clusters (see Table 3). For example, emissions range from 3,260 kt CO₂eq in Bhutan to 12,064,260 kt CO₂eq in China within Cluster A. The second highest emitter in the region. India, is also categorized in Cluster A.

3.3.1. Mitigation

The mitigation priorities among NDCs with urban content identify similar sectors to Africa (see Figure 12). Energy production, AFOLU, reduction of non CO₂ GHG emissions, transport and waste management are the highest priorities; improved governance and water management remain among the lowest priorities.

The building sector is also an under-prioritized opportunity for mitigation reflecting the developing status of many Parties in these clusters.

Figure 12: Asia: Cluster A + B: Mitigation Priorities



In prioritizing mitigation sectors, NDCs outline a number of interconnected opportunities to meet targets. India (Cluster A) outlines mitigation measures in all sectors except water management and the building sector. While this is encouraging, the building sector will be a critical industry to meet mitigation targets with a rising urban population and middle class. This is also especially important given commitments to ensure access to housing for a growing population

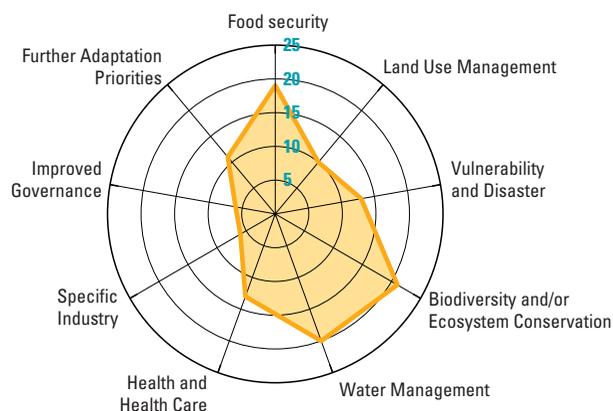
“Myanmar recognises a number of important emerging themes which are key to addressing both future emission reductions and adaptation to climate impacts, including the need for sustainable urban development...”. (NDC: Myanmar. pg. 04).

3.3.2. Adaptation

Adaptation is a key focus of NDCs within the region. Adaptation priorities are spread across the sectors, with a focus on food security, biodiversity and/or ecosystem conservation and water management (see Figure 13). Disaster, health care, industry, and improved governance are among the least prioritized adaptation measures in NDCs with urban content.

Connections between adaptation and mitigation measures are highlighted by a number of NDCs. For example, the People's Republic of China aims to strengthen the protection and restoration of wetlands and increase carbon storage capacity (NDC: PR China, pg 10).

Figure 13: Asia:
Clusters A+B: Adaptation Priorities

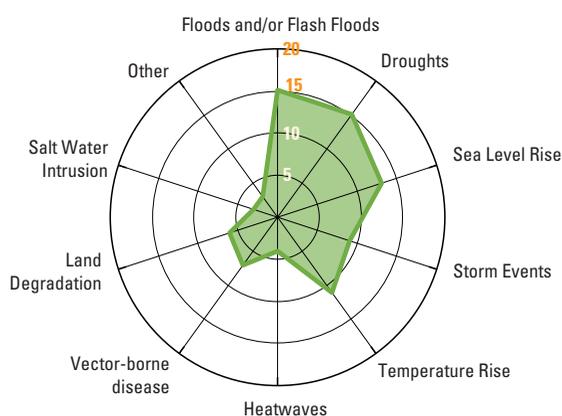


3.3.3. Urban Challenges

NDCs with urban content contain a higher number of direct and indirect references to urban adaptation challenges, compared to urban mitigation challenges. Seven NDCs reference urban mitigation challenges, while twenty refer to urban adaptation challenges. Like NDCs from the Africa region, there are also a large number of references to institutional, technical and finance challenges experienced by Parties.

NDCs with urban content identify floods and/ or flash floods, droughts and sea level rise, with many NDCs noting all three challenges (see Figure 14). Increased frequency of storms, glacial melt and higher intensity rainfall events are identified as exacerbating these challenges. Mentions of salt water intrusion (3) and heat waves (4) are infrequent.

Figure 14: Asia:
Urban Challenges: Type of Challenges



Parties that do mention heat waves are India, Saudi Arabia, Afghanistan and Georgia. Issues categorized under the 'other challenges' include, landslides (Indonesia), loss of biodiversity (Lebanon) and loss of water sources.

3.3.4. Urban Measures

There are few mentions of planned mitigation and adaptation measures to counter climate change within the urban context. Adaptation measures (13) are slightly more numerous in mentions than mitigation measures (9), Cluster A has significantly more direct and implied references of mitigation measures compared to NDCs in Cluster B. References to adaptation is approximately the same in the two Clusters. Finance capacity measures slightly outnumber those related to institutional and technical capacity.

The transportation sector is the primary focus of urban measures outlined in NDCs. The People's Republic of China, for example, signals the intention to develop green and low-carbon means of public transportation, as well as low-carbon communities, cities and industrial parks.

"To develop a green and low-carbon transportation system, optimizing means of transportation, properly allocating public transport resources in cities, giving priority to the development of public transportation and encouraging the development and use of low-carbon and environment-friendly means of transport, such as new energy vehicle and vessel". (NDC: China. pg 10)

The development of new public transport systems, such as mass rapid transit networks (e.g., Bangladesh & Saudi Arabia) are outlined, as well as improving the efficiency of existing networks to minimize emissions (e.g., Bhutan & Bahrain).

The energy and building sectors are also key sectors for urban measures, with a number of NDCs outlining specific measures related to construction, such as the Republic of Korea's intention to develop green building codes. Bahrain highlights the role of the Ministry of Works, Municipalities Affairs and Urban Planning, indicating that they will continue to improve the transportation network by increasing public transport efficiency and attractiveness. In the building sector, sustainable and green building construction projects will construct new government buildings that will generate

energy and water savings. Other sectors in which urban measures are outlined include coastal planning and regulations, and the tourism industry.

China, Afghanistan, Sri Lanka and Kuwait indicate measures to address climate change within industry related sectors.

“Enhance carbon intensity control in Urbanized Zones for Focused Development and to accelerate green and low-carbon transformation in old industrial bases and resource-based cities”. (NDC: China. pg. 22)

3.3.5. Requests

There are few direct urban related requests within NDCs from the region. While seventeen NDCs outline individual requests, focusing on institutional capacity and financial assistance, three NDCs make references related to both institutional and financial assistance, namely Lao People’s Democratic Republic, Sri Lanka and Myanmar.

“Capacity building on: - Sustainable and integrated urban planning.” : for the implementation of transport focused NAMAs”. (NDC: Lao PDR. pg 4f)

Table 3: Asia: List of Countries, associated GHG Emissions and Urban Populations

Country	Total GHG emissions per country in 2011 [kt CO ₂ e]	Urban population [%] most recent data	Urban population [%] projection 2050
LUSTER A			
Armenia	12,417.74	62.67	70.48
Bahrain	31,941.04	88.76	91.78
Bangladesh	180,498.43	34.27	55.68
Bhutan	3,259.61	38.64	55.01
China	12,064,260.00	55.61	75.81
India	2,828,845.83	32.75	50.27
Lao People’s Democratic Republic	161,456.98	38.61	60.82
Saudi Arabia	514,967.26	83.13	88.74
Sri Lanka	29,822.78	18.36	30.17
Viet Nam	285,091.06	33.59	53.75
CLUSTER B			
Afghanistan	17,981.31	26.70	45.34
Azerbaijan	53,982.83	54.62	68.02
Brunei Darussalam	14,494.49	77.20	83.95
Cambodia	126,838.76	20.72	36.19
Georgia	14,665.80	53.64	65.97
Indonesia	763,553.16	53.74	70.87
Israel	81,703.91	92.14	94.47
Japan	1,396,767.26	93.50	97.65
Jordan	26,440.77	83.70	89.34
Kazakhstan	350,475.73	53.25	64.57
Kuwait	96,788.19	98.34	98.84
Lebanon	19,791.50	87.79	91.69
Malaysia	271,818.84	74.71	85.87
Maldives	706.85	45.54	62.48
Mongolia	25,428.95	72.04	84.77

Country	Total GHG emissions per country in 2011 [kt CO ₂ eq]	Urban population [%] most recent data	Urban population [%] projection 2050
Myanmar	526,919.84	34.10	54.92
Nepal	33,160.97	18.62	35.58
Qatar	10,0891.32	99.24	99.80
Singapore	54,413.55	100.00	100.00
Turkey	434,798.46	73.40	83.73
Turkmenistan	88,648.72	50.04	65.50
United Arab Emirates	199,342.52	85.54	90.82
Yemen	39,949.08	34.06	54.07
CLUSTER C			
Democratic People's Republic of Korea	107,165.32	60.88	N/A
Iran (Islamic Republic of)	545,075.01	73.38	83.86
Kyrgyzstan	13,853.67	35.71	50.80
Oman	60,705.59	77.64	86.49
Pakistan	362,475.09	38.76	57.45
Philippines	163,797.79	44.37	56.25
Republic of Korea	650,085.53	82.47	87.61
Tajikistan	15,285.82	26.78	40.98
Thailand	431,312.31	50.37	71.80

Map 5: Urban Content in NDCs: Asia



3.4. OCEANIA

Eleven countries are categorized within the Oceania region for this analysis, and nine out of eleven NDCs from this region were found to contain urban content, all of which were classified into Cluster B (see Map 6).

Urbanization in the region is very unevenly distributed, including countries that are highly urbanized with large populations, namely Australia (89% urban population) and New Zealand (86% urban population), and small island states that are among the least urbanized such as the Solomon Islands, Vanuatu, Tonga (see Table 4). An outlier is Nauru, with 100% urban population. Urban population in these small island developing states is still expected to grow until 2015.

The majority of countries within Micronesia anticipate an urban population above 50% of the total by 2050, including Kiribati (54.5%), Palau (93.1%) and the Marshall Islands (80.1%). However, countries within the sub-regions of Melanesia and Polynesia (excluding Fiji) will remain less urbanized, with urban populations projected below 38% by 2050.

Emissions across the region range from small island states such as Palau, emitting 1.38 kt CO₂eq in 2011, to Australia which emitted 785,795.15 kt CO₂eq in 2011 (again, see Table 4). Australia and New Zealand, the first and second largest emitters within the region, do not have urban content within their NDCs.

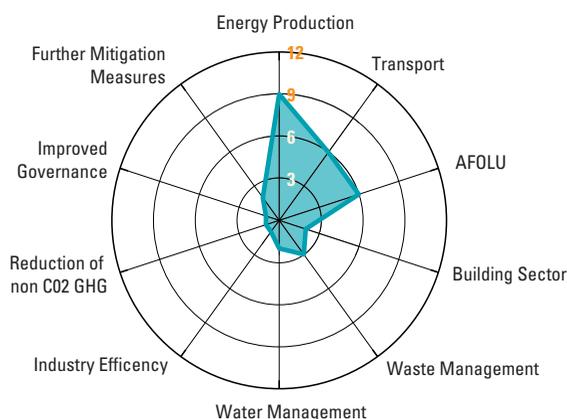
3.4.1. Mitigation

As shown in Figure 15, generic priorities for mitigation are: (i) energy production, (ii) transport and (iii) AFOLU, named in the majority of NDCs, while other sectors are sparsely mentioned.

Transport mitigation priorities outlined in NDCs are explicit, noting the importance of this sector alongside increasing urban populations. Fiji emphasizes the benefits of fuel replacement, namely to biofuels or electricity (NDC: Fiji, pg. 8), while the Marshall Islands intend to introduce electric vehicles and solar-charged lagoon transportation.

The AFOLU sector has a significant role to play in many of the NDCs due to associated land cover and associated emissions stored.

Figure 15: Oceania:
Cluster A+B: Mitigation Priorities



3.4.2. Adaptation

Adaptation priorities for NDCs with urban content are largely uniform and somewhat expected due to the composition of countries, particularly Small Island Developing States (SIDS), that already are, and will be, greatly impacted by climate change. Many NDCs list the importance of prevention and early warning systems against natural hazards such as cyclones, floods and tsunamis, which are expected to increase in severity and frequency (see Figure 16). Palau, which identified multiple sectors for adaptation, identifies the vulnerability and disaster sector as a priority for adaptation.

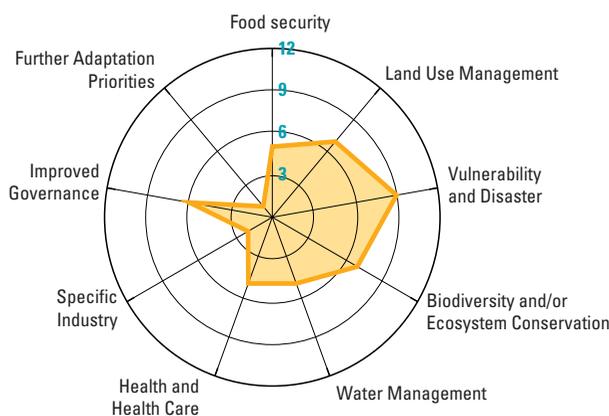
“Palau is particularly vulnerable to the impacts of climate change, principally from sea level rise and the increase in extreme events (drought, flooding, Category 4 and 5 typhoons). Sea-level rise threatens vital infrastructure, settlements, and facilities that support the livelihood of island communities”. (NDC: Palau. pg.04)

Additional industries that are identified as adaptation priorities within the region include tourism in Vanuatu, the establishment of on-grid solar Photovoltaic on urban islands and the testing of coconut oil based bio fuel in Kiribati.

Six NDCs recognize improved governance as an adaptation priority, noting the required integration between NGOs, horizontal integration in governance and the utilization of the private sector. Community based solutions are also prioritized by Parties within this Cluster.

Mangrove management is mentioned in a number of NDCs under land use management and biodiversity conservation. As the islands within this cluster have low elevations above sea level, wetlands and mangrove areas are at risk of inundation. The level of diversity amongst mangrove species within these islands is high. For example, Papua New Guinea has the world's highest mangrove diversity (UNEP 2006). Ensuring that these habitats are well maintained will help ensure that soil erosion, land degradation, salt water inundation and settlement flooding is minimized.

Figure 16: Oceania:
Cluster B: Adaptation Priorities

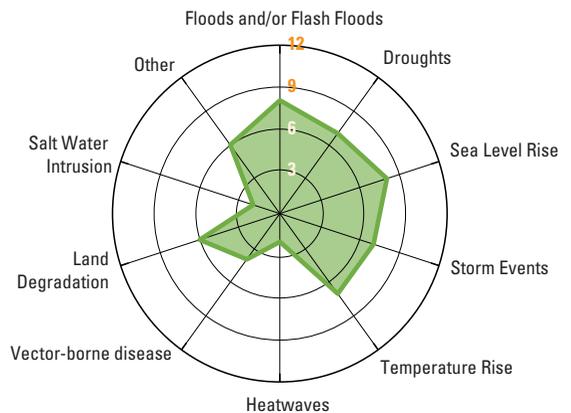


3.4.3. Urban Challenges

Adaptation, financial and technical challenges are referenced by all NDCs with moderate urban content (Cluster B). There are slightly fewer mentions of urban mitigation (6) and institutional (8) challenges (see Figure 17). A majority of the challenges identified are mentioned indirectly and cover a wide range of issues including reducing aid dependence (Nauru), lack of research data (Vanuatu), town planning by local governments (Fiji), management of increasing non-biodegradable water usage in urban areas (Kiribati), and financing of resilience and climate action plans.

“There is a need for strengthening the role of local governments in building resilience: Review the town plan regulations to facilitate the enforcement of zoning and buffer zones for coastal areas, river banks, high risk areas and mangrove areas” (NDC: Fiji. pg. 9).

Figure 17: Oceania: Urban Challenges



The types of urban challenges that are faced by Parties within this cluster are also numerous, with seven out of the ten sectors used in the analysis containing high numbers of references. Heatwaves, vector-borne disease, and salt water intrusion are among the least mentioned challenges.

Ocean acidification is mentioned in seven NDCs, the impact of which is highlighted by Kiribati, noting the increased loss of coastal and marine biodiversity, affecting livelihoods, household incomes and food security (NDC: Kiribati, pg. 16).

3.4.4. Urban Measures

Key urban measures that are outlined in NDCs within urban content focus on adaptation. Institutional, technical and finance capacity measures are outlined in the NDCs of Fiji, Kiribati, Tonga and Vanuatu. Additionally, these NDCs also outline strong urban mitigation measures. Vanuatu for example highlights the need to develop off grid renewable energy projects, as well as diversify the energy mix and ensuring efficiency (NDC: Vanuatu, pg. 4).

An analysis of the specific sectors that are prioritized for the implementation of urban measures indicates that the water, energy, building and land use and planning sectors are critical in implementing urban measures measures associated with both mitigation and adaptation. The proportion of direct and indirect urban measures is most frequent within transport, building and land use. For example, Palau is investigating projects and measures to convert waste cooking oil to biofuel for diesel vehicles, beginning with public school buses and a potential public bus route (NDC: Palau, pg. 5). Additionally, the country is looking to expand building measures focusing on cool

roofs and energy audits. The least referred to urban measures include food production, industry, with three references each.

When considering additional urban measures, Kiribati directly mentions population a resettlement, as seen below. With rising sea levels, many island states face dire relocation issues due to decreases in land area, reducing settlement spaces (IPCC 2014a). As a result some countries are forming re-settlement schemes to create expatriate communities on other islands.

“Population and resettlement – aim to reduce the vulnerability of Kiribati to increasing physical risks caused by climate change by establishing host country agreements to government-sponsored and self-sponsored emigration to resettle 1-Kiribati overseas and assist the inevitable migration of the population, due to climate change as and when this eventually arrives.” (NDC: Kiribati. pg. 19)

3.4.5. Requests

The majority of NDCs do not make any urban related requests for assistance related to finance, technical or institutional capacity. Only Nauru touches this point by outlining a need for assistance, stating that a “lack of funding at the national level has prevented many larger infrastructure projects from getting underway, such as a new hospital, electricity transmission system, improvements to port and airport, and land rehabilitation” (NDC: Nauru, pg. 5).

The Solomon Islands request urban related assistance in relation to institutional capacity and financial capacity. The Solomon Islands directly outline the figure required to implement a National Adaptation Program of Action, expected to total USD 17,250,000. Tonga and Papua New Guinea also outline finance assistance requests. Tonga goes so far as to tabulate intended interventions, noting existing funding and specifying additional financial requirements for a number of renewable energy systems.

Table 4: Oceania: List of Countries and Associated GHG Emissions and Urban Populations

Country	Total GHG emissions per country in 2011 [kt CO ₂ eq]	Urban population [%] most recent data	Urban population [%] projection 2050
CLUSTER B			
Fiji	2,213.24	53.73	64.96
Kiribati	56.70	44.30	54.50
Marshall Islands	7.89	72.68	80.12
Nauru	4.51	100.00	100.00
Palau	1.38	87.07	93.09
Papua New Guinea	10,888.09	13.01	22.73
Solomon Islands	4,536.58	22.33	35.18
Tonga	155.29	23.71	31.89
Vanuatu	440.15	26.13	37.53
CLUSTER C			
Australia	785,795.15	89.42	92.92
Cook Islands	47.99	73.50	81.62
Micronesia (Federated States of)	158.50	22.40	30.00
New Zealand	75,851.12	86.28	89.78
Niue	1.31	0 ¹	0 ¹
Samoa	348.88	19.10	23.41
Tuvalu	5.18	59.72	75.42

¹ No data available

Map 6: Urban Content in NDCs: Oceania



3.5. EUROPE

From the European region there were 17 NDCs submitted that represent 44 countries, due to the collective submission of the European Union (EU) representing 28 member States. No NDCs are categorized within Cluster A; three countries, the Principality of Monaco, Switzerland and Republic of Moldova, fall within Cluster B (see Table 5 and Map 7).

The very low presence of urban related content in the Europe region cluster is surprising, given the high urban population levels. The absence of urban content may have been exacerbated and driven by the collective reporting of the EU, which may have led to reduced specificity, including urban content. All countries within the region have a medium to high urbanization level, with most of countries experiencing high (60-80%) and very high (80-100%) urbanization levels (again see Table 5). Moreover all countries are projecting increasing urbanization level, particularly countries in southern and southeastern Europe, such as Albania, Serbia and Macedonia, where the urbanization levels will increase by over 12% by 2050.

3.5.1. Mitigation

The three NDCs that contain urban content outline a number of sectors to reduce emissions, focusing on energy production and the reduction of non CO₂ identified as the highest priority. Efforts within the sector of improved governance and water management are not mentioned.

Switzerland and the Republic of Moldova indicate other measures to meet emission reductions, including the use of international transfer of emission reduction units and the purchasing of certified carbon credits to meet targets.

3.5.2. Adaptation

There are few mentions of adaptation measures by NDCs within Cluster B. Water management and health and health care mentioned by two out of three NDCs; Republic of Moldova & The Principality of Monaco. Land use management, specific industry and improved governance are not mentioned by any NDCs containing urban content.

The Principality of Monaco also calls out adaptation priorities within biodiversity and/or ecosystem conservation, as well as additional adaptation priorities, namely a vulnerability study.

“A vulnerability study aimed at defining an action plan for adapting to climate change in Monaco was launched in 2014. [...] A summary of this work was sent to the country’s key stakeholders in the following areas: Health, Water resources, Biodiversity, Urban infrastructure and services, Planning and the built environment, Energy and utilities, Economic activity.” (NDC: Republic of Monaco. pg. 9).

3.5.3. Urban Challenges

The Republic of Moldova is the only Party with the region that identifies an urban challenge in their NDC, by calling out the need to address financing challenges - “there is no integration of climate change adaptation measures in the national budget” (NDC: Republic of Moldova, pg. 22).

3.5.4. Urban Measures

The NDCs from Switzerland and the Principality of Monaco include urban related measures focusing on mitigation. Initiatives associated with institutional capacity and finance are also directly and indirectly referenced. The Principality of Monaco outlines urban measures within the transport, energy, building and waste sectors.

“Monaco has the capacity to become a forerunner in the deployment of innovative, non-emitting modes of transport and energy consumption, and to support innovative waste processing techniques and the development of the circular economy...” (NDC: The Principality of Monaco. pg. 9).

Switzerland makes a direct reference to mitigation intentions in the transportation sector, as well as recognizing the importance of the housing sector in reducing emissions.

“Emission reduction potential mostly remains in the housing and transport sectors. This remaining potential has long transformation periods.” (NDC: Switzerland. pg. 3)

3.5.5. Requests

No NDCs in Cluster B request assistance related to financial technical or institutional capacity.

Table 5: Europe: List of Countries and Associated GHG Emissions and Urban Populations

Country	Total GHG emissions per country in 2011 [kt CO ₂ eq]	Urban population [%] most recent data	Urban population [%] projection 2050
CLUSTER B			
Monaco	n/a	100.00	100.00
Switzerland	53,066.8s6	73.91	80.81
Moldova	11,433.48	45.00	58.89
CLUSTER C			
Albania	8,712.29	57.41	75.81
Andorra	n/a	85.12	82.96
Belarus	108,921.43	76.67	85.25
Bosnia and Herzegovina	26,405.84	39.77	55.21
FYR Macedonia	12,645.71	57.10	69.42
Iceland	5,530.25	94.14	96.10
Liechtenstein	n/a	14.30	19.50
Montenegro	n/a	64.03	72.37
Norway	64,181.15	80.47	87.21
Russian Federation	2,777,724.31	74.01	81.09
San Marino	n/a	94.19	95.66
Serbia	n/a	55.55	66.98
Ukraine	410,067.31	69.70	78.00
European Union	4,730,203.02	74.80	
Austria	92,315.05	65.97	74.66
Belgium	137,517.87	97.86	98.64
Bulgaria	72,946.62	73.95	82.83
Cyprus	7,652.33	66.92	72.06
Croatia	30,453.51	58.96	72.28
Czech Republic	144,613.25	72.99	79.33
Denmark	58,416.04	87.68	91.92
Estonia	24,378.85	67.54	72.72
Finland	76124.6	84.22	89.07
France	502,656.66	79.52	86.29
Germany	929,540.26	75.30	82.99
Greece	105,013.93	78.01	85.85
Hungary	64,385.00	71.20	81.82
Ireland	61,268.1	63.23	74.6
Italy	482,619.04	68.96	77.71
Latvia	14,150.10	67.38	74.82
Lithuania	29,324.69	66.51	74.70
Luxembourg	12,929.54	90.16	94.30
Malta	2,025.46	95.41	97.19
Netherlands	200,143.54	90.50	96.36

Country	Total GHG emissions per country in 2011 [kt CO ₂ eq]	Urban population [%] most recent data	Urban population [%] projection 2050
Poland	422,791.47	60.54	70.00
Portugal	71,977.89	63.47	76.85
Romania	126,194.42	54.56	66.84
Slovakia	48,551.75	53.60	63.35
Slovenia	21,513.48	49.65	60.57
Spain	353,857.39	79.58	86.27
Sweden	68,780.33	85.82	90.34
United Kingdom	568,061.83	82.59	88.60

Map 7: Urban Content in NDCs: Europe



4

CONCLUSION AND RECOMMENDATIONS

The results of this study are encouraging: 113 out of 164 NDCs (69%) show urban content, indicating a significant effort to ensure sustainable urbanization. NDCs reflect national circumstances: they mirror the diversity of national challenges, as well as the collaboration and support necessary to effectively implement the targeted policies. Many Parties provide additional information, on support needs for implementation of NDCs, including domestic, international finance, technology transfer and development, and capacity-building support (United Nations 2015a).

These findings are significant and encouraging for both national urban and climate policy. Given the anticipated trends of urbanization across the world, particularly in Africa and Asia, it is very positive to see so many rapidly urbanizing countries in these regions addressing urban issues in their NDCs - 83% of NDCs from the Asia region and 77% from the Africa region have urban content.

Cities, we believe, will be critical in meeting national emission reduction and adaptation targets, and ultimately contributing to the achievement of the Paris Agreement as a whole. The prioritization seen in this first release of NDCs demonstrates strong national interest and attention to addressing mitigation and adaptation in urban environments.

The analysis of NDCs should continue, as the present findings represent just a modest first scan of the subject matter. It will require not only a more in-depth analysis of NDC content, but also a close monitoring of how countries are beginning to turn their NDCs into implementation plans, and ultimately into national policies, plans and actions.

Lessons from this analysis are as follows:

- 1. There is potential for NDCs to be used as strategic tools** for the integration and coherence of sustainable urban development and climate action. The New Urban Agenda recognizes the link between good urbanization, development, and addressing climate change. National urban policy and vertical integration of climate action will be necessary to realize the potential of urban emission reductions. Further specification and inclusion of urban content in NDCs through periodic reviews could play a significant role in encouraging urban related adaptation and mitigation across various levels of governance.
- 2. Place matters.** Urban climate change mitigation and adaptation action ultimately depend on the concrete location and spatial form. The variations in the countries' urbanization profiles, from fully urban such as city states, to highly urbanized and stagnating, to less urbanized but rapidly urbanizing **requires place-specific solutions**. There is a tremendous diversity in challenges, potentials, priorities and needs depending to the institutional, cultural and spatial structure, which varies tremendously across countries.
- 3. The role of NDCs in the integrated and national policy environment requires more analysis,** particularly the information on technical, financial capacities and governance. While NDCs have been developed, sometimes in rather short periods of time, in order to meet the conditions of the Paris Agreement, they will very likely begin to play a broader role in national policy and dialogue. Therefore, further understanding is needed on the role they will play in the multi-level systems and governance realities and how they can be integrated into existing in-country frameworks. This understanding is crucial to achieve greater policy coherence.

4. There is need for more research on cities and climate change, both on mitigation as well as urban vulnerability and resilience to climate change effects. Research can aid member States in identifying further GHG reduction potential, strengthening commitments of NDCs, as well as improving effectiveness and reducing costs of action.

All the above has significant relevance for the country's climate change action and urban development. Thus, it is important to note the general recommendations, while recognizing the diversity of specific cases and their contexts.

4.1. POLICY DEVELOPMENT

4.1.1. Policy Coherence – horizontal alignment at the national level

Ideally NDCs frame national climate change policies that facilitate their implementation. Therefore ensuring policy coherence between the new national commitments on the one hand, and existing national and sub-national climate and sectorial policies on the other, is critical. Streamlining various policies, particularly those governing sectors with high mitigation and adaptation potential in a country, is paramount to effective and efficient climate action, as is supportive fiscal policy.

Not all Parties have yet prepared the various national strategies, plans required to implement their NDCs. This will need to be carefully monitored. Beyond the intersection of climate change mitigation targets and urban policy, sectorial policies such as those that focus on energy, water, waste, disaster risk management, public infrastructure and the housing sector should also be considered. Sectorial policies should be harmonized as well.

4.1.2. Policy Coherence - vertical integration

Given each country has its own unique governance system, including coordination and harmonization mechanisms, policy integration and coherence will not only need synchronization of national climate policy with sectorial policies, but also with other levels of government, i.e. regional and/or local. Vertical integration of climate action into the different scales of government is important for effective urban climate action, as many actions depend on various levels of government and often are to be taken locally. Definition of roles and responsibilities of actors, their access to resources, and the harmonization of goals and targets, in particular in the institutional and governance environments are of crucial importance.

“An urban paradigm shift ... will ... recognize the leading role of national governments, as appropriate, in the definition and implementation of inclusive and effective urban policies and legislation for sustainable urban development, and the equally important contributions of sub-national and local governments, as well as civil society and other relevant stakeholders, in a transparent and accountable manner” (New Urban Agenda: Principles and Commitments: 15)

National institutional set-ups, relations between government levels and other stakeholders, and stakeholders' institutional capacities, are vital considerations for effective and appropriate vertical policy integration. Such issues generally lie outside of NDCs. They are therefore subject to other strategies, and dependent on existing levels of decentralization and subsidiarity. Effective urban climate action can be achieved in many ways, but may require an institutional setup that allows for the inclusion and participation of the broadest possible coalition of actors.

4.1.3. Integration of further international agreements: Paris, SDGs and the New Urban Agenda

Along with the Paris Agreement which came into force in November 2016, there are a number of additional international agendas that member States are beginning to harmonize with other national policies. The 2030 Agenda for Sustainable Development and the New Urban Agenda, outline additional commitments that seek integration into national policies, plans and strategies by member States.

The 2030 Agenda for Sustainable Development includes 17 Goals. The Agenda provides broad opportunities for a lateral alignment of international environmental and development policy goals. There are a total of 169 Targets underlying the 17 Goals, which have associated key performance indicators. Within the Goals there are a number of clear and direct references to cities and climate change, while other references are only indirect. Examples of direct references are:

- **Goal 7** calls for a target of double the global rate of improvement in energy efficiency by 2030.
- **Goal 9** targets resilient and sustainable infrastructure, alongside increased resource-use efficiency.
- **Goal 11** on “Sustainable Cities and Communities” explicitly outlines urban targets.

- **Goal 12** calls for a shift in consumption patterns and greater efficiency in production, including the removal of incentives that encourage wasteful consumption of natural resources.
- **Goal 13** points towards the need for integration of climate change measures into national policies, strategies and planning.

The SDGs therefore clearly provide opportunities for synergy with the Paris Agreement and also opportunities for integration of national and sub national policies. The need for recognizing and addressing the cause and impacts of climate change while achieving developmental goals has been outlined in a number of NDCs. India for example states how the aspirational goals of providing energy access and housing for all by 2022 and the elimination of malaria by 2030 (NDC: India. pg.22), can be achieved through climate action.

Additionally the New Urban Agenda is another key agreement, which aims to transform the urbanization model and paradigm in the 21st century. Climate change is integral to the vision of the agenda, as outlined in section g.

“We envisage cities and human settlements that:(g) adopt and implement disaster risk reduction and management, reduce vulnerability, build resilience and responsiveness to natural and man-made hazards, and foster mitigation and adaptation to climate change” (New Urban Agenda, Section 13g).

Section 14C of the Urban Agenda highlights the need for achieving urban environmental sustainability in cities and the required principles to achieve this vision. The recognition of ecosystems and biodiversity, and a broader harmonization with nature, is integral to ensuring the sustainable use of land and resources. Additionally, ensuring urban resilience and promoting disaster risk reduction, is essential to urban adaptation to climate change. To ensure these principles are achieved, the following two approaches are outlined:

- Implementation of inclusive and effective urban policies and legislation for sustainable urban development, and the contribution of subnational and local governments, civil society and relevant stakeholders, in a transparent and accountable manner (UN-Habitat 2016b Section 15b).
- Integrated urban development based on the primary

drivers of change, including, multi-stakeholder partnerships, appropriate checks and balances, mechanisms that empower, long-term territorial planning and design, and innovative financing frameworks and instruments (UN-Habitat 2016b Section 15b).

4.2. IMPLEMENTATION

4.2.1. Implementation of national strategy at local level

Site specific implementation, local action and community engagement is a critical aspect of successful Paris Agreement implementation. Effective participation has two significant benefits. Firstly it equips participants with information and empowers them through the opportunity to influence decision-making. At the same time these participatory processes allow relevant local knowledge and experience to be captured (UN-Habitat 2015b). This is an ongoing process whereby engagement begins early on and continued with implementation, through outreach and education programs. The importance of indigenous and local knowledge is highlighted in a number of NDCs included in this analysis, particularly within the rapidly urbanizing regions of Africa and Asia. Therefore any efforts to vertically integrate NDCs with sub levels of governance should ensure that participatory processes are included. Additionally, it is unclear how local capacity can assist or impede NDC implementation. A variety of approaches to climate policy implementation have already been seen across member States.

4.2.2. Call for support regarding finance, capacity and technology

In order to develop effective urban climate action, institutional capacity and readily mobilized resources are required. This process can be improved through technological transfer and exchange of knowledge. This analysis has highlighted that many countries do not refer to urban related capacity building or identified specific urban financial requests. A small number of countries have made specific requests for institutional support, especially to address urban challenges, including Parties with high and medium urban content. The climate change challenges of mega-cities may be structurally different from those of small towns, as well as their institutional, financial and technological capacity. It is therefore recommended to explicitly state the demands not only of cities, but of different urban categories in order to specifically target the limiting factors for each of those.

4.3. SECTORAL ISSUES

The importance of urban areas as a focus of national mitigation and meeting the targets set out in the Paris Agreement is due to the contribution of GHG by cities. Cities account for 3% of global land cover, yet consume a disproportionate amount of materials and energy (UN-Habitat 2016b).

While this review has focused on explicit urban content in NDCs, we are mindful that, even without this specific mention, certain sectors are relevant for urban areas. In reviewing all NDCs for sector specific content, we have found that even NDCs without specific urban reference have included sectorial content that may have an urban relevance. Figures 22 and 23 highlight the correlation between the different generic mitigation and adaptation priorities identified within submitted NDCs.

When looking at the Mitigation Priorities in all NDCs, we found a strong correlation between the identification of the energy production and transport, as well as reduction of non CO₂ GHG. All four sectors can be considered as relevant to urban environments.

When looking at the Adaptation Priorities in all NDCs, we found correlations between food security, land use management, and adaptation measures concerning vulnerability and disaster risk reduction, biodiversity/ ecosystem conservation and water management. At a first glance, the priorities seem to suggest broader national considerations and are not pointing towards urban environments.

Figure 18: Correlation of Mitigation Priorities in all NDCs

CORRELATION CHART OF MITIGATION PRIORITIES	Energy Production	Transport	Building Sector	Waste Management	Water Management
Energy Production	148	108	45	99	16
Transport		110	42	76	15
Building Sector			45	34	6
Waste Management				104	12
Water Management					16

Figure 19: Correlation of Adaptation Priorities in all NDCs

CORRELATION CHART OF ADAPTATION PRIORITIES	Food Security	Land Use Management	Vulnerability & Disaster	Water Management	Improved Government
Food Security	91	69	89	89	57
Land Use Management		52	64	66	39
Vulnerability & Disaster			78	73	57
Water Management				59	41
Improved Government					50

4.4. RESEARCH RECOMMENDATIONS

This present research of the urban content in NDCs has shown that these national documents are a useful tool in assessing national priorities and identifying entry points for support and assistance requests. NDCs are an emerging tool that can be used to integrate climate change policies across governance systems in a way which will improve structural approaches. Research should continue to focus on NDCs with the aim to identify ways to improve their effectiveness and strengthen their role in linking policies and meeting international targets. We suggest further research on NDC content and related implementation frameworks. Specific research recommendations for improving and promoting urban climate action include:

1. Further understanding of the coherence of climate change policies, both horizontally and vertically (see section 3.1), as well as the integration of mitigation and adaptation measures with urban policies, plans and strategies.
2. The role and linkages of NDCs in the implementation of the New Urban Agenda and the 2030 Agenda for Sustainable Development.
3. The impact of local level climate change governance and policy, mindful of national circumstances and structures.
4. The role and contribution of the plurality of actors, both State and non-State, in designing and implementing vertically integrated projects, which address and support adaptation and mitigation.
5. The role of the private sector in managing projects and directing investment to address climate change in urban areas.

REFERENCES

CCFLA 2015, State of City Climate Finance 2015. Cities Climate Finance Leadership Alliance, CCFLA. New York

Ellis, Peter & Roberts, Mark. 2016. Leveraging Urbanization in South Asia : Managing Spatial Transformation for Prosperity and Livability. Washington, DC: World Bank.

IPCC 2014a. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva.

IPCC 2014b. Climate Change 2014: Impacts, Adaptation and Vulnerability. Working Group II contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva.

NEW CLIMATE ECONOMY 2016, The Sustainable Infrastructure Imperative. Washington.

SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY. 2012. Cities and Biodiversity Outlook. Montreal, Canada.

UNEP 2006, Pacific Island Mangroves in a Changing Climate and Rising Sea – UNEP Regional Seas Reports and Studies No. 179. Regional Seas Programme, Nairobi, Kenya.

UNEP 2011, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication, https://www.unep.org/greeneconomy/sites/unep.org/greeneconomy/files/field/image/green_economyreport_final_dec2011.pdf, last accessed 2 August 2017

UN-HABITAT 2015a. HABITAT III Issue Paper: Urban Resilience. New York.

UN-HABITAT 2015b. Guiding Principles for Climate City Planning Action. Nairobi.

UN-HABITAT 2016a. Habitat III: New Urban Agenda. Quito Declaration on sustainable cities and human settlements for all. Quito:

UN- HABITAT 2016b. World Cities Report 2016. Urbanization and Development: Emerging Futures. Nairobi

UNFCCC 2015a, Synthesis report on the aggregate effect of the intended national determined contributions, Report of the Ad Hoc Working Group on the Durban Platform for Enhanced Action, Paris, United Nations.

UNFCCC 2015b, Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. Paris, United Nations.

UN DESA 2015. World Population Prospects: The 2015 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP.241.

WHO 2016, WHO's Urban Ambient Air Pollution Database – update 2016. Online (Last accessed 7th Sept 2017).

ANNEX 1

Table 6: World: List of Countries according to Clusters A, B and C.

Cluster A (Total: 26)	Cluster B (Total: 84)	Cluster C (Total: 50)
Armenia	Afghanistan	Albania
Bahamas	Algeria	Andorra
Bahrain	Argentina	Angola
Bangladesh	Azerbaijan	Antigua and Barbuda
Benin	Barbados	Australia
Bhutan	Belize	Belarus
Burkina Faso	Bolivia,	Bosnia and Herzegovina
Cameroon	Brazil	Botswana
Central African Republic	Brunei Darussalam	Canada
Chad	Burundi	Comoros
China	Cabo Verde, Republic of	Cook Islands
Côte d'Ivoire	Cambodia	Democratic People's Republic of Korea
El Salvador	Chile	Ecuador
Ethiopia	Colombia	European Union
Gambia	Congo	Grenada
Ghana	Costa Rica	Guinea-Bissau
Guinea	Cuba	Guyana
Haiti	Democratic Republic of the Congo	Honduras
India	Djibouti	Iceland
Lao People's Democratic Republic	Dominica	Iran , Islamic Republic of
Nigeria	Dominican Republic	Kyrgyzstan
Saudi Arabia	Egypt	Liechtenstein
Sri Lanka	Equatorial Guinea	Mali
Togo	Eritrea	Mauritania
Venezuela, Bolivarian Republic of	Fiji	Mauritius
Viet Nam	Gabon	Micronesia, Federated States of
	Georgia	Montenegro
	Guatemala	New Zealand
	Indonesia	Niue
	Israel	Norway
	Jamaica	Oman
	Japan	Pakistan
	Jordan	Paraguay
	Kazakhstan	Philippines
	Kenya	Republic of Korea
	Kiribati	Russian Federation
	Kuwait	Samoa
	Lebanon	San Marino
	Lesotho	Senegal
	Liberia	Serbia

Cluster A (Total: 26)	Cluster B (Total: 84)	Cluster C (Total: 50)
	Madagascar	Seychelles
	Malawi	Swaziland
	Malaysia	Tajikistan
	Maldives	FYR Macedonia
	Marshall Islands	Thailand
	Mexico	Trinidad and Tobago
	Monaco	Tuvalu
	Mongolia	Ukraine
	Morocco	United States of America
	Mozambique	Zimbabwe
	Myanmar	
	Namibia	
	Nauru	
	Nepal	
	Niger	
	Palau	
	Panama	
	Papua New Guinea	
	Peru	
	Qatar	
	Republic of Moldova	
	Rwanda	
	Saint Kitts and Nevis	
	Saint Vincent and the Grenadines	
	Sao Tome and Principe	
	Sierra Leone	
	Singapore	
	Solomon Islands	
	Somalia	
	South Sudan	
	Sudan	
	Suriname	
	Switzerland	
	Tonga	
	Tunisia	
	Tanzania, United Republic of	
	Turkey	
	Turkmenistan	
	Uganda	
	United Arab Emirates	
	Uruguay	
	Vanuatu	
	Yemen	
	Zambia	

**SUSTAINABLE
URBANIZATION**
IN THE **PARIS**
AGREEMENT

Comparative review of
Nationally Determined
Contributions for
Urban Content

HS Number: HS/065/18E

UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME

P.O.Box 30030, Nairobi 00100, Kenya;

Tel: +254-20-7625159; Fax: +254-20-7625015;

infohabitat@unhabitat.org

www.unhabitat.org/publications

#weareclimatechange