RESILIENT CITIES, THRIVING CITIES: THE EVOLUTION OF URBAN RESILIENCE

ICLEI Local Governments for Sustainability

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Resilient Cities 2019
10th Anniversary

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ABOUT ICLEI

ICLEI – Local Governments for Sustainability is a global network of more than 1,750 local and regional governments committed to sustainable urban development. Active in 100+ countries, we influence sustainability policy and drive local action for low emission, nature-based, equitable, resilient and circular development. Our Members and team of experts work together through peer exchange, partnerships and capacity building to create systemic change for urban sustainability.

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FOREWORD

Ten years ago, ICLEI – Local Governments for Sustainability launched the first Resilient Cities Congress in Bonn, Germany to respond to what we saw as a growing and largely unaddressed need of local and regional governments to plan for the uncertain impacts of climate change in an integrated manner. The outlook was bleak. Months prior, in 2009, the world political leaders had failed to reach a meaningful international climate agreement at COP15 in Copenhagen.

At the time, resilience was a relatively new concept in the international community, often used as a synonym for climate change adaptation. Indeed, during these 10 years, it has become painfully clear that climate change risks and hazards are not a distant threat, but a very present reality with highly localized consequences.

Climate change is a global problem, but its disastrous consequences are concentrated in urban areas and disproportionately affecting the poor and disadvantaged populations. Local governments must respond to non-climate related issues, such as earthquakes, economic crises, and socio-political conflicts. For these reasons, cities and their stakeholders have a crucial role and responsibility to integrate climate change adaptation and socio-economic considerations into an overarching resilience strategy.

Since our first Resilient Cities Congress in 2010, resilience has gone from a fringe topic to a mainstream policy approach at all levels. Today, 20 percent of ICLEI Members are adopting planning approaches that consider mitigation, adaptation, and sustainable urban development together.

In addition, more cities have completed their initial risk assessments and planning stages and are moving towards implementation.

Resilient development requires strong efforts of collaboration among all levels of government. With the Paris Agreement specifically naming the role of local governments in the fight to tackle climate change, as well as the 2030 Agenda for Sustainable Development, the SDGs, and the Sendai Framework, local and regional governments have now a central role as partners to nations to achieve various sustainability and resilience targets set by the international community.

Through the lens of the Resilient Cities Congress series, this report provides an appraisal of the state of resilient cities from the last ten years, as well as actions of the main players in the field of urban resilience. We hope that it will serve as a reference for political leaders, practitioners, funders and representatives of the international community and civil society involved in urban resilience and sustainable development, and as inspiration for the next decade.

Finally, we are grateful for the long-standing and invaluable contributions of our host City of Bonn, Patrons, supporting and endorsing partners, and participants to the success of the Resilient Cities Congress through the past decade.

Gino Van Begin
Secretary General
ICLEI – Local Governments for Sustainability

URBAN RESILIENCE THROUGH THE ICLEI LENS

The world has become predominantly urban, and cities are the place where the main challenges of sustainable development are being tackled. Although only occupying 2 percent of the land, cities are responsible for 70 percent of global GDP, greenhouse gas emissions (GHG), and global waste and over 60 percent of global energy consumption (UN-Habitat, 2016).

Because 70 percent of the population will live in urban areas by 2050, cities have a great opportunity to become unique hubs for services that fulfill the promise of inclusion and better social and economic opportunities for all. However, unplanned or mismanaged development and the increasing impacts of climate change and social conflict can put a severe pressure on urban systems, unleashing long-term stresses on basic components and exposing weaknesses to the disruptive impacts of multiple shocks.

A decade ago, the concepts of urban resilience and climate change adaptation were often used interchangeably. The resilience literature, however, shows different definitions in natural sciences, social sciences, psychology, and engineering. ICLEI opted for a broader, more integrated approach, defining urban resilience as the ability of cities to anticipate, prevent, absorb and recover from shocks and stresses, and to improve essential basic response structures and functions, while integrating the different aspects of urbanization, sustainability, development, and climate change.

A **resilient city** is prepared to absorb and recover from any shock or stress while maintaining its essential functions, structures, and identity as well as adapting and thriving in the face of continual change. Building resilience requires identifying and assessing hazard risks, reducing vulnerability and exposure, and lastly, increasing resistance, adaptive capacity, and emergency preparedness.

Resilience responds to shocks and stresses brought about by rapid environmental, technological, social and demographic changes, which can be caused by natural phenomena (flooding, earthquake, and epidemics), anthropogenic hazards (oil spill, radiation, system breakdown) or socio-economic crisis (political and social conflict, terrorism, economic crisis).

These shocks and stresses can affect one or multiple urban systems, such as food networks, energy grids and urban transportation, with possible spillover effects on the city-region territory. Yet, such interaction and interdependence of urban systems can be leveraged to take advantage of their co-benefits and complementarity, and realize synergies in the broader context of sustainable development.

The holistic meaning of resilience, its cross-cutting application and forward-looking approach has driven ICLEI to include Resilient Development among its five sustainability pathways.

The five ICLEI pathways towards low emission, nature-based, equitable, resilient and circular development are designed to create systemic change and were launched during the ICLEI World Congress 2018 in Montréal, Canada. The pathways provide a holistic framework for designing integrated solutions that balance the patterns of human life and the built and natural environments.

SHAPING THE DEBATE ON URBAN RESILIENCE AND ADAPTATION

To raise global awareness and help local governments tackle their resilience challenges, ICLEI launched the Resilient Cities Congress series in 2010, bringing local resilience to a world stage for the first time. The Congress provided a ten-year platform to track the evolution of the global resilience debate, and raise global awareness, especially among local and regional governments, about urban resilience.

The Resilient Cities Congress has been the annual global forum on urban resilience and adaptation convened in Bonn, Germany from 2010-2019. The Congress has provided an international platform to share the latest knowledge, good practices, challenges, and innovations for creating more resilient cities. It has also served as an annual meeting point to track local progress on the resilience targets of Sustainable Development Goal 11 to make cities inclusive, safe, resilient, and sustainable.

Over the course of ten years, these discussions fueled a decade of peer learning and exchange. Throughout the lifespan of the Resilient Cities Congress, the number of participants as well as experts and practitioners in the field continued to grow, allowing for increasingly robust learnings and exchange for cities and regions working to build local resilience around the world.

ICLEI, its network of cities and regions, and the community of resilience practitioners have contributed to a growing array of topics, challenges and opportunities in the global resilience debate, and are now looking forward to scale up efforts to leverage this momentum and foster implementation on the ground.

EVOLUTION AND PROGRESS

The Resilient Cities Congress was the first platform for exchanging knowledge and experiences on urban resilience. Over the course of ten years, urban practitioners and researchers have discussed key themes, such as the essential definition of resilience, and how to plan, finance, implement and measure the progress of urban resilience. The Congress has also provided a space for emerging topics, such as digitalization, food systems, and social cohesion under the resilience banner.

From 2010 to 2019, the Congress served as a space for discussion on urban resilience across major global sustainability agendas: The transition from the Millennium Development Goals (MDGs) to the 2030 Sustainable Development Agenda and its Sustainable Development Goals (SDGs), the Paris Agreement on Climate Change, the Sendai Framework for Disaster Risk Reduction 2015-2030, and the New Urban Agenda.

The Congress has witnessed the evolution of diverse commitments, such as the launch of the Making Cities Resilient (MCR) Campaign of the United Nations Office for Disaster Risk Reduction (UNDRR) in 2010 and the Durban Adaptation Charter in 2011. It facilitated the establishment of new multi-stakeholder partnerships and initiatives, such as the joint UN Environment-ICLEI Insurance Industry Development Goals for Cities, a framework to bring insurers' expertise closer to local and regional governments' needs, and served as a convening space of the Medellín Collaboration for Urban Resilience (MCUR).

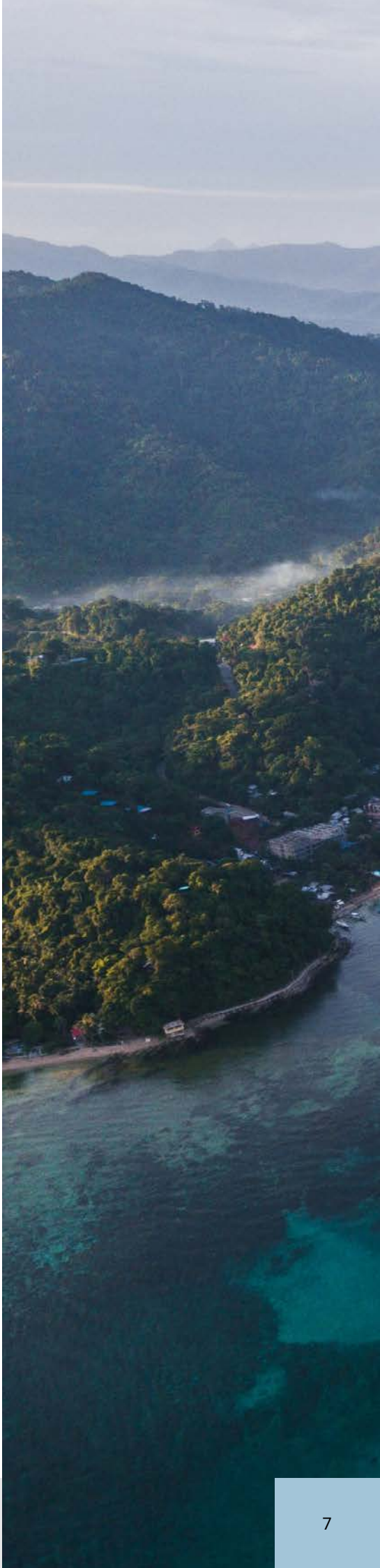
The Congress also helped to detect gaps between national governments' sustainability commitments and local and regional governments' sustainability potential but limited capacity, through multi-level governance initiatives like the Cities and Regions Talanoa Dialogues (see page 10). The need for regional dialogues fostered the creation of geographically defined platforms, such as the European Urban Resilience Forum or Open European Day in 2013 and the annual ICLEI Resilient Cities Asia-Pacific series in 2015.

GOVERNANCE AND URBAN RESILIENCE

Achieving inclusive, safe, resilient, and sustainable cities for all requires local government officials to recognize the interdependence of global goals and local actions and follow an integrated vision for development and urban resilience-building. Such an approach demands a paradigm shift in the way governance structures are managed not only between national and local governments but also between local governments, communities, and private actors (ICLEI, 2016).

Several key governance principles to guide the way toward a sustainable and resilient future have been identified during the ten years of the Resilient Cities Congress (ICLEI, 2017), namely:

- **Create opportunities for regular resilience dialogues** between various levels of government (e.g. on the implementation of the Nationally Determined Contributions (NDCs) or the development of the National Adaptation Plans (NAPs)), public and private sector actors (e.g. insurance), representatives from different sectors (e.g. health and transport), and community members.
- **Local context is key**: Implementation of global goals should be adapted to the specificities and needs of each individual urban space and its communities.
- **Give preference to integrated actions** that yield cross-cutting co-benefits.
- **Make the business case by showing the economic value** of local resilience initiatives.
- **Resilience planning is often experimental** and can accelerate action with flexible policy, investment mechanisms, and knowledge-sharing between governments and partners on successes and failures.
- **Turn disasters into opportunities** to raise awareness and motivate stakeholder engagement in resilience planning.
- **Leave time for trust-building**: Holistic approaches depend on the support and ownership of multiple stakeholders and cultivating this takes time.
- **Information is not knowledge**, so further support is needed to curate and manage the wealth of tools and data available to guide local decision-making and future scenario-planning.
- **Plan for the unexpected**: The effects of shocks and stresses are increasingly unexpected, but inclusive, good governance practices can foster institutions and societies that are more resilient and ready to respond to unexpected new challenges.
- **Report progress locally and globally**, including successes, failures, barriers, and gaps to inspire others and replicate good practices.



GLOBAL COMMITMENTS TO STRENGTHEN URBAN RESILIENCE

The last ten years have been pivotal in moving the global community toward more sustainable, resilient, and inclusive societies. The adoption of major global agendas (see box below) has highlighted the commitment of national governments and international organizations to a sustainable and resilient development.

Such agendas have increasingly recognized and institutionalized the central role that local governments play in climate action. Local governments are closest to the people and their needs, enabling them to drive bottom-up approaches and address global challenges locally, where they have the greatest impact. Policy integration and coherence with the global agendas has progressively happened at the local level. Additionally, major international networks of local governments have undertaken joint advocacy in international policy processes and have supported their constituencies to implement programs and solutions to promote resilient development.

Global policy processes and commitments related to urban resilience and adaptation

2030 Agenda for Sustainable Development **(Agenda 2030)**
Year and place of adoption: 2015, UN Summit held in New York, United States
Leading organization: United Nations
Aim: To go further to end all forms of poverty by calling for action by all countries, poor, rich and middle-income to promote prosperity while protecting the planet and tackling climate change, through 17 Sustainable Development Goals (SDGs). The SDG 11 looks into making cities and human settlements inclusive, safe, resilient and sustainable.

Paris Agreement
Year and place of adoption: 2015, UNFCCC Conference of the Parties (COP 21) held in Paris, France
Leading organization: United Nations Climate Change (UNFCCC)
Aim: To strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change, giving relevance to adaptation and resilience.

Sendai Framework for Disaster Risk Reduction
Year and place of adoption: 2015, World Conference on Disaster Risk Reduction held in Sendai, Japan
Leading organization: United Nations Office for Disaster Risk Reduction (UNDRR)
Aim: To achieve the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries over the next 15 years.

New Urban Agenda **(NUA)**
Year and place of adoption: 2016, United Nations Conference on Housing and Sustainable Urban Development (Habitat III) held in Quito, Ecuador
Leading organization: United Nations Human Settlements Programme (UN-Habitat)
Aim: To provide a shared vision for a better and more sustainable urban future for both developing and developed countries. By readdressing the way cities and human settlements are planned, designed, financed, developed, governed and managed, the NUA tackles the issues of resilience, especially related to the urban poor.

Since its inception in 2010, Resilient Cities encouraged the political commitment of local and regional leaders to urban resilience. Building on the Global Cities Covenant on Climate "Mexico City Pact" (supported by ICLEI, the World Mayors Council on Climate Change, and United Cities and Local Governments (UCLG)), the Mayors Adaptation Forum at the Resilient Cities Congress (2011, 2013, and 2014) focused on the promotion and implementation of the Durban Adaptation Charter, aimed at fostering a more integrated approach on risks with a priority on vulnerable populations and building capacity locally, promoting a bottom-up driven approach in the design of strategies for sustainable and resilient urban development. The Mayors Adaptation Forum and the following yearly special meetings at Resilient Cities (Mayors' Lunch and Dinner) interacted with the UNFCCC global processes by bringing the voice of local leaders in the climate change discussions.

TEN YEARS OF RESILIENCE MILESTONES

2010

1st edition of the Resilient Cities Congress

UNDRR launches the MCR Campaign

Launch of the Global Cities Covenant on Climate or "Mexico City Pact"

2011

The Durban Adaptation Charter is adopted by 114 mayors from 28 countries

1st Mayors Adaptation Forum at the Resilient Cities Congress

2012

ICLEI creates the Resilience Portfolio holder position in its governance structure

2013

The Rockefeller Foundation launches the 100 Resilient Cities initiative (100RC)

1st ICLEI Open European Day

2014

The Medellín Collaboration for Urban Resilience (MCUR) is launched at the 7th Annual World Urban Forum (WUF) in Medellín, Colombia

2015

1st ICLEI Resilient Cities Asia Pacific Forum (RCAP) takes place in Bangkok, Thailand

Adoption of the 2030 Agenda for Sustainable Development

UN Sustainable Development Goal 11: Make cities inclusive, safe, resilient and sustainable

Adoption of the Paris Agreement

Adoption of the Sendai Framework

Cities Alliance Joint Work Programme (JWP) is launched

2016

Adoption of the New Urban Agenda (NUA)

2017

The Climate Summit of Local and Regional Leaders at COP23 addresses the challenges of urban resilience and climate adaptation

Launch of the C40 Adaptation Diplomacy project

2018

ICLEI announces the Resilient Development Pathway as part of its strategic vision

UNEP PSI and ICLEI launch the Insurance Industry Development Goals for Cities at the ICLEI World Congress

The Rockefeller Foundation launches the City Resilience Index (CRI)

UN-Habitat launches the Urban Resilience Hub at the 9th WUF in Kuala Lumpur, Malaysia, as well as the City Resilience Profiling Tool (CRPT)

2019

10th edition of the Resilient Cities Congress

C40 launches the 'Measuring Progress in Urban Climate Adaptation' framework

MULTI-LEVEL GOVERNANCE AND MULTI-STAKEHOLDER COLLABORATION

Over the last ten years, different levels of governments have strengthened cooperation among themselves, as well as with the private sector and civil society for the inclusive and informed planning and implementation of resilience. Greater and more efficient horizontal and vertical coordination efforts have been highlighted to provide enabling framework for local action and to align administrative and financial resources with the local level. Furthermore, this could interconnect deeper national urban policies, economic development and climate action.

VERTICAL INTEGRATION

The governance coordination gap between sub-national, national and international levels was one of the main concerns for the urban resilience community. To address this issue, over the past decade, new global initiatives have been created to improve institutional mechanisms for multi-level coordination. National urban policy and climate action must be interconnected strategic priorities that are integrated into national economic development policy and budgets.

With the adoption of the Paris Agreement and the Nationally Determined Contributions (NDCs), partnerships among all levels of government – and across sectors – have been fostered to enhance countries' level of climate ambition. In this regard, more attention from national and international levels in supporting urban resilience and local adaptation has been raised, especially in ensuring that national

policy equips local and regional governments with the necessary tools, capacity and resources to support the national commitments. Open dialogue and information sharing among all levels of government have been promoted during the Resilient Cities Congress to ensure that resilience and climate adaptation plans are based on real information around the risks and emissions profile in cities and surrounding regions. Alongside the Congress, several other platforms have helped to bring different actors closer together.

Since 2005, the Nairobi Work Programme (NWP) – a mechanism under the UNFCCC established at COP11 – has facilitated and catalyzed the development, dissemination, and use of knowledge that would inform and support adaptation policies and practices. More recently, the Climate Summit of Local and Regional Leaders – the official gathering of local and regional governments at COP23 (2017) – served as the springboard for key initiatives and partnerships to support implementation of the Paris Agreement, demonstrating that when cities, regions, businesses, communities and all levels of government join forces, it makes climate action stronger and more effective.

The Cities and Regions Talanoa Dialogues are a series of in-country climate consultations designed to kick off a collaborative process involving all levels of government. They convene national, regional and local governments to take stock of, shape and strengthen their NDCs, as well as engaging key climate actors within a given country. These consultations are part of the broader Talanoa Dialogue initiative launched at COP23, which served as an initial stocktaking exercise in 2018 to prepare for future NDC submissions.

COLLABORATION WITH THE PRIVATE SECTOR

Similarly, the Resilient Cities Congress encouraged collaboration with the private sector, such as service and technology providers, investors, insurers, think tanks and consulting agencies, to enhance transfer and exchange of technical expertise and to invest capital in adaptive infrastructure.

The Congress fostered discussions on challenges and barriers for effective collaboration, such as the need for sufficient and reliable data, risks, regulation, legislation, and policies. Businesses working on resilience technologies, services, and infrastructures have shared their experience and expertise in the planning and implementation of projects, while insurers and investors have shared the challenges and opportunities for funding and insurance. Local governments have shared the need to engage more effectively with the private sector to implement innovative technological solutions, reduce the risks of their investments, and fund resilient and adaptive infrastructure.

To facilitate this exchange, ICLEI is engaging the private sector in local sustainability and urban resilience projects that are meaningful for the communities. Such is the case of City-Business Collaboration Accelerator (CiBiX) workshops during Resilient Cities 2019, where the cities of Milan, Italy, and Malmö, Sweden, presented their specific challenges to businesses working in such fields.

FINANCING RESILIENCE AND INSURING CITIES

Institutional investors, national governments and local communities are increasingly promoting investments in climate action and sustainable development. However, a serious gap exists between the amount of money that can be profitably invested in these projects and the current investment level.

The International Finance Corporation estimates the climate investment potential in emerging markets at about 29.4 trillion USD (IFC, 2018). Such untapped potential is due to a shortage of projects that are robust enough in terms of bankability to be accepted and funded by financial institutions or the private sector. In other words, funds for climate projects are often available and investors are ready; the missing ingredients are bankable projects.

A bankable project is not just profitable – it quantifies the projected positive outcomes, such as social or environmental benefits, and has clear mechanisms for implementation and evaluation.

Too often local governments have limited financial literacy, which hinders their capacity to build projects attractive for investors and insurers. Similarly, the latter tend to place little importance on the specific needs and characteristics of local governments, effectively creating a working barrier.

As such issues became evident through the Finance Days, organized as part of the Congress since 2015, so did the actions to tackle them: Financial institutions and investors must adapt to new forms of financing if they wish to take advantage of the current development agenda. To ensure capital reaches places where it can have the greatest impact – both financially and socially – investors must combine traditional bankability criteria with the long-term objectives of state and community leaders, better understanding local needs and capacities. Local and regional governments must better embed key financial concepts, such as risk management and reduction, financial returns, implementation monitoring and evaluation of progress into their projects. This will help make a business case for attracting cash flows. Local and regional governments need to identify mixed sources for funding their resilience and sustainability projects (e.g. grants, private sector loans, bonds, taxes, etc.)

Investing in urban resilience is key to sustainable development, and the lack of financial and technical resources could hold cities back from pursuing a resilient future. The global need for urban infrastructure investment amounts to over 4.5 trillion USD per year, of which an estimated premium of nine percent to 27 percent is required to make this infrastructure low-emissions and climate resilient (The World Bank, 2019).

As a response to increasing disaster impacts, the importance of risk transfer and financial instruments such as climate risk insurance have been highlighted in the different global processes and commitments. Comprehensive climate risk management approaches are urgently needed to reduce, transfer and manage risks posed by climate change, especially in developing countries (Le Quesne

et al., 2017). In this regards, Resilient Cities has been a platform for local and regional governments to understand the state of discussion relating to the insurance industry's role in integrated disaster and climate risk management. To support them, ICLEI has become partner of different initiatives to improve the dialogue around financial protection to disasters, such as the InsuResilience Global Partnership and the UNEP FI Principles for Sustainable Insurance (PSI).

"After a year-long global consultation involving insurance industry leaders, mayors and other local government leaders, and key stakeholders, the Insurance Industry Development Goals for Cities were launched in Montréal on 22 June at the ICLEI World Congress 2018. The goals set the global agenda for the industry and cities in the context of economic, social and environmental sustainability – or sustainable development." (UNEP, 2018)

The Finance and Insurance Forums in Resilient Cities 2017 and 2019 and the Insurance Track in 2018 (in collaboration with UNEP PSI, InsuResilience, Advancing Climate Risk Insurance Plus) brought together financial institutions and local leaders to discuss the gaps and barriers for local governments to access funding for adaptive infrastructure and resilience projects. In these knowledge exchanges, the key outcomes of financing resilience and insuring resilient cities include:

- **Finance mechanisms should enable local and regional governments to access funds** that directly support their objectives. Local and regional governments need better access to national and international funding, private finance, and markets.
- **Local and regional governments need to build capacity to increase their finance literacy, understand finance requirements, identify opportunities, and build financeable projects**. Intensive support for project preparation (e.g. data collection and prefeasibility studies) is crucial.
- **There is a need to create an enabling environment for investment** at the local level by reducing uncertainty and communication barriers between local and regional governments and financial institutions. Existing national barriers for direct investment in cities should be lifted.
- **Investors and donors need to have confidence** in order to invest. Therefore, local and regional governments need to demonstrate their capacity to manage funds effectively and provide a strong evidence supporting their projects.
- **Reconciling the different perspectives and priorities** between sectors, building trust, and establishing a common language is important for effective public-private-community partnerships.
- **National climate action plans and financing mechanisms should be customized** to match the priorities of local and regional governments and their communities.
- **Mitigation and resilience are both smart investments** contributing to long-term social and economic development, which is why cities continue to mobilize their own funding in the absence of external sources.
- **Further quantification of adaptation's benefits**, such as avoided costs, insurance savings and increased property value, is needed to make the business case to other public and private actors.

The Transformative Actions Program (TAP) catalyzes and improves capital flows to cities, towns, and regions, and strengthens their capacity to access climate finance and attract investment for urban infrastructure to adapt to the effects of climate change. By supporting local governments to prepare bankable projects to access finance, the TAP helps the implementation of urban resilience projects.

EVIDENCE-DRIVEN RESILIENCE PLANNING AND ACTION

Data gathering, data analysis and scientific knowledge are a valuable source of information for local and regional governments in designing and assessing their resilience strategy. Collaboration between scientists, data analysts and policymakers is essential to evidence-driven, data-based urban resilience planning and decision-making.

The growing availability of data provides significant opportunities for urban planning and design. Planning for resilience requires methods of working with data and systems which can be easily translated to decision-makers to develop evidence-based, replicable practices, and easily-communicated scenarios that can inform the resilience planning process (Langenheim et al, 2017).

To do this, local and regional governments, the research community, and the private sector have increased collaboration and strengthened partnerships to develop systems for environmental analysis, predictive modelling and planning support using data collected from official channels, as well as crowd-sourcing. Some of these systems not only inform the planning process, but can also be used to provide real-time and vital information to citizens in the case of emergency or disaster.

Yet, many local and regional governments – especially in the Global South – lack the capacity and resources to either collect, organize, and systematize adequate and reliable data on their hazards and vulnerabilities, or to elaborate their wealth of information in a scientific and coherent manner.

Indeed, while data have generally become easier to obtain, especially through the use of satellite systems and earth observation techniques, their growing size and complexity has augmented their acquisition costs and elaboration skills. To help municipalities overcome such barriers, the Resilient Cities Congress has encouraged and facilitated partnerships with researchers and universities, which could provide the crucial capacity and expertise local and regional governments often need.

Other sources of data discussed at the Congress include data collected directly from informal settlements, which provide useful qualitative on the ground information about neighborhood-level risks. This data can be gathered through traditional data collection mechanisms, such as field surveys, but also through increasingly common means such as SMS and mobile applications. In 2016, Resilient Cities focused on building capacity of local governments to identify and reduce risks, as well as on improving participatory mechanisms to build the resilience in slums and other informal settlements.

Additionally, the Congress has premiered some ICLEI-developed methodologies to plan and act holistically in different climate fronts: integrated climate action (low emission and climate resilient development) and urban resilience. Based on the blueprint of the GreenClimateCities (GCC) Program, this family of ICLEI methodologies offers a step-by-step guide to plan, implement, and accelerate urban development policies, plans, and processes. They include a wide range of resources, tools and guidance notes to support local and regional governments to reach climate neutrality and achieve long-term resilience. Through robust Measuring, Reporting and Verification (MRV) processes, ICLEI's process methodology supports local and regional government in tracking their actions and commitments, remaining accountable and increasing efforts to reach their sustainability and resilience goals.

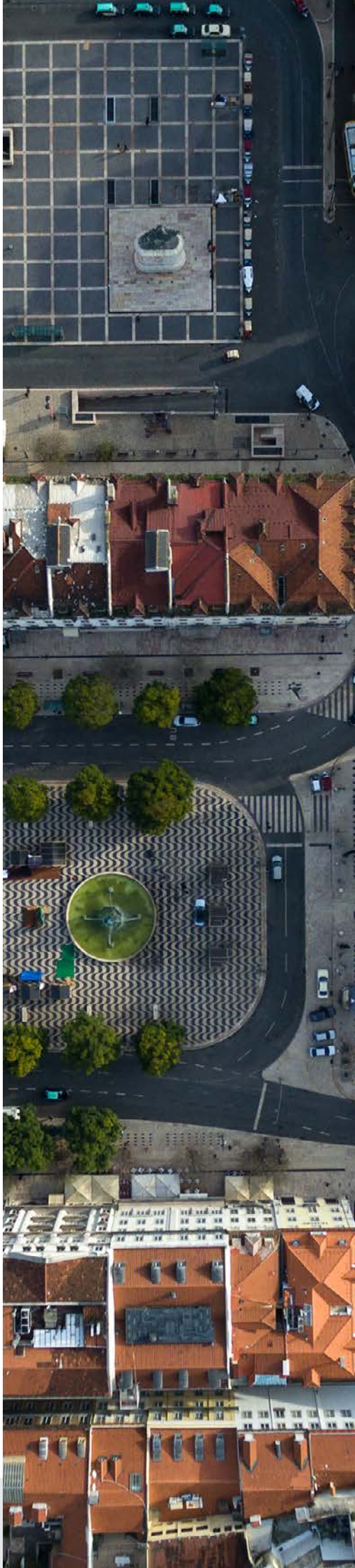
The #CitiesIPCC campaign tackles the challenges of adaptation and mitigation in cities through science-policy dialogue. This campaign was created after the 2018 Cities and Climate Change Science Conference (CitiesIPCC) in Edmonton, Canada, which highlighted how national and sub-national climate commitments could enhance the scientific evidence of adaptation and mitigation opportunities in cities.

The CitiesIPCC outlined a number of outcomes to foster science-policy dialogue for ambitious climate action:

- A global research agenda on cities and climate change that advances climate change science and gives recognition and visibility to the knowledge generated by urban stakeholders;
- Enhanced understanding of the impacts of climate change at the urban level, the range of possible responses and the role of cities in the implementation of the Paris Agreement; and
- Better informed climate decision-making at the local level, as a result of improved relations between the policy, practice and the scientific communities working on/in urban areas, through new projects, platforms and partnerships.

Last, ICLEI created a stocktaking document based on aggregated data by cities and regions, providing a strong, evidence-based justification for adaptation diplomacy.

"Data speak louder than words" Report (2018) gives voice to cities and regions in the 2018 national stocktaking exercises on climate change and sustainable development. It is an actionable document that supports knowledge advancement on adaptation and strengthens efforts in urban climate resilience planning. The report presents key findings for informing action in climate change adaptation and resilience at all levels of government, furnishing clear, data-based, evidence-driven messages for adaptation diplomacy in major international processes.



MAINSTREAMING URBAN RESILIENCE IN THE SUSTAINABILITY AGENDA

While science-based multi-level and multi-stakeholder resilience building and financing are core topics in the resilience debate, several others have proven to crucially benefit urban resilience. Among these, the topics that have found a unique space in the Resilient Cities Congress and significantly enriched the discussions are: nature-based solutions, sustainable mobility, food systems, circular development, social cohesion and digitalization. This section of the report aims to connect urban resilience to the broader sustainability agenda.

NATURE-BASED SOLUTIONS AND RESILIENT CITIES

Both national and subnational governments are increasingly implementing nature-based solutions to strengthen resilience. Because of their potential to safeguard biodiversity, increase the attractiveness and quality of life in urban areas, and reduce cities vulnerabilities to numerous shocks and impacts caused by climate variability, nature-based solutions are gaining traction. ICLEI incorporates nature-based development as one of its five development pathways, encouraging decision makers to prioritize healthy local environments in which air, water, soil and all natural resources that sustain life and health are protected and nurtured. But what exactly are nature-based solutions and why are they enjoying such momentum?

Nature-based solutions include actions taken to restore, protect and manage natural ecosystems, as well as to imitate the work of nature for social benefit. They can serve different purposes: protecting existing ecosystems and biodiversity; leveraging ecosystems to supply or increase a particular service they provide; and offering economic and social opportunities, such as creating jobs or mitigating and adapting to climate change. In addition, their cost-effectiveness often makes very favorable business cases.

Nature-based solutions and their connection with biodiversity can also help to achieve most of the UN Sustainable Development Goals. For example, they can help protect life below water and on land (SDG 14 and 15, respectively) and strengthen healthy ecosystems rich in biodiversity. This in turn can stimulate economic activities and growth (SDG 8), with positive ramifications on food production (SDG 2) and poverty reduction (SDG 1). Their implementation and spillover effects on job creation can also empower women (SDG 5) and help tackle inequalities (SDG 10).

The rich theme of nature-based solutions always found a home in the agenda of the Resilient Cities Congress. During the past decade, actions aimed at nature protection and biodiversity conservation were taken mainly as a precaution against extreme environmental degradation. Gradually, local governments have also begun to appreciate the benefits and cost-effectiveness of bringing nature back to cities, as well as the importance of preserving local fauna and flora. For example, the ability of soil to filter water has been leveraged by Copenhagen and across China, in what are known as "sponge cities," where rainwater is purposefully directed to above-ground green areas that can absorb and filter it, enriching underground reservoirs. Similarly, the air-filtering and cooling power of plants and trees has been put at the core of the Vertical Forest residential towers in Milan. Slowly but steadily, nature-based solutions have been deployed globally, for protecting and expanding forest areas for gaseous pollutants capture, plant ing windbreaks for soil conservation, and installing green roofs for biodiversity enhancement, carbon storage and rainwater retention.

However, this momentum has also highlighted gaps in knowledge that still exist, particularly on the interlinkages among nature's systems and their evolution in the long-term. Indeed, nature-based solutions generally include plants and living elements that may lead to unexpected consequences. For instance, too many trees planted to address the heat-island effect might also cause problems such as aggravation of allergies or obstructions for transportation.

As with all activities, nature-based solutions should be planned by bringing to the table all relevant stakeholders who can offer expertise that sectoral representatives might lack. Botanists and biodiversity experts could help mainstream urban vegetation options, easing the replicability of successful measures. Similarly, landscape architects may include nature in land development, harmonizing local flora and building aesthetics. Co-benefits of nature-based solutions could also interest the insurance industry, as investments in such projects could mitigate risks to public health and damages to insured properties.

SUSTAINABLE MOBILITY AND URBAN RESILIENCE

The transport sector is one of the main sectors responsible for GHG emissions. The World Health Organization (WHO) estimated that in 2010 it accounted for 23 percent of all global energy-related emissions. But pollution is just the tip of the iceberg. Other major – often overlooked – issues include road deaths, urban congestion, public spending on road construction and maintenance, and isolation of residents who lack access to reliable transportation. These issues are often rooted in urban planning that prioritizes vehicles over people, paired with a lack of viable alternatives – such as walking, biking, shared and public transport options. Cities that invest in infrastructure for cars over public transportation risk excluding part of the population from fair opportunities and decent services. They should rather aim to change social behavior towards the use of private cars: for instance, challenging the correlation between wealth and car-ownership and increasing the use of non-motorized vehicles. In certain contexts, there may be the need to increase safety on the roads before implementing sustainable mobility programs, but the long term vision sould not focus exclusively on it.

To tackle urban transport problems effectively, cities should first scale up their public transport offer through, for example, frequent, affordable, and fairly distributed buses, subways and trams. These options can be complemented by and enhanced through underused mobility alternatives, such as bikes, electric scooters, shared fleets and dedicated pedestrian paths. Moreover, municipalities can boost the effectiveness of their transportation investments by integrating them into a more cohesive urban planning. This is what is known as transit-oriented development (ToD). Public infrastructure projects can, in fact, raise real estate values and create business opportunities, which in turn can channel resources back to the city through property taxes on and development of such areas.

To speed up this transition, cities can simultaneously disincentivize the use and convenience of privately-owned vehicles by, for example, levying congestion fees, increasing the cost of on-street parking lots, and introducing low emission areas. Importantly, phasing out private cars should happen in parallel to the expansion of alternative transport options, because doing it in isolation overburdens existing infrastructure or increases costs for those who have no alternative but to drive.

The Transformative Urban Mobility Initiative (TUMI) is the leading global implementation initiative on sustainable mobility formed in partnership by eleven world-wide partners, including ICLEI. TUMI's mission is "changing mobility for the benefit of people and the environment, with a view to the future."

TUMI is based on three pillars: innovation, knowledge, investment. It supports innovative pilot projects around the world. It shares knowledge with planners about modern mobility concepts, in workshops and conferences. It invests in the construction and modernization of sustainable urban infrastructure.

Rural or residential areas outside the city, on the other hand, tend to suffer from other issues, such as poor connections to workplaces, schools, hospitals and recreation opportunities, forcing residents to rely on their own vehicles to meet their basic needs. Improving such transport linkages through walking and biking lanes, public and shared transport options can provide fairer and more accessible mobility to all people. In the long-term, electrified, fast and accessible connections to urban centers could drive forward climate neutrality in the transport sector and re-distribute cities' pres-

sure for accommodation and food production to rural areas, providing them with economic opportunities.

While the entire transportation sector is much broader and more complex than city level transport and private vehicles, it often serves one simple need: moving people and goods from place to place. Yet, at least in the urban context, the need for road travels should ideally be kept at a minimum, enabling people to reclaim their role as the city's protagonists by offering them services at a walkable distance. A truly people-friendly urban area should prioritize walking and reduce residents' need to drive to meet basic needs, such as education and food-shopping. Putting people at the core of urban planning, rather than cars, is likely to result in smaller, more scattered services around the city. This fragmentation, while at odds with the concept of economic efficiency, is a form of redundancy,and a core pillar of resilience that helps maintain the overall system viable in case one part fails.

FOOD SYSTEMS IN THE URBAN RESILIENCE CONTEXT

URBAN FOOD MATTERS: FROM GLOBAL REALITY TO LOCAL ACTION

Rapid urbanization trends, together with global challenges like climate change, overpopulation and natural or manmade disasters, drastically affect food security. At the same time, by 2050 almost 80 percent of all food produced globally is projected to be consumed in urban areas (FAO, 2019).

This emphasizes the urgency for national and local and regional governments to "strengthen food system planning" and make their food systems "more efficient, inclusive and resilient", as stated in the New Urban Agenda adopted in October 2016 at the HABITAT III Conference.

There is conflicting understanding about the role and mandate of various levels of government when it comes to food policy and planning. However, the crucial role of subnational governments in driving the shift towards a more sustainable and resilient food systems is clearly demonstrated by the commitment of more than 200 signatory cities to the Milan Urban Food Policy Pact aiming to provide healthy and affordable food for all, while minimizing waste, preserving biodiversity, and adapting to climate change impacts.

Toronto, Canada

Established in 1991, the Toronto Food Policy Council (TFPC) provides the space for actors from the food, farming and community sector, including City Councilors, to connect and develop innovative food policies and strategies ensuring access to healthy, affordable, sustainable, and culturally acceptable food, integrating rural and urban issues into the common agenda. The TFPC contributed significantly to the Toronto Food Charter, which advocates for the "the fundamental right of everyone to be free from hunger". It is also a community reference group for the 2010 Food Strategy.

CITY REGION FOOD SYSTEMS FOR RESILIENT CITIES

The ICLEI Seoul Declaration, adopted and signed by 96 Mayors at the 2015 ICLEI World Congress, highlights the fostering of "sustainable urban food production projects and resilient city-region food systems programs." But why do cities need to look beyond their jurisdictional boundaries and consider the region? How can they build a resilient city-region food system and what are the benefits?

There are several tools, resources and frameworks developed to support local and regional governments to identify challenges and opportunities to transition food systems towards sustainability. These have been shared at specially-dedicated Urban Food Forums incorporated in the Resilient Cities Congress series program since 2013.

The City Region Food Systems (CRFS) framework developed by FAO and RUAF Foundation accentuate the territorial (city-region) approach to food systems, which advocates for strong linkages between urban, peri-urban, and rural areas, therefore providing a more holistic perspective (FAO, 2019a and RUAF).

FAO defines the CRFS as "*a complex network of actors, processes and relationships to do with food production, processing, marketing, and consumption that exist in a given geographical region that includes a more or less concentrated urban centre and its surrounding peri-urban and rural hinterland; a regional landscape across which flows of people, goods and ecosystem services are managed*" (FAO, 2019b).

A city-region approach, coupled with multilevel governance mechanisms, can create supportive policy environments since food systems transcend administrative and political boundaries (e.g. foodsheds and watersheds). There is a continuous interdependence between city and its surrounding regions. Surrounding rural areas are often supplying cities with food, water and energy; while being influenced by urban growth and decisions taken in the urban centers (ICLEI, 2016; Jennings et al., 2015). Such a phenomenon is not confined to megacities, since some small and medium-sized municipalities with economies dependent on urban-rural linkages are also the fastest growing urban agglomerations (UN DESA, 2018; UN-Habitat, 2016a).

The CRFS approach establishes and operationalizes the linkages between SDG 2 (food security, improved nutrition and sustainable agriculture), SDG 11 (inclusive, safe, resilient and sustainable cities) and SDG 12 (sustainable consumption and production) (FAO, 2019c). It can increase food security and healthy nutrition for both urban and rural dwellers, fostering the latter's economic development and releasing cities from the pressure of producing enough food. In the long run, the CRFS approach can help increase resilience against shocks by minimizing the dependence on distant supply sources, strengthening rural-urban linkages, preserving ecosystem and promoting natural resources management.

Quito, Ecuador

The city of Quito developed its participatory urban agriculture program AGRUPAR on the basis of community consultations. Since 2002, the program has provided technical training on agricultural production, entrepreneurship and commercialization to more than 21,000 people, of whom 84 percent were women. It has benefited almost 74,000 people directly and almost 114,000 people indirectly (Heindorf, 2019; ICLEI, 2016; ICLEI, 2017).

SHAPING AND IMPLEMENTING CRFS

In order to develop a resilient CRFS, cities require political will and support. In this regard, institutionalization of food systems within local and regional governments is key. This can be done by incorporating food-related strategies into climate action plans, embedding into already existing policy domains (e.g. health, education, logistics, public procurement, disaster management) and strengthening the synergies between them. The establishment of Food Policy Councils bringing together stakeholders to share perspectives on food systems challenges and co-create innovative solutions can be an effective and inclusive governance mechanism to influence food policy and planning.

Medellín, Colombia

In 2009, Medellín became the first Colombian city to design a special municipal department for Food and Nutrition Security. Such a political move was essential for the institutionalization of food security and embedding city-region food systems' considerations into corresponding plans and policies aimed at strengthening rural-urban linkages. Launched in 2016, the 12-year Plan for Food and Nutrition Security aims to eradicate hunger and ensure food security. Urban-rural continuum is a priority in the case of Medellín's food system. The Municipality of Medellín together with the Metropolitan Area of Aburrá Valley, and the Government of Antioquia established an inter-institutional task-force called "Alianza para el Buen Vivir" ("Alliance for Good Living"), which seeks to generate political, administrative, and economic synergies crucial to the implementation of CRFS-oriented coherent regional actions. The task-force focuses on the improvement of agricultural production and food supply systems with special attention to food loss and waste management (Dubbeling et al., 2017; ICLEI, 2017).

FOOD SECURITY AND FOOD WASTE: TWO SIDES OF ONE COIN

Every year, one third of all food globally produced (1.3 billion tons) gets lost or wasted, which amounts to 680 billion USD in industrialized and 310 billion USD in developing countries (FAO, 2019d). To tackle this challenge, cities and regions are implementing programs to prevent and significantly reduce food waste (see example of Baltimore in the highlight box). These programs promote the redistribution of food and take away significant amounts of waste from landfills, which reduces CO2 emissions. Reliance on non-renewable energy sources can also be minimized by green energy produced through anaerobic digestion facilities. Waste recycling and reuse also have the potential to create new and creative job opportunities in circular economy.

Food Systems Resilience in Baltimore and Denver, USA

In the United States, up to 40 percent of food (the amount that is enough to feed 164 million people) goes to waste instead of being consumed. To ameliorate such appalling statistics, the city of Baltimore developed the Baltimore Food Waste & Recovery Strategy in 2016. Among its ambitious goals, the strategy aims to reduce 50 percent of commercial food waste and 80 percent of household food waste by 2040 through public awareness and education initiatives, as well as encouraging donations of excess food and incentivizing residents and businesses to compost organics and food scraps.

Similarly to Baltimore's strategy, the 2018 Denver Food Action Plan puts food security and food waste reduction in the spotlight. By 2030, Denver will reduce the number of food-insecure households by 55 percent and the amount of residential food waste by 57 percent.

RESILIENT URBAN FOOD SYSTEMS

Throughout the ten editions of the Resilient Cities Congress, the debate gradually shifted from urban agriculture towards city-region food systems, inclusive urban food governance, sustainable food waste management and healthy lifestyles (plant-based diet). In 2013, the Congress held a Resilient Urban Food Systems Forum for the first time; its success made it a recurring element of the program for the following years. That same edition served to the signature of the Bonn Mayors Declaration with a call for cities to develop city-region food systems and establish the CITYFOOD Network, a close collaboration between ICLEI and the RUAF Foundation, which became an important milestone and a resource for cities in fostering their urban-rural linkages and shaping resilient city-region food systems. The network is designed for local and regional governments to help them develop a strategic approach to their city-region food systems. Bringing together 30 local governments globally, the network serves as a platform for peer-exchange, capacity building, and the promotion of policies and instruments for advancing sustainable and inclusive food systems.

CIRCULAR DEVELOPMENT FOR RESILIENT CITIES

Resilient Cities has been a pioneer event connecting urban resilience with the circular economy, highlighting the practical methods for advancing resilience through local private sector engagement, resource efficiency and circular economies. By applying a resilience approach in the transition towards the circular economy, local and regional governments could impact positively their communities, economies and the environment. In 2018 and 2019, the Congress showcased the benefits of a circular development approach that integrates resilience to catalyze local economies and social cohesion through, for instance, the creation of circular jobs.

CIRCULARITY PARADIGM: WHY SHOULD CITIES GO CIRCULAR?

Cities are responsible for the production of 80 percent of the greenhouse gas emissions (GHG) and 50 percent of global waste (OECD, 2019). Roughly half of total GHG emissions from cities are triggered by the extraction and processing of resources (IRP, 2019), many of which are not renewable. Moreover, products and infrastructure often have a limited life span by design and at the end of their usable life cycle turn into waste. Such a linear, "take-make-dispose" production model has proven to be unsustainable, wasteful and harmful for the environment and biodiversity in the long run.

In contrast to the linear model, a circular economy ensures that materials are used in an efficient way, prioritizing renewable resources and preserving the value of materials and products as long as possible through the "*reduce, reuse, recycle, recover*" hierarchy. The implementation of the circular model can benefit cities with increased economic productivity through the waste reduction and creation of new jobs, while in the long run enhancing resilience and reducing carbon emissions. For instance, the circular economy model can foster cities' resilience by reducing dependency on raw materials (through strategies such as products' life extension, upcycling, and design for reuse). Also, the diversity aspect of the circular economy (including modularity, versatility and adaptivity) can help build resilience. It implies that, in the face of external shocks and stresses, diverse systems with many connections are likely to be more resilient rather than the ones built for single purposes only. Finally, redesigning how materials flow through urban systems is also an opportunity to rethink resource access and make it more inclusive, making the circular economy framework a multifaceted tool towards urban resilience.

Circular development is one of ICLEI's five integrated pathways towards sustainable urban development. The circular development model aims at closing material loops and giving priority to a sustainable management of resources that benefit local communities. Local governments play a pivotal and enabling role in circular development. A number of tools exist for them to promote circularity at the local level:

- **Urban Metabolism Analysis (UMA):** Through the UMA, cities can measure their resource flows from consumption to waste. This tool allows a better understanding of cities' dependency on key resources and determine effective policies to overcome resource management challenges.

- **City-business collaboration for innovation:** Circularity cannot be properly implemented without the engagement of the private sector. Businesses must fundamentally change their production strategies in order to achieve circularity, and local governments, in turn, can support them in delivering innovative circular solutions. This can be accomplished through early-market engagement activities, exchange platforms for materials or incentives for the market uptake of low emission products and infrastructures.

- **Community engagement:** Circular projects carry the opportunity to generate tangible benefits for local population, especially vulnerable groups, by reconnecting people with resources and employment.

- **Circular public procurement:** By embedding circular principles in their tendering process – through initiatives such as local sourcing, encouraging low energy footprints and using life cycle costing – local governments can create a market push for circular alternatives.

- **Lifecycle planning:** Adopting a circular economy lens implies considering the impacts of projects and investments throughout their entire life span, from design to reuse and disposal, thereby allowing to identify potential synergies and strategies that prevent waste and resource consumption (e.g. designing buildings for disassembly).

CIRCULAR JOBS CREATION

Cities can improve both their environmental resilience and their socio-economic conditions through the creation of green circular jobs and improved access to resources. A growing circular economy is likely to create up to 3 million jobs in Europe by 2030, while reducing unemployment by up to 520,000 (WRAP, 2015). Globally, 6 million new jobs will be added by 2030 in the condition of circular economy (ILO, 2018) through the waste management, repair, construction and energy production as well as other sectors changing production strategies from linear to circular (IISD, 2018).

For example, through the Waste-to-Wealth initiative, the City of Baltimore is creating new jobs by supporting local businesses that capture valuable materials from the waste stream to make their products. The initiative brings together city agencies, businesses and nonprofits and targets three main areas: food waste, wood waste and construction and demolition waste.

To support cities in building and monitoring inclusive circular jobs, ICLEI has formed a consortium with Circle Economy and UN Environment through its Global Initiative for Resource Efficient Cities (GI-REC). Cities such as Amsterdam and Brussels have already undertaken an analysis of their resource flows with respect to employment. The outcomes of these examinations can inform local action plans and policies for circular economy projects that create local jobs.

Amsterdam, The Netherlands

Amsterdam became the first city in the world to assess the amount and types of circular economy jobs as well as the skills needed to further advance the circularity model. The research found out that 11 percent of the total employment in Amsterdam is composed of circular economy jobs (140,000). The areas of circular design, repair service, and digital technology were identified as primary domains of circular jobs.

TOWARDS INCLUSIVE AND SOCIAL URBAN RESILIENCE

SOCIAL DIMENSION OF URBAN RESILIENCE

Urban resilience must not be regarded through a narrow climate change adaptation vision only, but rather as a wide and holistic fabric incorporating both environmental and socio-economic aspects, including social justice, equity and multicultural dynamics.

Along with environmental vulnerabilities, cities face socio-economic risks such as growing wealth inequalities, migration crises and social inclusion challenges (Martin-Moreau & Ménascé, 2018). To illustrate, the City of Zamboanga in the Philippines is exposed to a number of natural disasters, such as typhoons and landslides due to its coastal location, while simultaneously being affected by the influx of migrants and internally displaced persons, which exacerbates the situation and creates additional challenges to its urban resilience. Strengthening social cohesion along with ensuring appropriate disaster response has become a priority for Zamboanga, which is now working on building an inclusive economy through sustainable development (ICLEI, 2018).

Therefore, not only environmental, but also social and societal hazards must be considered by urban planners and included in the relevant policy frameworks, providing in this way a holistic vision of the urban resilience concept (Martin-Moreau & Ménascé, 2018). As such, resilient cities must ensure equal access to basic services for all residents, including marginalized and vulnerable groups, as well as inclusive and participatory decision-making mechanisms that reflect community priorities (World Bank, 2018). Social cohesion and inclusion are essential drivers that contribute to a better disaster preparedness and response in cities (100 Resilient Cities, 2019). Cohesive and engaged communities, supported by the local government, are able to face unforeseen shocks and stresses together, without civil tensions and violence (ARUP, 2014).

RESILIENCE OF THE URBAN POOR AND INFORMAL SETTLEMENTS

Today, around 1 billion people live in slums and it is estimated that by 2030, 3 billion people will need access to adequate and affordable housing (UN-Habitat, 2018). In 2016, Resilient Cities featured the Inclusive and Resilient Urban Development Forum, organized in cooperation with Cities Alliance, which focused on how cities can work with the urban poor, including those living in informal settlements and working in the informal sector to increase citywide resilience. The key questions addressed relate to securing housing and access to basic services through inclusive governance and finance. To achieve inclusive governance and finance, local and regional governments should eliminate discriminatory policies and attitudes to ensure that the needs of marginalized groups are effectively integrated in urban planning.

URBAN RESPONSE TO THE CHALLENGES OF FORCED MIGRATION

According to the 2019 UNHCR Global Trends Report, about 70.8 million people were forcibly displaced from their homes by the end of 2018; among them 41.3 million internally displaced people (IDPs), 25.9 million refugees and 3.5 million asylum seekers; while in the course of 2019 some 13.6 million people were newly displaced. Forced migration can be triggered by conflicts caused by humans, natural disasters, scarcity or lack of access to resources, or a combination of these.

In this context, local and regional governments' preparedness and resilience undergo continuous scrutiny, as most forced migrants, including 61 percent of the refugee population (UNHCR, 2019) are based in urban areas due to potentially better access to healthcare, education, and employment opportunities. Newcomers are more likely to be confronted with discrimination, social exclusion, poverty, and unemployment than other urban dwellers. Forced migration also adds pressure on housing, availability of resources and infrastructure, as well as on the proliferation of informal settlements. However, migrants can also contribute to the socio-economic growth – when there is sufficient institutional support for their integration (IDMC, 2018; ICLEI, 2016).

"Refugees may leave their property behind, but they take their knowledge with them, wherever they go!" Robert Hakiza, Executive Director, Young African Refugees for Integral Development (YARID), Kampala, Uganda (ICLEI, 2017)

Amman, Jordan

Throughout its history, Amman, Jordan, has been home to various refugee groups: Palestinians after 1948 and 1967, Iraqis in 2003, Syrians since 2012 and recently, Sudanese and Yemeni (Hawkins et al., 2019). Amman has therefore experienced a growing pressure on its infrastructure, which triggered action from the local authorities to accommodate the new arrivals. Not only did the city commit to improve infrastructure, but also to expand employment opportunities considering the skills of refugees and other marginalized groups. Moreover, through its City Resilience Strategy, Amman leveraged community engagement methods to include refugees and raise general awareness on environmental challenges (100 Resilient Cities, 2017).

BUILDING RESILIENCE FOR ALL: A MULTICULTURAL APPROACH TO URBAN RESILIENCE

Migration flows generally increase the diversity of communities. While this can certainly enrich them with new perspectives, experiences and traditions, it can also exacerbate issues such as marginalization and segregation.

To avoid that, local and regional governments should actively promote and protect human rights and boost communities' participatory engagement in all governance processes, ensuring that vulnerable, marginalized and non-native groups can input and contribute to everyday life (UN-Habitat, 2018a). For example, the City of Copenhagen, Denmark, facilitates special dialogues between city residents and urban planners. This led to long-lasting solutions for inclusive and social resilience, such as greening and transforming socially-marginalized neighborhoods into climate-adapted, integral parts of the city, as in the case of St. Kjelds Quarter (ICLEI, 2018).

AMARE-EU Project

The AMARE-EU project has designed a framework to develop concrete, low cost, and easily-applicable solutions for involving urban vulnerable groups that, due to linguistic, cultural, socio-economic and other factors, are the most affected in case of a disaster.

The project has established an online self-assessment tool for the European cities to evaluate their ability to foster disaster prevention while accounting for multicultural societies. In addition, it provides an online library covering the topics of resilience, multiculturalism, and community participation. The aim of this project is to produce a toolkit, which together with developed guidelines and good practices would support local governments in ensuring efficient involvement of multicultural groups in the strategies of prevention and preparedness. Through training and planning activities, AMARE-EU has successfully piloted in four European cities (Catanzaro, Italy; Heraklion, Greece; Skopje, North Macedonia; and Rotterdam, The Netherlands) affected by both natural disasters and multicultural challenges (AMARE-EU, 2019).

URBAN RESILIENCE IN THE AGE OF DIGITALIZATION

Rapid digital transformation and the recent wave of digitalization noticeably impact the lives of most people regardless of their location. Not only is more than half of the global population active on the internet, "things" too are now becoming connected to the net. The "Internet of Things" (IoT) let devices, such as kitchen appliances and cars to connect to the internet, generate and store data. In a not-too far future, such a wealth of information might even be used to train Artificial Intelligence (AI) algorithms. What are the implications of such a phenomenon, and how should cities respond?

OPPORTUNITIES AND CHALLENGES OF RAPID DIGITALIZATION FOR CITIES

As any other development trend, digitalization brings with it both opportunities and challenges for cities. Digital transformation has a high potential to foster urban planning efficiency through data infrastructure and analytical tools. Digital technologies and Information and Communication Technologies (ICT)-based solutions can facilitate improvement of urban infrastructure, and tackle challenges, such as waste reduction, energy efficiency and disaster preparedness.

For example, the mobile application EXTREMA provides a platform for citizens and a dashboard for local authorities to ensure efficient management of extreme temperature events. The tool is used in Athens, Paris, Rotterdam, Milan, Lisbon and the Island of Mallorca (Resilient Cities 2019).

Another example of the digital approach towards disaster preparedness and protection of civil population is a warning app NINA designed by the German Federal Office of Civil Protection and Disaster Assistance (BBK). The main aim of the app is to alert citizens about different hazards that might occur in their city, such as dissemination of harmful substances or major fires. The app is based on the federal modular warning system, which since 2013 is being used by German cities, specifically by their fire departments, who issue warning information with regards to the local dangers.

Lastly, the development of ICT is making data available across multiple aspects of urban systems and everyday life. Along with the proliferation of digital solutions, automated and autonomous systems are increasingly undertaking complex monitoring and control tasks in the public space. This is the case of automated driving, which is becoming an urban resilience challenge in some cities, especially in developed countries. As local governments become digital infrastructure providers, new legislation and policies related to the roles and responsibilities of different stakeholders in case of disaster are rising, as well as new vulnerabilities of critical urban infrastructure are increasing (ICLEI, 2018).

Undoubtedly, digitalization can offer a wide range of benefits; however, threats against cyber-security and data privacy might undermine local and regional governments' resilience. Cities collect and store a significant amount of sensitive personal data, which makes them potential targets of cyber-attacks. In terms of security issues, individuals, public services, and the city's own reputation (and possible future investment) are at risk. Data protection requires vast investments in human resources, technology and cyber-resilience. Cyber-resilience underlines the ability of ICT systems to continue their services even in the event of cyber-attacks or physical disasters (McKinsey&Company, 2018).

OPEN DATA AND URBAN RESILIENCE

As much as cities need to protect their data privacy, they also need to take into consideration the possibility of making non-sensitive data accessible to a wider audience (van Winden & de Carvalho, 2017). The open data approach guarantees municipal transparency and serves for addressing urban resilience in a more collaborative way (Landry et al., 2016). Openness allows cities to access information and resources containing best practices and solutions from other local governments, which will eventually lead towards building their own local resilience.

Edmonton, Canada

Through its Open City Initiative, Edmonton set up an Open Data Catalogue to provide freely-available, easy to access and user-friendly data. As it develops its Climate Change Adaptation and Resilience Strategy, Edmonton has already utilized the Catalogue to create an interactive, open-source map database of trees, which connects people with nature and helps them visualize the effects of climate change from year-to-year (ICLEI, 2017).

Open data as a source of information can provide solutions for municipalities whose ICT resources are limited (ICLEI, 2018a). At the same time, some cities like Helsinki, Finland, who are further along in their digital transformation, embrace the open data tool to the fullest and allow everyone to easily access all data produced by the City, unless there is a specific restriction in place (van Winden & de Carvalho, 2017). In addition, such platforms as the Open Data for Resilience Initiative provide a virtual space for collaborative mapping to build resilient cities and boost cooperation between local governments, civil society and the private sector (e.g. Open Cities Africa project, carried out in eleven cities in Sub-Saharan Africa).

"Openness allows cities to build on the work and best practices of others by reusing others' components and solutions. For municipalities with limited ICT resources and capabilities it should be a top priority to rely on open standards and on ICT" Ina Schieferdecker, Member of WBGU and Director of Fraunhofer FOKUS (ICLEI, 2018).

LEVERAGING THE TEN-YEAR LEGACY OF THE RESILIENT CITIES CONGRESS

For the last decade, Resilient Cities has been a convening space for key stakeholders on urban resilience to exchange knowledge and best practices in urban policy and planning. However, the legacy of the Congress goes beyond the face to face discussions and reflects on the transferrable capacity built throughout ten years in the urban practitioners' community. The Congress triggered innovative dialogues, bringing actors and constituencies together that would not typically talk to each other or work together to formulate new paths towards building resilience. Also, Resilient Cities advanced global partnerships and commitments, which elevated the discussions on urban resilience and created an environment for future investments by advocating for policy and governance reforms to favor long term urban resilience.

The Resilient Cities Congress built a standing knowledge platform gathering reports, presentations, and congress proceedings to be used by urban practitioners, including city officials, academia, think-tanks, and businesses across the globe.

OUTLOOK 2020-2030

Resilient Cities 2019 marked the 10th anniversary of the Congress and a moment to reflect on the future of urban resilience under the light of the 2030 Agenda. Over the course of ten years, the sustainability and resilience community have discussed the challenges of governing, planning and financing resilience, and the Resilient Cities Congress has served as a platform to showcase best practices and challenges of its implementation.

The next ten years will be critical to boost local resilience action and enhance implementation. The following findings from the Congress could be used as guiding information for policy and decision makers and experts in the path towards implementation: in this regard, Resilient Cities and ICLEI's considerations can be summarized as follows:

- Resilience is more than successful adaptation to climate change, and national and sub-national governments should adopt a multi-faceted approach to address their challenges and find solutions to the wide range of climate, anthropogenic, technological and socio-economic shocks and stresses.

- Local resilience has to be mainstreamed and aligned to other sustainability agendas to ensure an integrated approach to sustainable development and well-being.

- Greater commitment of national and sub-national governments to resilience is required, and city networks can support local governments by facilitating knowledge exchange and financial opportunities.

- In terms of finance, increased accessibility of local and regional governments to available international sources of funding should be fostered, existing barriers preventing direct access to this funding lifted, and social and financial innovation solutions to reach the most vulnerable groups should be identified.

- Communities and individuals need to be informed about the benefits of resilience approaches, as well as being engaged in (possibly) all stages of resilience building so they can feel a sense of ownership on each project.

- Improved multi-level and multi-stakeholder collaboration is needed to build coherent and knowledge-based policies and actions, as well as to bring to the discussion table different perspectives, needs and solutions.

- Digitalization and the access to open data can improve information sharing among stakeholders to better prepare, react and recover from shocks and stresses.

- The broad range of sustainability and resilience has boosted demand for research-informed policy-making processes. Such a knowledge gap has already been highlighted by international sustainability research agendas, which in turn have called for the development of new evidence-based research in support of local policymakers.

- To help local and regional governments address the implementation challenge, during the next ten years, ICLEI's Resilient Development Pathway will promote more effective multi-level collaboration and vertical integration, science-policy dialogues, and innovative solutions for urban resilience.

This decade-long learning and expertise will be channeled into a new process that builds upon the success of the Resilient Cities Congress series. ICLEI and the City of Bonn will undertake a new initiative as a response to the need for accelerated action to achieve the Paris Agreement's climate neutrality target by mid-century and deliver the Global Goals by 2030. This initiative will connect local and regional governments to global partners, held in tandem to the annual UN Bonn Climate Talks and supported by monitoring activities with customized inputs into global decision-making processes and milestones. The "Resilient cities, thriving cities" report hence positions itself as the bridge between the legacy and future evolution of urban resilience building.

REFERENCES

1. 100 Resilient Cities (2017). Amman Resilience Strategy. Retrieved September 2019, from: https://www.100resilientcities.org/wp-content/uploads/2017/07/Resilience-Strategy-Amman-English.pdf#targetText=GAM%20participation%20in%20100%20Resilient,stresses%20it%20is%20subjected%20to.

2. 100 Resilient Cities (2019). Social Cohesion. A Practitioner's Guide to Measurement Challenges and Opportunities. Retrieved September 2019, from: http://100resilientcities.org/wp-content/uploads/2019/09/100RC-Facebook-Social-Cohesion-Report.pdf

3. AMARE-EU (2019). ICLEI Forum 2019: AMARE-eu was there! Retrieved September 2019, from: https://www.amareproject.eu/iclei-forum-2019-amare-eu-was-there/

4. ARUP (2014). City Resilience Framework. Retrieved October 2019, from: https://assets.rockefellerfoundation.org/app/uploads/20140410162455/City-Resilience-Framework-2015.pdf

5. Baltimore Food Waste Recovery Strategy (2018). Retrieved September 2019, from: https://www.baltimoresustainability.org/wp-content/uploads/2018/09/Baltimore-FoodWasteRecoveryStrategy_Sept2018_FINAL.pdf

6. Baltimore Office for Sustainability. Waste to Wealth. Retrieved September 2019, from: https://www.baltimoresustainability.org/projects/waste-to-wealth/

7. BBK. Warn-App NINA. Retrieved September 2019, from: https://www.bbk.bund.de/DE/NINA/Warn-App_NINA.html

8. Circle Economy website: https://www.circle-economy.com/

9. Cities and Climate Change Science Conference (CitiesIPCC) website: https://citiesipcc.org/about/

10. Denver Food Action Plan (2018). Retrieved September 2019, from: https://www.denvergov.org/content/dam/denvergov/Portals/771/documents/CH/Food%20Action%20Plan/DenverFoodActionPlan.pdf

11. Dubbeling, M., Santini, G., Renting, H., Taguchi, M., Lançon, L., Zuluaga, J., De Paoli, L., Rodriguez, A. & Andino, V. (2017). Assessing and Planning Sustainable City Region Food Systems: Insights from Two Latin American Cities. Retrieved September 2019, from: https://www.mdpi.com/2071-1050/9/8/1455/htm

12. eThekwini Municipality (2012). Durban Adaptation Charter. Retrieved November 2019, from: http://www.durban.gov.za/City_Services/development_planning_management/environmental_planning_climate_protection/Projects/Documents/DAC__Pamphlet.pdf

13. Edmonton Open City Initiative website: https://www.edmonton.ca/city_government/initiatives_innovation/open-city.aspx

14. EXTREMA App website: http://extrema.space/

15. FAO (2015). A vision for City Region Food Systems. Retrieved September 2019, from: http://www.fao.org/3/a-i4789e.pdf

16. FAO (2019). Urgent action in urban areas, key to achieving Zero Hunger and healthy diets for all. Retrieved September 2019, from: www.fao.org/news/story/en/item/1184269/icode/

17. FAO (2019a). City Region Food Systems Programme. Retrieved September 2019, from: http://www.fao.org/in-action/food-for-cities-programme/overview/what-we-do/en/

18. FAO (2019b). Food for the Cities Initiative. Retrieved September 2019, from: http://www.fao.org/fcit/fcit-home/en/#targetText=The%20concept%20of%20city%20region,and%20ecosystem%20services%20are%20managed

19. FAO (2019c). CRFS on the international agenda. Retrieved September 2019, from: http://www.fao.org/in-action/food-for-cities-programme/approach/internationalagenda/en/

20. FAO (2019d). Key facts on food loss and waste you should know! Retrieved September 2019, from: http://www.fao.org/save-food/resources/keyfindings/en/#targetText=Roughly%20one%20third%20of%20the,310%20billion%20in%20developing%20countries.

21. Global Initiative for Resource Efficient Cities (GI-REC) website: https://resourceefficientcities.org/about/

22. Hawkins, A., Assad, R. & Sullivan, D. (2019). Citizens of Somewhere. A Case Study of Refugees in Towns Amman, Jordan. Retrieved September 2019, from: https://reliefweb.int/sites/reliefweb.int/files/resources/RIT%2BReport%2BAmman%2BJordan.pdf

23. Heindorf, I. (2019, May). Quito's Participatory Urban Agriculture Programme (AGRUPAR). Retrieved September 2019, from: https://panorama.solutions/en/solution/quitos-participatory-urban-agriculture-programme-agrupar

24. ICLEI (2011). The Mexico City Pact. Retrieved September 2019, from: https://unfccc.int/sites/default/files/mxcpact_cccr_final.pdf

25. ICLEI (2011a). Resilient Cities Report 2011. Retrieved September 2019, from http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Resilient_Cities_2011/RC2011_Congress_report_20120228.pdf

26. ICLEI (2013). Bonn Declaration of Mayors. Retrieved October 2019, from: http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/MAF_2013_Bonn_Declaration_of_Mayors.pdf

27. ICLEI (2013a). Resilient Cities Report 2013. Retrieved September 2019, from: http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Resilient_Cities_2013/RC2013__congressreport_singlepage.pdf

28. ICLEI (2014). Resilient Cities Report 2014. Retrieved September 2019, from: http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Full_papers/RC2014__Congress_Report__Final.pdf

29. ICLEI (2016). Resilient Cities Report 2016. Retrieved September 2019, from: http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Resilient_Cities_2016/Documents/Resilient_Cities_2016_Report.pdf

30. ICLEI (2017). Resilient Cities Report 2017. Retrieved September 2019, from: https://resilientcities2018.iclei.org/wp-content/uploads/2017/11/RC2017_Report_Online_26102017_Final-compressed.pdf

31. ICLEI (2018) Resilient Cities Report 2018. Retrieved September 2019, from: https://resilientcities2018.iclei.org/wp-content/uploads/RC2018_Report.pdf

32. ICLEI (2018a, April 26). Our digital cities: Open, transparent – but hackable? Retrieved September 2019 from: https://talkofthecities.iclei.org/our-digital-cities-open-transparent-but-hackable/

33. ICLEI (2018b, June). ICLEI in the Urban Era. Retrieved September 2019, from: https://worldcongress2018.iclei.org/wp-content/uploads/World%20Congress%202018%20booklet.pdf

34. ICLEI (2019). GreenClimateCities Program. Retrieved October 2019, from: https://iclei.org/en/GreenClimateCities.html

35. ICLEI (2019a). Cities and Regions Talanoa Dialogues. Retrieved September 2019, from: https://iclei.org/en/Talanoa_Dialogue.html

36. ICLEI Seoul Declaration (2015). Retrieved September 2019, from: http://english.seoul.go.kr/get-to-know-us/mayors-office/mayors-speech/118370-2

37. ICLEI-RUAF CITYFOOD Network. Retrieved September 2019, from: https://iclei.org/en/CITYFOOD_Network.html#targetText=The%20ICLEI-RUAF%20CITYFOOD%20Network,technical%20expertise%20to%20its%20participants

38. ICF (2018). Climate Investment Opportunities in Cities. Retrieved September 2019, from: https://www.ifc.org/wps/wcm/connect/875afb8f-de49-460e-a66a-dd2664452840/201811-CIOC-IFC-Analysis.pdf?MOD=AJPERES&CVID=mthPzYg

39. IISD (2018). Estimating Employment Effects of the Circular Economy. Retrieved September 2019, from: https://www.iisd.org/sites/default/files/publications/employment-effects-circular-economy.pdf

40. ILO (2018). Employment and the role of workers and employers in a green economy. Retrieved September 2019, from: https://www.ilo.org/weso-greening/documents/WESO_Greening_EN_chap2_web.pdf

41. InsuResilience Global Partnership website: https://www.insuresilience.org/

42. Internal Displacement Monitoring Center (2018). Thematic series. UnSettlement: Urban displacement in the 21st century. Retrieved September 2019, from: http://www.internal-displacement.org/sites/default/files/inline-files/20180209-idmc-intro-urban-displacement-thematic-series.pdf

43. International Resources Panel (2019). Global Resources Outlook 2019: Natural Resources for the Future We Want. Retrieved September 2019, from: http://www.resourcepanel.org/reports/global-resources-outlook

44. Jennings, S., Cottee, J., Curtis, T. & Miller, S. (2015). Food in an Urbanised World: The role of city region food systems. In: Urban Agriculture Magazine (May 2015). Issue 29. City Region Food Systems. Retrieved September 2019, from: https://www.researchgate.net/publication/303366299_City_Region_Food_Systems

45. Landry, J-N., Webster, K., Wylie, B. & Robinson, P. (2016). How can we improve urban resilience with open data. Retrieved October 2019, from: https://www.ccmdesign.ca/files/od4d-resilient-cities.pdf

46. Langenheim N., White M., Barton J., Eagleson S. (2017). Designing with Data for Urban Resilience. In: Geertman S., Allan A., Pettit C., Stillwell J. (eds). Planning Support Science for Smarter Urban Futures. CUPUM 2017. Lecture Notes in Geoinformation and Cartography. Springer, Cham. Retrieved October 2019, from: https://doi.org/10.1007/978-3-319-57819-4_7

47. Le Quesne et al. (2017). The Role of Insurance in Integrated Disaster & Climate Risk Management: Evidence and Lessons Learned, MCII, Report No.22, October 2017. Retrieved October 2019, from: http://www.climate-insurance.org/fileadmin/user_upload/ACRI__2017_Role_of_Insurance_in_ICRM_online.pdf

48. Martin-Moreau, M. & Ménascé, D. (2018). Urban resilience: introducing this issue and summarizing the discussions. In: The Veoplia Institute Review. Facts Reports. Resilient Cities (2018). Retrieved September 2019, from: https://journals.openedition.org/factsreports/4562?file=1

49. McKinsey&Company (2018). Smart city resilience: Digitally empowering cities to survive, adapt, and thrive. Retrieved September 2019, from: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/smart-city-resilience-digitally-empowering-cities-to-survive-adapt-and-thrive

50. Migration Data Portal (2019). Forced migration or displacement. Retrieved September 2019, from: https://migrationdataportal.org/themes/forced-migration-or-displacement

51. Milan Urban Food Policy Pact. Retrieved September 2019, from: http://www.milanurbanfoodpolicypact.org/

52. Mitroliou, E. (2018). Data speak louder than words. Retrieved September 2019, from: https://resilientcities2019.iclei.org/wp-content/uploads/Data-speak-report-web-final.pdf

53. OECD (2019). The Circular Economy in Cities and Regions. Retrieved September 2019, from: http://www.oecd.org/cfe/regional-policy/Circular-economy-brochure.pdf

54. Open Data for Resilience Initiative website: https://opencitiesproject.org/

55. Open Data for Resilience Initiative. Open Cities Africa. Retrieved September 2019, from: https://opencitiesproject.org/

56. Overseas Development Institute (2017). Mass displacement and the challenge for urban resilience. Retrieved September 2019, from: https://www.odi.org/sites/odi.org.uk/files/resource-documents/11202.pdf

57. Resilient Cities Congress (2019). Finance Forum. Retrieved October 2019, from: https://resilientcities2019.iclei.org/program/finance-forum/

58. Resilient Cities Congress (2019a). Resilient Food Systems. Retrieved September 2019, from: https://resilientcities2019.iclei.org/program/resilient-food-systems/

59. Resilient Cities Congress (2019b). Exhibitors. Retrieved September 2019, from: https://resilientcities2019.iclei.org/exhibition/exhibitors/

60. RUAF. A City Region Food System Indicator Framework. Retrieved September 2019 from: https://www.ruaf.org/projects/city-region-food-system-indicator-framework

61. Toronto Food Charter. Retrieved September 2019, from: http://tfpc.to/wordpress/wp-content/uploads/2011/10/Toroto_Food_Charter.pdf

62. Toronto Food Policy Council. Retrieved September 2019, from: http://tfpc.to/

63. Transformative Actions Program website: https://tap-potential.org/

64. TUMI Network website: https://www.transformative-mobility.org/

65. UN DESA (2018). 2018 Revision of World Urbanization Prospects. Retrieved October 2019, from: https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html

66. UNEP (2018). PSI / ICLEI Insurance Industry Development Goals for Cities. Retrieved October 209, from: https://www.unepfi.org/news/industries/insurance/psi-iclei-insurance-industry-development-goals-for-cities/

67. UNEP Finance Initiative website: https://www.unepfi.org/psi/

68. UN-Habitat (2016). The New Urban Agenda website. Retrieved September 2019, from: http://habitat3.org/the-new-urban-agenda

69. UN-Habitat (2016a). World Cities Report 2016. Retrieved October 2019, from: http://wcr.unhabitat.org/

70. UN-Habitat (2018). Sustainable Cities and Communities. Retrieved November 2019, from: https://unhabitat.org/wp-content/uploads/2018/07/UN-Habitat-Brochure.pdf

71. UN Habitat (2018a). City Resilience Profiling Tool. Retrieved September 2019, from: http://urbanresiliencehub.org/wp-content/uploads/2018/02/CRPT-Guide.pdf

72. UNHCR (2018). Global Trends. Forced Displacement in 2018. Retrieved September 2019, from: https://www.unhcr.org/5d-08d7ee7.pdf

73. United Nations (2015). Paris Agreement. Retrieved September 2019, from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

74. United Nations (2015a). Sendai Framework for Disaster Risk Reduction 2015-2030. Retrieved September 2019, from: https://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf

75. United Nations (2015b). Transforming our world: the 2030 Agenda for Sustainable Development – A/RES/70/1. Retrieved September 2019, from: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

76. United Nations (2017). New Urban Agenda. Retrieved September 2019, from: http://habitat3.org/wp-content/uploads/NUA-English.pdf

77. van Wilden, W. & Carvalho, L. (2017, September). How digitalization changes cities: innovation for the urban economy of tomorrow. Retrieved from: https://www.researchgate.net/publication/321027425_How_digitalization_changes_cities_innovation_for_the_urban_economy_of_tomorrow

78. World Bank (2018). Required Sectoral Module. Community and Social Dimensions (of Urban Resilience). Retrieved September 2019, from: http://documents.worldbank.org/curated/en/292671525766240243/pdf/126008-WP-P150083-PUBLIC-socialdimensions.pdf

79. World Bank (2019). City Resilience Program. Retrieved October 2019, from: https://www.worldbank.org/en/topic/disasterriskmanagement/brief/city-resilience-program

80. World Health Organization (2019), Health and sustainable development. Climate Impacts. Retrieved November 2019, from: https://www.who.int/sustainable-development/transport/health-risks/climate-impacts/en/

81. WRAP (2015). Economic Growth Potential of More Circular Economies. Retrieved from: http://www.wrap.org.uk/sites/files/wrap/Economic%20growth%20potential%20of_more%20circular%20economies.pdf

ANNEX. ICLEI RESILIENCE PROJECTS

The table below summarizes the past and ongoing resilience projects led by ICLEI around the world. For an updated list, please visit the ICLEI's activity database.

Project/ Activity	Geographic Scope	Statement	Dates
Resilient Cities Congress Series	Global	ICLEI Resilient Cities Congress has been providing an open, global space where local governments, researchers, businesses and civil society could meet as equals, contributing with their knowledge and expertise to the advancement of urban resilience.	2010-2019
Frontline Cities and Islands	Global	ICLEI promotes sustainable island and urban development through resilience and systems planning, clean energy, coastal fisheries management, infrastructure, innovative finance, ecosystems services, post disaster recovery and sustainable tourism.	
International Workshop on the Application and Management of Smart Water	Global	This workshop focused on exploring solutions, technology and applications on building a more resilient and water smart city by a series of indoor lectures, technical visits and group presentations.	2018
Basque Declaration	Europe	ICLEI initiated and continues to promote the uptake of the Basque Declaration, which was adopted by the participants of the 8th European Conference on Sustainable Cities and Towns in April 2016.	2016-Present
Future Resilience for African Cities And Lands (FRACTAL)	Africa	Through FRACTAL, local governments in sub-Saharan Africa adopt a model of inclusive climate research and action, effectively bridging the divide between science and policy with city identified challenges and needs driving information advancement.	2015-2020
AfriAlliance: Africa-EU Innovation Alliance for Water and Climate (AfriAlliance)	Africa	Through the AfriAlliance, ICLEI aims to support existing networks in identifying and sharing social innovations and technological solutions for key water and climate challenges.	2016-2021
Greenhouse Gas Inventory, Climate Action Plan, Vulnerability Assessment	Africa	Through a transdisciplinary learning approach and scientific research, ICLEI contributes to an improved understanding of climate processes, and regional and local climate trends that drive the southern African climate system's natural variability and responses to change within that system.	

Project/ Activity	Geographic Scope	Statement	Dates
CDKN Knowledge Accelerator Project (CDKN KA)	South Asia	Through this project, CDKN is shifting from knowledge generating and technical assistance to knowledge brokering. ICLEI facilitates knowledge brokering through making information and learning on climate compatible development easier to access and use for the Asia region.	2018-2020
Great Lakes Community Climate Change Project	Canada	ICLEI facilitated and trained two groups of municipalities and stakeholders: Training-the-Trainers and Collaborative Implementation Groups	2016-2018
Building Adaptive and Resilient Cities Program	Canada	ICLEI builds the capacity of local governments to adapt to climate change and increase their resilience through suite of solutions including planning tools, vulnerability and risk assessment resources, stakeholder consultation workshops and peer and partner networking opportunities.	
The Adaptation Changemakers Project	Canada	The Adaptation Changemakers Project is training and building agents of change for climate adaptation in communicates across Canada. With technical guidance from ICLEI and regional experts, participants are initiating their adaptation effort with local stakeholders, assessing their risks, and developing a local action plan.	2018-2020
Together for Climate, Managing Risk Through Community Collaboration	Canada	Through the Together for Climate project, municipalities are helping to lead a collaborative co-developed planning exercise with key local groups including regional governments, First Nations, chambers of commerce, land developers, academics, and health professionals.	2018-2020
Thriving Earth Exchange and Resilience Dialogues (TEX)	United States	American Geophysical Union's Thriving Earth Exchange (TEX) program matches communities with earth and space scientists to lay strong, scientifically based foundations for climate action and adaptation planning.	2017-2018
Pacific Resilience Fiji	Fiji	ICLEI supports Fiji cities by providing streamlined processes for assessing their risks and challenges and developing achievable action plans. It works side-by-side with the cities and assists them to find partners for action.	2018-Present
Supporting Kochi, Coimbatore, Bhubaneswar in the Climate Smart Cities Program	India	Through this project, ICLEI enables adoption, implementation and dissemination of the best practices adopted by various Indian cities and setting benchmarks of creating climate resilient and sustainable urban habitats.	2019-Present

Project/ Activity	Geographic Scope	Statement	Dates
UNISDR Training series on 'Making Cities Resilient'	Chinese Taipei	ICLEI and its local partner International Climate Development Institute (ICDI) deliver three training events that teach local stakeholders how to improve resilience mechanisms under the UNISDR frameworks; how to ensure the life quality in order to achieve Disaster Risk Reduction (DRR) from social, environmental and financial perspectives, by implementing the "Disaster resilience scorecard for cities;" and how to enhance and introduce new technology in DRR and resilience to start new business models in the related industry.	2018
Integrated Rural Urban Water Management for Climate Based Adaptations in Indian Cities (IAdapt)	India	The IADAPT project addresses the water management issues in Indian cities, moving from existing water management practices that plan, establish and operate water supply, wastewater and stormwater systems as separate entities to more integrated and collaborative approaches.	2017-2020
Improved Municipal Planning in African CiTies (IMPACT) - for a Climate Resilient Urban Future (IMPACT)	Malawi and Zimbabwe	Through this project, ICLEI builds on the understanding of what enables collaboration mechanisms for climate resilient development, such as environments that allow for learning-by-doing and accumulation of knowledge that can be harnessed, local government officials who are engaged and passionate about building climate resilience, and cities where strong multi-sectoral partnerships exist.	2018-2020
Supporting African Cities Development of Climate Action Plans (CAPs)	Mozambique	Through the CAPs Project, ICLEI Africa is supporting Moroni, Comoros and Nacala, Mozambique with becoming leading Africa cities in terms of climate mitigation and adaptation action planning as well as supporting these cities with continued compliance to the Global Covenant of Mayors for Climate & Energy Program (GCoM).	2018-2019
Pacific Resilience Honiara	Solomon Islands	ICLEI supports the island cities by providing streamlined processes for assessing their risks and challenges and developing achievable action plans. It works side-by-side with the cities and assists them to find partners for action. The ongoing project has led to strong partnerships between ICLEI, UNISDR, UN-Habitat and academic professionals and institutions.	2016-Present
New York City Divestment Case Study (NYC Divestment)	United States	Providing the first in-depth look at the steps NYC took to reach a divestment commitment, ICLEI' s case study shows how the the largest municipal pension system in the United States has begun to divest billions of dollars from fossil fuels — and demonstrates to peer cities, large and small, that the principles and processes behind fossil fuel divestment are transferable to nearly any location where the will to divest exists.	2018

Project/ Activity	Geographic Scope	Statement	Dates
Reducing Extreme Heat Risk for Vulnerable Populations	Canada	ICLEI worked with Toronto Public Health to carry out research on strategies being used in other jurisdictions to manage extreme heat in older apartment buildings that don't have air conditioning.	2014-2015
Workshops Towards a Sustainable and Resilient Kaohsiung	Chinese Taipei	ICLEI provides workshops that educate municipal governments on how to improve sustainable and resilient mechanisms under the UN frameworks, how to ensure the quality of life quality in order to achieve sustainable development from social, environmental and financial perspectives, and how to enhance and introduce new technology in resilience to start a new business model in the related industry.	2019
Get Ready: The Game of Home Hazard Preparedness	Canada	ICLEI created a mobile app to educate homeowners and residents about the impacts of natural hazards and extreme weather, and how people can prepare for these events in their home.	
Temperate	United States	Temperate is the next-generation, cloud-based adaptation planning software tool for cities and regional organizations, designed to support leaders in local government sustainability planning. With Temperate, ICLEI aims to guide users through exploring potential future climate hazards, creating a vulnerability assessment, and designing adaptation strategies that will help communities along the path toward climate resilience.	
Social Implementation Program on Climate Change Adaptation Technology (SI-CAT)	Japan	To assist SI-CAT in its efforts, ICLEI is compiling the best practices in urban resilience and adaptation programs/ projects taking place outside of Japan.	2015-Present
Urban Resilience Training Series	China	ICLEI and UNDRR are working closely to capacitate local governments in China to address disaster risks at the local level and implement urban resilience objectives including the Sendai Framework.	2019-Present

2019 Congress Organizers

ICLEI Local Governments for Sustainability

NACHHALTIGKEIT. SUSTAINABILITY. DURABILITÉ. BONN.

2019 Patrons

United Nations Climate Change

UNDRR UN Office for Disaster Risk Reduction

UN-HABITAT FOR A BETTER URBAN FUTURE

Federal Ministry for Economic Cooperation and Development

NACHHALTIGKEIT. SUSTAINABILITY. DURABILITÉ. BONN.

2019 Supporting Partners

Federal Ministry for Economic Cooperation and Development

IDRC | CRDI
International Development Research Centre
Centre de recherches pour le développement international

Canada

Foundation for International Dialogue of the Savings Bank in Bonn

gef

ACRI

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Global Covenant of Mayors for Climate & Energy

2019 Endorsing Partners

United Nations Climate Change

UNDRR UN Office for Disaster Risk Reduction

UN-HABITAT FOR A BETTER URBAN FUTURE

UN environment

UNCDF Unlocking Public and Private Finance for the Poor

UNDP

United Nations University UNU-EHS Institute for Environment and Human Security

United Nations ESCAP Economic and Social Commission for Asia and the Pacific

The Congress Le Congrès

Council of Europe Conseil de l'Europe

European Environment Agency

Cities Alliance Cities Without Slums

Federal Office of Civil Protection and Disaster Assistance

World Bank Group

Global Platform for Sustainable Cities

IDB

Global Infrastructure Basel The Sustainable Infrastructure Financing Forum and Summit

CDKN Climate & Development Knowledge Network

Cities Climate Finance Leadership Alliance

FMDV

iied International Institute for Environment and Development

World Resources Institute

IUCN

vfi

RUAF Foundation

Resilient Regions Association

metropolis

Regions4 Sustainable Development

GFDRR Global Facility for Disaster Reduction and Recovery

ISOCARP Knowledge for Better Cities

UCCRN Urban Climate Change Research Network

EMI Earthquakes and Megacities Initiative

GRF Global Risk Forum GRF Davos

IWA International Water Association

DKKV Deutsches Komitee Katastrophenvorsorge e. V. German Committee for Disaster Reduction

Feuerwehr und Rettungsdienst Bonn

Stadt Essen

Grüne Hauptstadt Europas

die Deutsches Institut für Entwicklungspolitik

German Development Institute

PIK Potsdam Institute for Climate Impact Research

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