

# Connecting city knowledge needs with solutions - The City Research and Innovation Agenda, a pathway to transforming ambition into future action



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## Abstract

### INTRODUCTION

The Global Covenant of Mayors for Climate & Energy (GCoM) is the world's largest alliance for city climate leadership (112,629 member cities as of December 2022) (Global Covenant of Mayors for Climate and Energy 2021). Since the 2018 Edmonton Cities and Climate Change Conference, GCoM and partners including UN Habitat have been undertaking a series of participatory co-design processes to understand and close knowledge gaps for evidence-based climate action in cities (Solecki et al 2021, Hunter et al 2022, Oke et al 2022). This includes the City Research and Innovation Agenda (CRIA) that identifies research and innovation priorities to meet the climate change ambitions of their members (GCoM 2022), a city perspective - of the Global Research Action Agenda for Cities and Climate Change (GCoM & UN Habitat 2022, & World Climate Research Programme 2019).

### OBJECTIVES

Here, we aim to highlight how the priorities identified in the CRIA, pertaining to the topics of the 2023 Ecocity World Summit – Biodiversity, Healthy Ecosystems, New Lifestyles and Regenerative Design – can assist in focusing city actors, including research and solution providers to reduce the local-level knowledge, information, and technology gaps, needed to transform city ambition into future reality.

Because while cities have significant ambition to design resilient and net-zero urban centres of the future, to meet the urgency of the dual biodiversity extinction and climate crises (Oke et al 2021), they require precise, evidence based and rapid decision making. We argue that coordinating researchers and other solution providers around the priority knowledge needs of cities themselves, is one way to achieve more precisely outcomes needed.

## Findings

### OVERALL FINDING

From the 39 priorities identified in the CRIA, 10 of them directly relate to Biodiversity, 16 relate to Healthy Ecosystems, 22 relate to New Lifestyles and 9 related to Regenerative Design.

### FINDINGS RELEVANT TO EACH OF THE THEMES

(Biodiversity, Healthy Ecosystems, New Lifestyles and Regenerative Design)

According to the themes of the CRIA, the most critical area of focus for **Biodiversity & Regenerative Design** is urban planning and design, requiring new strategies and nature-based solutions to reduce emissions and urban heat islands, as well as incorporating climate action into budgeting and planning; and developing building and urban places with net-positive impact.

Infrastructure and governance are the key areas for **Healthy Ecosystems and New Lifestyle**, priorities encourage research and innovation to address the urgency of water scarcity and pollution, urban agriculture potentials, circular economy potentials, controlled landfilling through community engagements, assessing recycling benefits, and understanding the impact of scope 3 emissions in urban mitigation planning. Governance priorities, are to understand the financial needs of nature-based solutions, award resilience, develop flexible and distributed/networked solutions, communicate economic and health effects of action versus inaction, and reduce the gap in climate relevant data on vulnerable communities.

For **New Lifestyle**, the priorities are mainly around financing, equity and supporting marginalised groups and vulnerable communities, technology-based innovations, and transformative decisions through social involvement and city-lead engagement.

### More information

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## Findings (visual abstract)

**CRIA Urban Planning and Design research and innovation priorities** to accelerate future actions for "Biodiversity", "Regenerative Design", "New Lifestyle", and "Healthy Ecosystems".

	Biodiversity	Regenerative Design	New Lifestyle	Healthy Ecosystem	CRIA priorities
Urban Planning & design	●	●	○	○	Priority 1: Identify a strategic approach to retrofitting city building stock based on building typology to reduce emissions.
	○	●	○	○	Priority 2: Quantify emissions and energy savings potential for deep energy retrofits of all buildings within the municipality and incorporation of digital tools to support emission reduction and boost systems' efficiency.
	○	●	○	○	Priority 3: Develop policy to set new building standards and accelerate uptake of efficiency benchmarks.
	○	○	●	○	Priority 4: Incorporate informal settlements and their residents in urban planning strategies through active consultation and co-creation.
	○	○	○	●	Priority 5: Use of social science in engaging a broad group of stakeholders in new initiatives from planning through implementation.
	○	○	●	○	Priority 6: Explore connections between water, energy, and materials to develop sustainable solutions in urban areas.
	○	○	○	●	Priority 7: Quantify potential and chart implementation pathways for blue/green infrastructure and nature-based solutions to reduce emissions, build adaptive capacity and resilience, provide co-benefits, and address issues of biodiversity.
	○	○	○	○	Priority 8: Assess planning policies and prioritise actions to help mitigate urban heat island effect.
	○	○	○	○	Priority 9: Explore adaptation and resilience in cities through culture and history to better understand their impact on climate action today.
	○	○	○	○	Priority 10: Mainstream climate change action planning into city decision making, integrating mitigation and adaptation into comprehensive planning and budgeting processes.

**CRIA Infrastructure research and innovation priorities** to accelerate future actions for "Biodiversity", "Regenerative Design", "New Lifestyle", and "Healthy Ecosystems".

	Biodiversity	Regenerative Design	New Lifestyle	Healthy Ecosystem	CRIA priorities
Infrastructure	○	○	○	○	Priority 11: Assess solutions to address the urgency of water-scarcity, pollution, and allocation in cities and their related ecosystems.
	○	○	○	○	Priority 12: Support community-based and entrepreneurial innovation in climate smart food systems.
	○	○	○	○	Priority 13: Further understanding is needed on potential for urban agriculture in terms of climate change mitigation and local food security.
	○	○	○	○	Priority 14: Understand impact of scope 3 emissions in urban mitigation planning, and how this can be best incorporated into municipal climate plans.
	○	○	○	○	Priority 15: Assess energy efficiency increase through use of micro grids.
	○	○	○	○	Priority 16: Evaluate balance between connected vs. distributed renewable systems based on access and reliability.
	○	○	○	○	Priority 17: Explore potential for circular economy approach throughout city systems, and how these may differ in developed and developing cities.
	○	○	○	○	Priority 18: Evaluate benefits of diversion and recycling considering supply and demand.
	○	○	○	○	Priority 19: Better understand how sustainable consumption habits can be fostered.
	○	○	○	○	Priority 20: Communicate community benefits of controlled landfilling to build understanding and buy-in of waste collection systems.
Governance	○	○	○	○	Priority 21: Explore how digital infrastructure can be built into transit systems to connect public and private transit technology.
	○	○	○	○	Priority 22: Explore how urban plans can be shaped to reduce vehicle miles travelled and support active/shared transit.

**CRIA Governance research and innovation priorities** to accelerate future actions for "Biodiversity", "Regenerative Design", "New Lifestyle", and "Healthy Ecosystems".

	Biodiversity	Regenerative Design	New Lifestyle	Healthy Ecosystem	CRIA priorities
Governance	○	○	○	○	Priority 23: Collaboration and capacity building to develop bankable projects and increase creditworthiness to de-risk investment.
	○	○	○	○	Priority 24: Increase focus on understanding the financial adaptation gap for cities, including short and long term financial needs for nature-based solutions.
	○	○	○	○	Priority 25: Governance landscapes (considering formal and informal actors) to support greater generation of municipal revenue and which support groups marginalised due to gender, age, race, ethnicity, religion, indigenous status and disability.
	○	○	○	○	Priority 26: Increase understanding of potential for digital financing - including crowd-sourcing, digital green bonds, and others - to fund city-scale projects.
	○	○	○	○	Priority 27: Strategic methods for awarding projects which prioritise sustainability, circular economy, and resilient low-emission roadmaps in urban solutions.
	○	○	○	○	Priority 28: Develop flexible and distributed/networked solutions that can be expanded or changed as innovation progresses or financing allows.
	○	○	○	○	Priority 29: Calculation and communicate of economic and health effects of action vs. inaction.
	○	○	○	○	Priority 30: Evaluate combinations of high-tech and low-tech innovation.
	○	○	○	○	Priority 31: Measures to value a wide range of climate and societal co-benefits of climate solutions.
	○	○	○	○	Priority 32: Explore incentives for municipal employees to innovate and take risks with transformative decisions.
Governance	○	○	○	○	Priority 33: Investigate emerging social innovations in cities that could be exported globally to scale solutions.
	○	○	○	○	Priority 34: Explore effective governance frameworks to facilitate city-led research and innovation, including creating space for learning-by-doing and learning-from-failure.
	○	○	○	○	Priority 35: Communication of uncertainty and risk of climate hazards for cities.
	○	○	○	○	Priority 36: Understand the mitigation and adaptation potential of city actions, including implications for social equity and justice.
	○	○	○	○	Priority 37: Generate city scale data for development of specific observation, models, and scenarios.
	○	○	○	○	Priority 38: Reduce the gap in climate relevant data on vulnerable communities.
	○	○	○	○	Priority 39: Equitable development and dissemination of knowledge and data inclusive of co-design and co-production through collaborative partnerships across public and private sectors, and civil sectors (including youth, Indigenous populations, residents of informal settlements, and other marginalised individuals).