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# BUILDING URBAN SECURITY IN CLIMATE CHANGE CONTEXT

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***Abstract****: Climate change and the degradation of nature are quickly becoming accepted as security challenges that we must address. Both globalization and technological development, complemented by the revolution in military affairs, raised the existing interdependencies and vulnerabilities. Moreover, climate change effects are amplified as urban populations become ever larger.*

*In this context, the planet is like a "patient" with multiple chronic conditions that needs to be treated both globally and locally. The applied treatment has to be effective, fast and safe to return the patient to a state of homeostasis that will secure our future.*

*Cities are interconnected complex systems with extensive and unpredictable feedback processes that operate at multiple scales and time frames. At urban level, there is the crucial necessity in anticipating and coping with climate challenges and also with war. Thus, in this paper we will also address cities as part of the cause and part of the solution for recent security challenges.*

***Keywords:*** *climate change; security; city; urban planning; civil-military cooperation; resilience.*

## Introduction

Climate change and nature degradation are current security concerns in the context of accelerated urbanization, along with other particularly important trends, such as the increase in armed conflicts at the international level. These challenges of contemporary societies are increased by global interdependencies, as well as by disparities between states in a technological world. Still, these concerns compete for attention and funding with more established threats, such as cyber-attacks or Russia-Ukraine war and other "hot spots" on global agenda.

In this context, cities play a key role in addressing climate and natural environmental crisis and also anticipating new challenges. Forced by the dynamics of the involved challenges, urban settlements will be able to improve their preparedness for natural and man-made disasters, improve response strategies and adopt more effective measures, thus strengthening their resilience to rapid change, if decision-makers manage to rethink the way we live and develop with existing resources at their disposal, by constantly innovating.

How can we build safer cities in this fragile context? Of course, the answer lies precisely in how we approach these challenges of a society in constant change stemmed by globalization and technological advancement. A common feature of these changes is the increasing speed of manifestation, as well as their spatial impact. Under pressure, transforming these global challenges into opportunities for cooperation, not conflict, can lead to building relationships based on a deep understanding of what binds us in our unity of human existence.

The changes that societies living in cities are experiencing today relate to rapid and visible evolution triggered by climate change effects in urban and inhabited spaces. It would therefore be important to understand, identify and know their impact on the transformations of different urban fabrics.

## 1. Understanding Climate Change and Security Interdependencies from the Global to the National Scale

International crises often involve rethinking security from the global to the local. In this regard, the 2025 World Economic Forum, held in Davos earlier this year, discussed the evidence indicating that climate change will lead to increased risks of interpersonal and group violence. Thus, "it was found that a 1°C increase in temperature increases interpersonal violence by about 2%, while the risk of intergroup conflict increases by 2.5% to 5%. This relationship is evident at different scales – local, national and even global" (Ruhweza and White 2025).

It was also noted that the loss of natural elements is likely to have the same type of effect. Climate and nature crises should be seen as linked, reinforcing each other. Climate change is acidifying the oceans, driving species migrations, and altering rainfall patterns in ways that threaten all aspects of nature degradation. Nature degradation, in turn, is depleting carbon pools and creating additional CO2 emissions, through mechanisms such as wildfires and increased deforestation, accelerating warming.

Also the military operations in urban terrain are transforming the cities around the world while reshaping the global influences of the biggest countries. Center for Naval Analyses Military Advisory Board coined in 2007 climate change as a "threat multiplier" meaning it exacerbates existing threats (e.g., terrorism, civil unrest, civil wars) (Goodman and Baudu 2023). Armed forces may need to adapt their strategies to address emerging climate-related challenges, such as humanitarian assistance after disasters or responses to increased resource competition.

### *1.1. The Challenges of Governance in a Rapidly Changing World*

As climate and natural environment crises accelerate, new threats are emerging that challenge elements of the status quo at both national and global levels. Now, we need robust, multi-stakeholder political processes to identify and address these concerns that must be prioritized.

Current intense political discussions focus on issues such as the sovereignty of states threatened by armed conflict and global interdependencies, the management of areas threatened by rising sea levels, the looming economic crisis, the governance of areas such as the Arctic and its resources, and climate-driven migration.

On this political background, the initiative of incorporating environmental threats into national security strategies is essential for preparing for the cascading risks that climate change and nature degradation will bring. Concomitantly, military and defence organizations are increasingly on the front lines of managing climate disruption, from responding to natural disasters to stabilizing regions affected by resource scarcity. All these initiatives are taken as the decision-maker became aware of the fact that ecosystems restoration to stabilize the climate and mitigate risks is a difficult task in a context where the international situation is doubled by ongoing armed conflicts and uncertainties on the international political scene.

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From social, to economic and ecological perspective the existing disparities of the world's cities should be diminished because they cause harmful cascading effects on human communities and their existence, leading to the irreparable deterioration of environment. Thus, contemporary cities will

have to reconfigure their operating laws in new flexible, adaptive urban systems and to increase their capacity for managing unpredictable situations.

Cooperation for integrated resource management, such as water-sharing agreements in drought-prone regions, would not only preserve the benefits of nature, but also reduce the risk of conflict arising from resource scarcity. Such cooperation is essential given the need to transform global food systems. Also, when carefully planned, early warning and adaptation saves both lives and resources in the long term. But to truly make a difference, we need action at every level—local, national, regional, international.

### *1.2. Decision-making consensus and the speeds of change from national to local level*

Urban climate resilience planning involves multiple participants. Therefore, planning, implementation, and maintenance of ecosystem-based adaptation measures require civil-military cooperation, each dimension with the need to adapt their policies, procedures, regulations, and practices in new integrated systems.

In order to support cities in climate resilience planning and design, there are science-based tools available for hazard exposure and vulnerability analysis. Policymakers, government authorities, planners, designers, and practitioners can work together to determine the requirements of the priority areas and set the adaptation targets.

Achieving consensus in decision-making regarding climate change and security at various scales — from national to local — requires coordinated efforts, inclusive dialogue, and adaptive strategies. Below is a structured analysis of decision-making processes, the challenges of consensus-building, and the implications for managing climate-related changes.

National governments often develop climate policies within existing frameworks that may not explicitly integrate security considerations. Hence, there's a need for comprehensive legislation that acknowledges the interplay between climate risks and national security.

International agreements (e.g., Paris Agreement (United Nations Climate Change 2015)) serve as platforms for countries to align their climate goals but often face challenges in implementation at the national level due to differing priorities. Multidisciplinary approaches that merge environmental science with social sciences can enhance understanding of the complexities involved in decision-making.

Thus, taking into consideration urban climate resilience planning, we underline four layers of awareness in decision-making process.

*Information Gaps and Planning:*

- A lack of accessible data on specific vulnerabilities exacerbates uncertainty in decision-making processes at both national and local levels.
- Encouraging transparency around climate data collection fosters better understanding among stakeholders regarding risks associated with inadequate action.

*Competing Interests and Adaptive Governance:*

- The urgency imposed by escalating climatic events often outpaces existing institutional capacities for response; thus, highlighting gaps necessitating rapid innovation within governance structures at all levels.
- Incremental adaptations might occur faster due to lower resource requirements than large-scale transformational shifts which demand extensive rethinking across multiple sectors — and securing multi-stakeholder buy-in could slow progress significantly if misaligned interests emerge during discussions.
- Building nimble institutions capable of responding quickly while ensuring stakeholder alignment is critical amid this dynamic environment.

- Decision-making structures must be flexible enough to adapt as new information becomes available or conditions change (e.g., new scientific data on climate impacts).
- Creating feedback loops where community-level observations inform national policies can enhance responsiveness.
- Different sectors may have conflicting priorities (e.g., economy vs environment), making it difficult to reach an agreement on shared goals.
- Industrial lobby groups may resist regulations they perceive as threatening profitability; thus requiring careful negotiation strategies that identify win-win scenarios.

*Technological Integration:*

- Leveraging technology (such as AI or GIS mapping) enables rapid assessment enabling faster deployment towards localized responses ─ but adapting human systems alongside technological advances remains essential given socio-political complexities involved.
- Navigating decision-making surrounding the interdependencies between climate change and security necessitates concerted efforts spanning from global frameworks down through national policies into localized actions based upon participatory governance principles characterized by engagement transparency adaptability inclusiveness guidance & collaborative networks across diverse actors operating within multi-layered contexts ultimately ensuring timely effective responses toward achieving resilient sustainable futures against ever-present challenges posed by climate change.

*Cultural Differences, Education and Awareness:*

- Raising awareness about climate realities among local populations–and enhancing education about adaptation measures–can foster grassroots support for necessary policy changes.
- Community-based programs focused on resilience-building not only address immediate threats but also empower citizens through knowledge sharing.
- Diverse cultural perspectives can influence how communities perceive risks associated with climate change; building consensus requires acknowledging these differences respectfully.
- Tailoring communication effectively across cultural contexts is crucial for fostering collaboration toward shared objectives related to resilience-building initiatives.

## 2. What Can Cities Do to Be More Resilient to Climate and Security Challenges?

Facing the previous stated serious challenges requires innovations in governance systems and planning. At the moment, the international system is set up to act on a state-to-state basis. Therefore, city leaders are forging networks within and across international boundaries to address shared problems, including climate change. National governments and multilateral organizations are not organized to work with city-level governance mechanisms, but around working with nation states, which limits the purpose for devolved decision making and consultative engagement at the city level. A common challenge for sustainable growth and climate resilience of cities is to achieve a de-coupling of economic growth from environmental degradation

We therefore need a sustained push in the promotion of transnational climate change governance. In this context local authorities and stakeholders could build their capacities for sustainable economic and ecologic planning of more resilient cities by using technological tools that facilitate cooperation and interoperability.

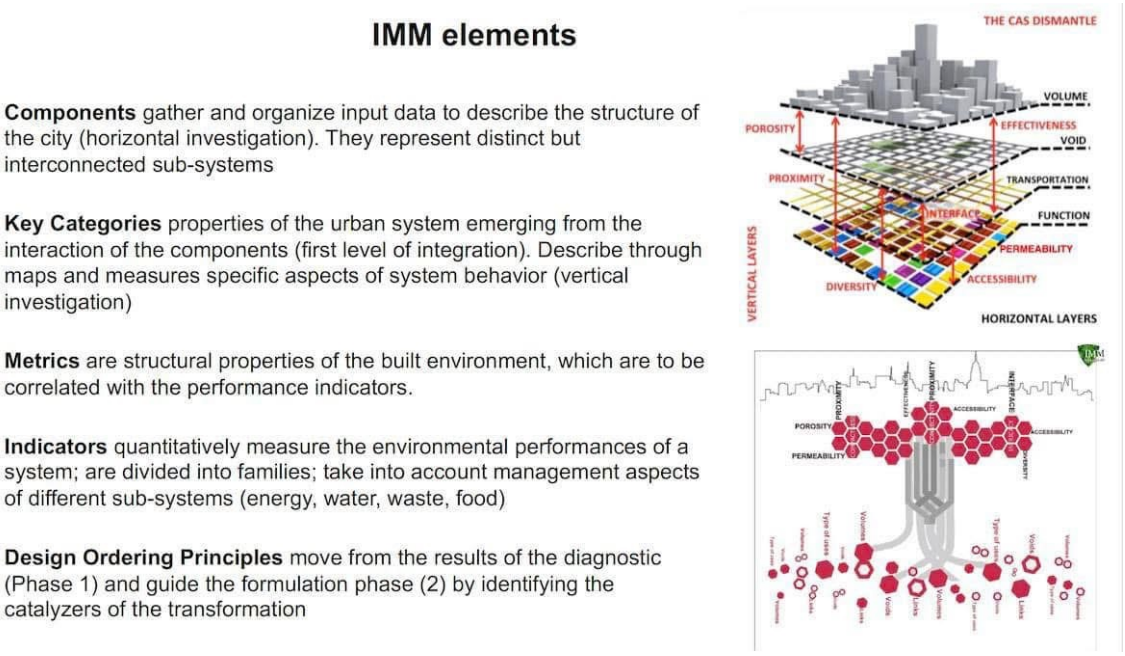


**Figure no. 1:** Integrated Modification Methodology (Politecnico di Milano 2012)

At city level approach, Integrated Modification Methodology (IMM) is a methodological interpretation of the Sustainable Development Goal (United Nations 2023), serving as a tool to apply Goal 11[1] principles in urban projects. Essentially, it is a scientific procedure designed to investigate the built environment on various scales, providing strategic planning and design scenarios. This could be an example to comprises four iterative phases planning at urban level:

- Investigation: study of morphological components and functioning mechanisms, leading to systemic problem diagnosis.
- Formulation: identification of the weakest structural attribute and definition of a local strategic plan based on sustainable design principles.
- Modification: translation of the strategic plan into tangible design steps through the IMM action wheel, resulting in one or a group of modification scenarios.
- Retrofitting: evaluation of scenarios using the same procedure as the actual context, refining the modifications.
- In already fragile contexts, this dynamic and scope for engagement to address climate risks is hindered by weak capacity, lack of political will and the perception that climate change is not a priority.

### *2.1. Cities as Part of the Cause and Part of the Solution for Climate Change*

Cities are interconnected complex systems with extensive and unpredictable feedback processes that operate at multiple scales and time frames.

"The climate of the earth is changing and as a result cities are bracing themselves to cope with threats from a more hostile environment, including flooding and extreme storms, as well as rising temperatures and water shortages. They must also deal with profound social problems. For thousands of years, cities have proved highly effective at lifting people out of poverty. But today there is a growing divide between rich and poor. While globalisation and the opening-up of markets around the world has generated great wealth, it is unevenly distributed. The gated communities of the affluent stand next to shanty towns in which households have no clean running water. A third of all city dwellers now live in slums. In many cities of the developed world there is also rising income

[1] A.N.: Goal 11 - *Make cities and human settlements inclusive, safe, resilient and sustainable.*

inequality, resulting in increasingly polarised societies" (P. D. Smith 2012). This polarisation of societies leads to conflicts, instead of unity. Thus in this context, the optimal action is *Anticipatory Adaptation* (McCarthy, Canziani and Leary 2001).

In 2018, in the book *Planning and Designing Defence Objectives in the Smart City*, we highlighted some current and particularly important things: "A smart city is not only a more efficient human settlement but also a paradoxically vulnerable space, due to its high complexity and physical and cyber interdependencies. Therefore, in a world where the security of citizens is increasingly difficult to ensure, the benefits of living in a smart city should be greater compared to its vulnerabilities. We believe that in the future there will be no sustainable urbanization and safer cities without a new form of spatial planning. This should take into account phenomena such as: degradation of the natural environment and climate change, the increase in terrorist attacks taking place in cities and the increase in urban violence, the increase in disparities between different cities around the world, poverty, migration, the emergence and development of new technologies, etc." (Rusu 2018).

Cities are vulnerable to all kinds of stresses and shocks. "Through our practice and research across multiple contexts in the developed and developing world, we see that there are a number of generalizable characteristics observable in resilient cities. These relate to the behaviours and capacities of multiple sets of actors within cities who can shape resilience outcomes — from different parts of city government, to the business sector, civil society, and communities themselves" (Uennatornwaranggoon 2015). In short, they are dynamic places where resilience is critical to avoiding prolonged or irrecoverable outcomes when bad things happen.

While cities contribute significantly to global challenges such as climate change and inequality, they also possess immense potential to lead as proactive solutions. Therefore, through intentional policies, innovative practices, and community engagement, cities can transform themselves into resilient and sustainable environments that benefit both their residents and the planet. Balancing these dual roles is essential for a sustainable urban future.

### *2.2. Critical Urban Climate Change Resilience Recommendations*

Building urban security in the context of climate change is a multifaceted challenge that requires a comprehensive approach. As climate change exacerbates natural disasters, sea-level rise, and other environmental stresses, cities must adapt to safeguard their residents, infrastructure, and economies.

In this context it is necessary to prioritise climate resilience by taking a consistent and holistic approach to urban planning and investment decisions. An accessible framework that can help decision-makers to embrace collaboration is the City Resilience Framework (CRF) launched for the first time in 2014 (ARUP 2024). Since then it significantly shaped city resilience, influencing urban practice globally.

The new version of CRF (2024) reframes the 12 goals and 56 indicators of CRF'14 by redirecting indicators towards 22 updated goals that align more closely with city departments.
The updated version of framework emphasis:

- Foster engagement with a wide range of stakeholders to ensure inclusive planning, supporting this challenging task that city practitioners regularly face.
- Collaborate with regional and national authorities to align strategies and share resources.
- Create a consistent narrative that supports cities to mobilize investment.
- Review interventions and initiatives to ensure resilience is embedded.

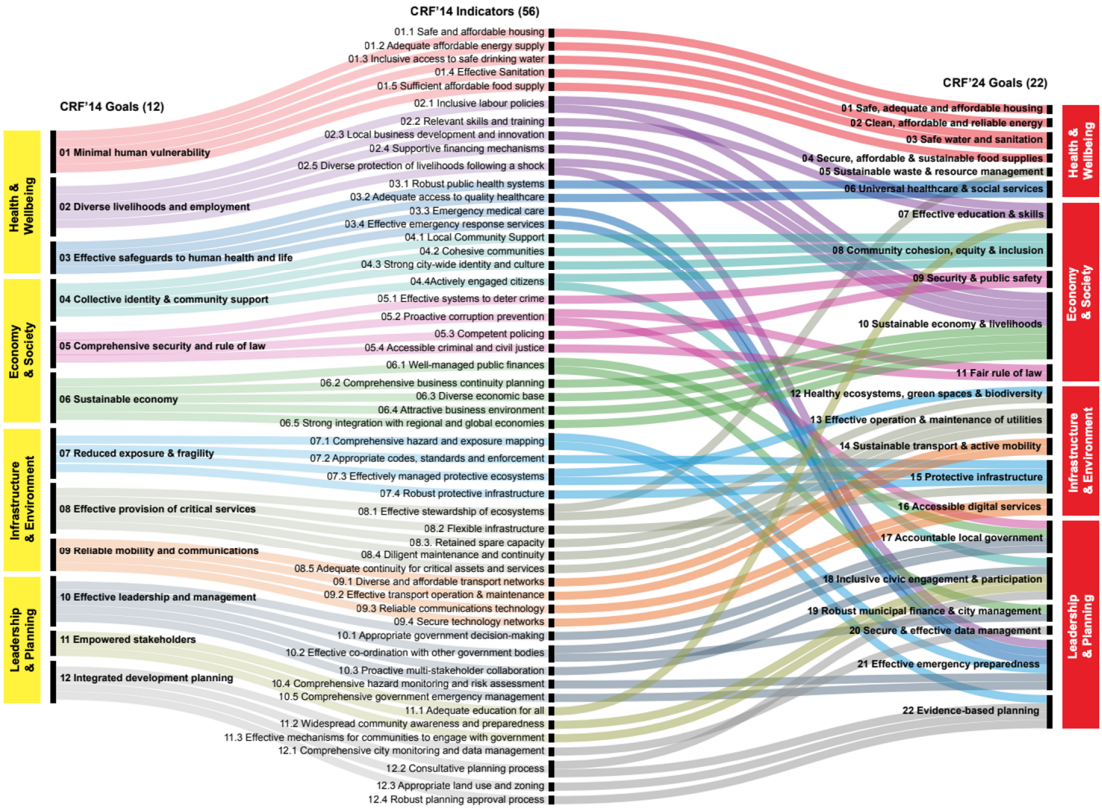


**Figure no. 2:** City Resilience Framework 2024 Edition (ARUP 2024)

Previous figure shows how CRF'24 reframes the 12 goals and 56 indicators of CRF'14 by redirecting indicators towards 22 updated goals that align more closely with city departments. This way cities can clearly identify priority areas for actions, making the framework more accessible, action-oriented and able to attract investment. The extended 22 goals are more effective and better grouped by dimensions: Health & Wellbeing, Economy & Society, Infrastructure & Environment, Landscape & Planning.

The path forward to more resilient and secure cities is through knowledge, collaboration, coordination and synergy across sectors. These factors should be reinforced by human values as trust, power and control, mutual respect and recognition of those involved in cities planning and development.

To effectively leverage their potential as solutions, cities have to rely on four main pillars:

*a) Integrate Sustainability into Core Planning* by:

- Embedding sustainability and resilience into the fabric of urban policy, planning, and governance;
- Ensuring that urban security policies incorporate climate considerations across all vital sectors, such as housing, transportation, and health;
- Implementing regulations that discourage construction in high-risk areas and promote the development of green spaces;
- Encouraging mixed-use neighbourhoods that foster local economies and reduce reliance on long-distance travel, minimizing carbon footprints;
- Mapping climate risks by utilizing geographic information systems (GIS) to pin the areas that are at risk of flooding, heatwaves, wildfires, and other climate impacts;

- Identifying vulnerable populations, such as low-income communities, the elderly, and those without adequate housing or healthcare;
- Adapting strategies and planning of the armed forces in order to address emerging climate-related challenges, such as humanitarian assistance after disasters or responses to increased resource competition;
- Planners and designers of future virtual realities who should take into consideration that the city have both a defensive and an offensive role by its activities and function.

In all these, *human discernment and creativity* will play an important role in planning by using *artificial intelligence algorithms* to generate the most accurate situation and possible future cities development scenarios. Also, the use of green defence concept as the development and implementation of ecological processes which are undertaken by military in order to increase energy efficiency and mitigate negative influence on the environment without negatively influencing operability is also an aspect of this pillar.

*b) Collaborate Across Sectors* by:

- Fostering collaboration among government, civil-military, private sector, non-profits, and communities, including environmental organizations, businesses, and academic institutions, to pool resources and expertise for urban security initiatives and to develop integrated approaches to urban challenges;
- Working with neighbouring municipalities to address shared climate risks and pool resources for regional resilience strategies;
- Developing and regularly updating disaster preparedness plans that take climate risks into account, ensuring that all stakeholders are aware of their roles during a crisis;
- Smart city solutions by utilizing technology such as Internet of Things sensors for real-time monitoring of environmental conditions, enabling timely responses to climate-related threats;
- Data-driven decision making by leveraging big data analytics to improve forecasting, manage resources efficiently, and support evidence-based policy-making.

*c) Invest in Green Infrastructure and Technologies* by:

- Prioritizing investments in green technologies, renewable energy, and sustainable transportation systems;
- Establishing and securing funding for climate adaptation projects, leveraging public-private partnerships and international climate financing;
- Focusing on context related nature-based solutions;
- Retrofitting buildings in terms of upgrading buildings to be more resilient to extreme weather events, ensuring that they can withstand floods, hurricanes, and heatwaves;
- Configuring sustainable drainage systems (SuDS) by implementing green infrastructure solutions like parks, green roofs, and permeable pavements to manage stormwater and reduce flooding;
- Energy resilience: diversify and enhance the energy supply, incorporating renewable energy sources and ensuring access to backup power during emergencies.

*d) Address Social Equity* by:

- Ensuring that measures taken also address social inequalities, providing opportunities and resources for all community members;
- Conducting regular training and simulations for residents and local authorities to enhance community readiness for climate-related emergencies;
- Developing programs that address climate-related health risks, including heat-related illnesses and vector-borne diseases;
- Ensuring that healthcare facilities are resilient to climate impacts, maintaining essential services during disasters;

- Involving community members in urban planning processes to ensure their needs and insights shape climate adaptation strategies;
- Launching campaigns to educate residents about climate risks, emergency procedures, and ways to strengthen community resilience.
- Providing equitable access by ensuring that all community members, particularly marginalized groups, have access to resources and support during climate crises.
- Tailoring strategies to fit the cultural contexts of different neighbourhoods to enhance trust and cooperation among residents, ensuring that climate adaptation measures resonate with community values and practices.

## Conclusion

Building urban security in the context of climate change necessitates a proactive, inclusive, and multi-layered approach. By incorporating risk assessments, enhancing infrastructure, fostering community engagement, and promoting innovative solutions, cities can become more resilient to the myriad challenges posed by a changing climate. Investing in these strategies not only protects urban populations but also enhances the overall quality of life and supports sustainable development in the long run.

As we understand that besides raw materials and energy as essential resources for human settlement development, the most important resource nowadays is knowledge. Over time, through knowledge and innovation we could find solutions to challenges that occur. Nowadays applied knowledge needs to take into consideration moral values that govern human beings in a society where technological tools and artificial algorithms occur. It also emphasizes the critical importance of conducting climate risk assessments to adapt to the dynamic changes in climate and anthropogenic development. It outlines the necessity of developing climate projections as "threat multiplier" focusing on extreme temperatures, sea level rise, and extreme precipitation.

To effectively map future climate challenges, the establishment of a comprehensive climate risk database and the enhancement of numerical modelling skills are essential. In addition to hazard assessments, vulnerability assessments should focus on properties, people, and services, as these are the most impacted. Creating a detailed building inventory and formulating vulnerability curves using historical data and expert judgment are recommended steps.

Furthermore, civil-military spatial planning should align with urban climate adaptation efforts. Based on the results of climate risk assessment, developing regulations and building codes, as well as rational land use planning for new development areas, are effective measures for spatial adaptation to climate change. Planning, implementation, and maintenance of ecosystem-based solutions require the civil-military cooperation, each with the need to adapt their policies, procedures, regulations, and practices. The lack of coordination between developing speeds of cities creates an operative void that leaves the city at the expense of other forces outside the discipline.

In summary, while cities contribute significantly to global challenges such as climate change and inequality, they also possess immense potential to lead as proactive solutions. Through intentional policies, innovative practices, and community engagement, cities can transform themselves into resilient and sustainable environments that benefit both their residents and the planet. Balancing these dual roles is essential for a sustainable urban future.

## BIBLIOGRAPHY:

ARUP. 2024. *City Resilience Framework 2024 Edition – Preparing for the next decade.* The Rockefeller Foundation.

Goodman, Sherri, and Pauline Baudu. 2023. "BRIEFER: Climate Change as a "Threat Multiplier": History, Uses and Future of the Concept." 3 January. Accessed 03 05, 2025.

https://climateandsecurity.org/2023/01/briefer-climate-change-as-a-threat-multiplier-history-uses-and-future-of-the-concept/#:~:text=The%20term%20was%20coined%20in,to%20contribute%20to%20security%20risks.

McCarthy, James J., Osvaldo F. Canziani, and Neil A. Leary. 2001. *CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY.* Contribution of Working Group II to the Third Assessment Report, Cambridge: CAMBRIDGE UNIVERSITY PRESS.

P. D. Smith. 2012. *City. A guidebook for future urban age.* . London: Bloomsbury Publishing.

Politecnico di Milano. 2012. *Integrated Modification Methodology (IMM).* Accessed February 2, 2025. https://www.immdesignlab.com/methodology.

—. 2012. *Integrated Modification Methodology" (IMM).* Accessed February 2, 2025. https://www.immdesignlab.com/methodology.

Ruhweza, Alice, and Eric White. 2025. "Why we need to start talking about the relationship between climate change and security." *World Economic Forum Annual Meeting.* Davos: https://www.weforum.org/stories/2025/01/climate-change-security-relationship/. Accessed February 2, 2025. https://www.weforum.org/stories/2025/01/climate-change-security-relationship/.

Rusu, Sorina-Georgiana. 2018. *Planificarea și proiectarea obiectivelor destinate apărării în orașul inteligent.* București: Ed. Paralela 45.

Uennatornwaranggoon, Fern. 2015. *INSIGHTS FROM THE ASIAN CITIES CLIMATE CHANGE RESILIENCE NETWORK. Urban Climate Change Resilience in Action: Lessons from Projects in 10 ACCCRN Cities.* The Rockefeller Foundation.

2015. "United Nations Climate Change." *https://unfccc.int/.* December. Accessed February 2, 2025. https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf.

United Nations. 2023. *The Sustainable Development Goals Report. Special edition.* New York, NY, 10017, United States of America: United Nations Publications.