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Positionspapier aus der ARL 167

RESILIENT METROPOLITAN REGIONS

Recommendations for Action

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Hanover 2026

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Positionspapier aus der ARL 167
eISSN 1611-9983
The PDF version is available at https://www.arl-net.de/shop (Open Access)
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Published by the ARL – Hanover 2026
Translation and proofreading: K. Thomas
Formal proofreading: S. Trockel
Typesetting and layout: G. Rojahn

Recommended citation:
ARL – Academy for Spatial Development in the Leibniz Association (ed.) (2026):
Resilient Metropolitan Regions – Recommendations for Action.
Hanover. = Positionspapier aus der ARL 167.
https://doi.org/10.60683/d7sr-nv71

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Executive Summary

Metropolitan scale is increasingly the most appropriate territorial level from which to address resilience in the face of systemic and cross-boundary risks, since metropolitan regions concentrate population, economic functions, infrastructure networks and socio-spatial inequalities. Further, climate risks, infrastructure failures, health crises and social fragmentation routinely exceed municipal boundaries and individual sectoral approaches. Metropolitan resilience is thus defined as the capacity of actors and systems within a supra-municipal territory, with a shared strategic vision, to maintain essential functions, adapt to long-term stresses and transform in response to shocks, ensuring that socio-spatial inequalities are not reproduced or deepened.

In the current polycrisis context, characterised by climate change, geopolitical tensions, digital transformation, pandemics and growing social inequalities, resilience has evolved from an emerging concept into a guiding paradigm for public policy. As emphasised in the Strategic Foresight Reports of the European Commission (2020, 2025), resilience must go beyond reactive crisis management and instead enable anticipation, adaptation and transformation in a sustainable way. Resilience is a dynamic process combining three interrelated capacities: anticipation (preparedness and foresight), response (absorbing and managing shocks), and adaptation and transformation (learning and structural improvement).

In this context, resilience has become increasingly prominent in debates on urban strategies and spatial planning, providing a strong opportunity for the aggiornamento of the term. For spatial planning, the most relevant perspective is evolutionary resilience, which emphasises not only maintaining essential functions but also "bouncing forward" by using crises as opportunities for innovation, institutional learning and structural change. In this vein, resilience has a clear territorial dimension since vulnerabilities and capacities differ across places, depending on infrastructure, ecological systems, social capital, governance arrangements and spatial morphology. Hence, metropolitan territories function as "systems within systems", requiring better governance, cross-scale coordination and integrated planning approaches.

Resilient metropolitan regions are those aware that resilience is not a static goal but a continuous process of anticipation, coordination, learning and transformation. Such an understanding represents both a necessity and an opportunity to modernise the role of planners and spatial planning, strengthen governance capacities, and promote sustainable and socially cohesive metropolitan development with the aim to navigate uncertainty and emerge stronger from future disruptions.

To foster resilience, a greater emphasis on governance at the metropolitan level is needed. The following recommendations for action are intended to help both policymakers and practitioners to enhance their capacity to anticipate, respond and learn from changes:

> Focus on the five more strategic fields of action: sustainable urbanisation, natural and technological risks, green and blue infrastructures, critical infrastructures, and social vulnerabilities and basic needs;

> Enhance metropolitan-wide networking capacities to better manage shared risks and emerging threats;

> Integrate resilience assessments and strategic foresight into all stages of policymaking;

> Think, plan and act "metropolitan", a scale that concentrates population, activities, infrastructures and facilities which primarily structure the territorial system;

> Establish robust institutional frameworks to ensure coordinated and accountable governance.

RESILIENT METROPOLITAN REGIONS

Recommendations for Action

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Abstract

In an era of *polycrisis*, characterised by climate change, geopolitical instability, digital transformation, pandemics and widening social inequalities, resilience has become a guiding principle for public policy. As highlighted in the Strategic Foresight Reports of the European Commission (2020, 2025), resilience requires moving beyond reactive crisis management towards proactive anticipation, preparedness and structural transformation. In this context, the metropolitan scale emerges as the most appropriate level to address systemic and cross-boundary risks, as metropolitan regions concentrate critical infrastructures, economic activity, population density and socio-spatial inequalities.

Metropolitan resilience is defined as the capacity of actors and institutions within a supra-municipal territory, with a shared strategic vision, to maintain essential functions, adapt to long-term stresses and transform in response to shocks. Adopting an evolutionary perspective, resilience is understood as a continuous process of learning, institutional flexibility and innovation.

This paper proposes a set of recommendations for action to foster resilience at metropolitan level focusing on five strategic fields of action: sustainable urbanisation, natural and technological risks, green and blue infrastructures, critical infrastructures and social vulnerabilities. Strengthening metropolitan governance capacities, enhancing inter-institutional cooperation, integrating resilience assessment and strategic foresight into policymaking, and establishing robust institutional frameworks are also essential to ensure coordinated and accountable resilience strategies.

Keywords

Urban resilience – Resilient metropolitan regions – Strategic spatial planning – Metropolitan governance – Strategic Foresight.

1 Background and objective of the Position Paper

Resilience has become a topic of increasing importance due to the acceleration of social change, the succession of more frequent crises (polycrisis) and the emergence of future uncertainties. Despite the massive boost of the term since the 2000s (Amirzadeh/Sobhaninia/Sharifi 2022; Ribeiro/Pena Jardim Gonçalves 2019), the consequences of the global financial crisis, the COVID-19 pandemic, the digital transformation and the increase of climate-change-related phenomena on all continents have introduced this issue to recent policy debates. The 2020 Strategic Foresight Report adopted by the European Commission (EC 2020), for example, puts resilience forward as a new compass for EU policies, defining it as "the ability not only to withstand and cope with challenges but also to undergo transitions, in a sustainable, fair, and democratic manner". The 2025 Strategic Foresight Report highlights that "the scale, complexity, diversity and persistence of challenges ahead require a new level of resilience […]", which "entails a leap beyond a mainly reactive approach towards a proactive and forward-looking one, to anticipate events, optimise resources, and prepare for different future scenarios" (EC 2025).

The concept of resilience has also become increasingly prominent in debates on urban strategies (Observatory Metropolis. 100 Resilient Cities 2017) and on urban and regional policy and planning (Davoudi 2012; Tasan-Kok/Stead/Lu 2013; Greiving 2018; Marom/Shlomo 2024). In this regard, the Resilient Cities Network claims that resilient cities cannot be built without a metropolitan approach. Shocks or events overflow traditional administrative boundaries affecting neighbouring municipalities, leading to the emergence of the "metropolitan scale" as a key territorial reference for policy development and the management of resilience. Moreover, any shock in one of the parts of a metropolitan territory has a quicker and probably stronger ripple effect through the whole system. As a result, metropolitan territories, where rural-urban areas are connected, are more complex than "other" cities and therefore responses need to be integrated. This is a multi-level governance issue, since no single metropolitan body is likely to possess all the competences required.

The metropolitan scale faces challenges in organising this response for several reasons. Firstly, the municipalities embedded in these systems tend to set their own decisions and policies, usually in an uncoordinated manner. Secondly, the understanding of "metropolitan" changes from place to place. And finally, metropolitan borders are often functional and very much dependent on collaboration dynamics between stakeholders. This means that it is more difficult to provide effective responses in the absence of proper metropolitan governance.

2 Understanding resilience and its spatial dimension

Resilience has been defined as the ability of a complex (socio-ecological) system to absorb disturbance and retain its basic functions and structure (Walker/Salt 2006) or to adapt (or even transform) accordingly (Ribeiro/Pena Jardim Gonçalves 2019) in the face of two main types of risks or changes[1]:

> Abrupt "shocks" (e.g. an earthquake or a pandemic) that disrupt everyday life and drastically impair the functioning of (urban) systems, though typically only for a limited period of time;

> Enduring "stresses" or crises (e.g. climate change or aged infrastructures) that put (urban) systems under constant pressure, leading to overloads that can severely restrict sustainable development in the long run (Coaffee et al. 2018).

1 Priebs (2022: 100) underlines the importance of the following crises and threats: the climate crisis (i.e. increasing global warming and its consequences, heavy rainfall, floods, droughts, etc.); the biodiversity crisis; pandemics; the energy crisis; terrorist threats from attacks on public institutions and busy places in the cores of metropolitan regions; and military threats (e.g. Russian attack on Ukraine).

Furthermore, three general approaches to resilience can be distinguished, each focused on different systems – infrastructure, ecosystem and social systems – and ideal responses to shocks and stresses – bouncing back and/or adaptation-transformation (Davoudi 2012). Among the different approaches (engineering, ecological and evolutionary resilience), the "evolutionary resilience approach" is the most relevant for spatial planning, since it emphasises learning capacity, viewing shocks as turning points[2] (Brunetta et al. 2019). The concept of resilience is based on the premise that systems can be subject to stresses and shocks, but can also manage them so as to absorb disturbances, reacting and adapting to them (Brown 2016). Thereby, resilience should be thought of as a continuous process (Wilson/Wilson 2019), and this is where planning and management come into play.

The abovementioned characteristics and dynamics of resilient systems can be visualised using an idea of interlocking gears (see Figure 1), where processes of anticipation, reaction and adaptation go hand in hand.

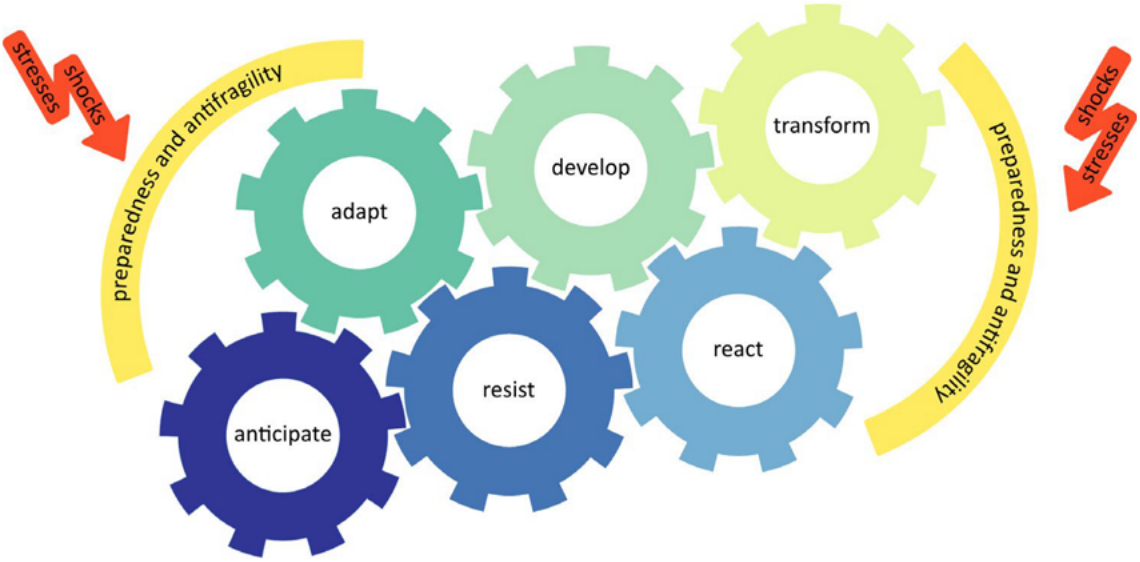


Figure 1: Resilient systems in their relation to external shocks and stresses / Source: the authors.

Vulnerabilities and responses to shocks and stresses vary across places. Although spatial planning is the policy area most directly related to territorial development, the integration of resilience approaches in spatial and territorial planning remains incomplete (Pascariu/Banica/Nijkamp 2022). In this regard, territorial strategies for adaptation and transformation should be based on an in-depth assessment of the relationships between socio-ecological and socio-technical systems. This should include consideration of specific territorial aspects such as (i) attributes and assets (economic, social, environmental, infrastructure) and (ii) capacities (social capital, community functions, connectivity, planning) (Brunetta et al. 2019).

In particular, the notion of spatial resilience "integrates the analysis of consequent resistance, adaptation and transformation of the territory to perturbations or shocks" (Pascariu/Banica/Nijkamp 2022), viewing territories as systems within systems (Berry 1964). However, a distinction can be made between spatial resilience and territorial resilience, with the former remaining very much linked to ecological studies of ecosystem management/planning (where issues regarding connectivity, accessibility, spatial morphology and landscape structure are major topics), while the latter is more linked to social-economic and urban systems (Pascariu/Banica/Nijkamp 2022).

2 This connects with the term "antifragility" (Taleb 2012), which suggests that "something is antifragile if it can from time – from events, perturbations, stressors, volatility, disorder – also gain, get stronger, improve, evolve and adapt better". In other words, "antifragile gains from disorder" (e.g. Blečić/Cecchini 2024).

3 Resilience at metropolitan level: characteristics, challenges and tools

3.1 From urban resilience principles to metropolitan resilience

Many studies have identified the key characteristics of resilience frameworks at urban level. Table 1 summarises the five principles that can be derived from these elaborations:

Urban resilience principles	Examples
ROBUSTNESS *Be resistant to shocks & stresses*	> Well-equipped technical, social and green-blue infrastructures > Robust population > Redundancy in critical infrastructure
ADAPTABILITY *Be flexible in responding to changed circumstances*	> Flexibility in (decision-making) processes > Multifunctional urban structures > Efficient infrastructures and governance > Empowerment and pronounced "Do it Yourself" (DIY) culture
LEARNING *Be prepared for change by reflecting on prior events*	> Forecasting capability (stress tests, scenario development) > Monitoring of urban systems > Knowledge exchange with other cities / sectors of society > Constant study of trends
INNOVATION *Be creative in dealing with novel challenges*	> Resourceful & creative stakeholders > Skills & qualifications in civil society, public sector, business > Networking btw. different groups, communities, policy areas > High socio-cultural diversity
GOVERNABILITY *Remain capable of acting during crises*	> Agile politics and administration > Independence from superordinate systems and trends > Capabilities to coordinate & cooperate > Equity & empathy

Table 1: Urban resilience principles / Source: the authors based on Davoudi 2012, Tasan-Kok/Stead/Lu 2013, Coaffee et al. 2018, Greiving 2018, Sharifi/Yamagata 2016, 2018, Wittmayer/Hölscher 2017, Ribeiro/Pena Jardim 2019, Amirzadeh/Sobhaninia/Sharifi 2022 and Datola 2023.

Metropolitan resilience requires a shared understanding of the meaning of "metropolitan" among all stakeholders. This agreement is particularly relevant in metropolitan contexts, where the relevant scale is dynamic and depends on functional interrelations, and where formal status varies from country to country. In our view, metropolitan territories are not simply large or dense urban agglomerations but are functionally integrated and institutionally complex territorial systems where strategic functions, risks and vulnerabilities often cut across municipal and urban/rural boundaries. Therefore, we adopt a definition of metropolitan resilience that refers to the capacity of actors and systems within a supra-municipal territory that contains most urban functions, with a shared strategic vision, to be prepared to maintain essential functions, adapt and transform in response to stresses and/or shocks, while ensuring socio-spatial inequalities are not reproduced or deepened. Metropolitan resilience depends less on scale than on the ability to coordinate fragmented municipalities, align sectoral policies and act across administrative boundaries.

3.2 Challenges and fields of action for metropolitan resilience

The range of matters to which urban planning scholars apply resilience includes mitigation and adaptation to climate change; disaster planning, management and recovery; energy and environmental security; urban water management and urban design (Wilkinson/Porter/

Colding 2019: 24). However, the essential functions of metropolitan systems go beyond this "spatial" approach. They are related to the provision of basic requirements for life (i.e. clean air, water, food, energy and housing) and the provision of opportunities to prosper and thrive, and social cohesion. Challenges that call for action at metropolitan scale are climate change, transportation, housing, public health management, security and social cohesion (Observatory Metropolis. 100 Resilient Cities 2017: 4).

As a result, some fields of action emerge as particularly relevant at metropolitan level. Firstly, urban sprawl, which is linked to high land take and usually involves soil sealing due to building or transport infrastructures. Secondly, critical infrastructures (e.g. transport, water, energy, telecommunication, data centres, education, hospitals, etc.) in densely populated areas, which must be considered and dimensioned in such a way that they not only function under normal conditions (i.e. a fault-free system state) but also guarantee the basic functionality of the overall system in the event of failure (e.g. blackout). Climate-change related events – such as flooding, which is the most frequent natural disaster affecting urban areas – and effects like the "heat island effect" also call for action in the frame of resilient strategies. Finally, social vulnerabilities and inequalities in access to affordable housing and basic healthcare, youth unemployment, aging, poverty, safety in public spaces and socio-spatial segregation require social solidarity mechanisms and decisive public action (European Committee of the Regions 2019), following the principle of a just transition.

These fields of action arise as interrelated systems that require integrated metropolitan governance tools and capacities to promote resilient territories. Thinking and planning strategically helps us to understand the potential trade-offs of resilience policies: for example, infrastructure protection, energy renovation or climate adaptation may increase resilience in technical terms while producing exclusionary or gentrifying effects if affordability, access and social justice are not considered.

3.3 Metropolitan governance and strategic spatial planning

Metropolitan governance is a condition for the success of resilient strategies but is also a challenge in itself. It refers to coordination, cooperation and collaboration capacities, both at institutional and community levels. In metropolitan regions, resilience can be enacted through diverse plans, infrastructural projects and governance arrangements according to the scale, main objective (resilience-related issue), system characteristics (flexibility, diversity, redundancy, safe failure), governance itself (authorities engaged in the planning process), agents' capacities (responsiveness, resourcefulness and learning) and institutional features (rights and entitlements, decision-making, information) (Marom/Shlomo 2024). All these elements should be considered when assessing metropolitan governance intended to foster resilience.

To manage resilience, flexibility and adaptative co-management are crucial. The latter is characterised by four institutional prescriptions: (1) collaboration in a polycentric governance system, (2) public participation, (3) an experimental approach to resource management and (4) management at the bioregional scale (Huitema et al. 2009). This approach echoes the concept of inter-territoriality, which describes a form of multi-level governance involving multiple stakeholders and crossing different territorial scales in line with the issue at hand: political constituencies, administrative districts and territories of everyday life (housing, work, consumption, leisure, etc.) (Perrin 2024).

Adopting a strategic spatial planning approach can enable these dynamics at metropolitan level. The Metropolitan Commitment 2030 (Pla Estratègic Metropolità de Barcelona 2023) includes a series of statements that support this position (see Table 2).

Dimensions	Focus	How do they relate to the metropolitan scale?
Institutions	Flexible decision-making and implementation	Progressively adapt their capacity for action to the dimensions of the real metropolitan territory through tools for coordination and cooperation with its immediate environment.
Challenges	Identification of essential functions and infrastructures	Identify the areas in which this scale is the most appropriate to face certain challenges and then determine and design the corresponding policies, which in many cases can complement municipal policies to make them more effective.
Information & measurement	Availability of data and indicator frameworks	Avoid just aggregating data from the municipalities that make up the metropolitan area but use specific indicators and analyses of the whole metropolitan area.
Stakeholders' participation	Processes for actors' engagement and networking	Design participatory processes with very fine-tuned samples using a combination of tools that provides sufficient diversity and representativeness to promote a shared awareness of risks and threats and community learning.

Table 2. Metropolitan governance and strategic planning dimensions of resilience / Source: Authors' synthesis based on the Metropolitan Commitment 2030 (Pla Estratègic Metropolità de Barcelona 2023) and associated PEMB documents on metropolitan governance.

Strategic spatial planning is a dynamic process involving the entire community and aims to achieve sustainable, competitive and socially cohesive development. There are two main types of plans according to the nature of the issue to be addressed: cross-cutting and sectoral plans. Firstly, cross-cutting plans include metropolitan strategic plans, metropolitan spatial plans, metropolitan climate-change plans or metropolitan resilience plans. Planning models that combine binding spatial planning with strategic planning in the same planning document have also appeared and can be a useful solution, as shown by the case of the Territorial Coherence Plans (*Schémas de Cohérence Territoriale, SCoT*) that have existed in France since the 2000s and that cover large urban areas, large catchment areas or employment areas[3]. These plans were conceived as both strategic and operational cross-cutting planning instruments with a horizon of 20 years. In recent times they have targeted anticipation of the consequences of climate change and ecological, energy, demographic and digital transitions. Secondly, among the sectoral plans, metropolitan transport plans are particularly important since unsustainable mobility in metropolitan regions is one of the biggest drivers of the climate crisis (greenhouse emissions, air pollution, etc.). Metropolitan strategic, spatial and transport plans can be seen as the golden triangle of the planning action of the metropolitan regions, which are institutions with an unequivocal strategic vocation (Donati 2023).

4 Recommendations for action to foster resilience at metropolitan level

Having addressed the challenges, the characteristics of resilient territories and the planning approach, we propose the following recommendations to foster resilience at metropolitan level:

3 A SCoT associates several municipalities and municipal groupings and their respective spatial or urban plans. It is managed by a specific, inter-territorial body and provides a reference framework to coordinate the various sectoral policies that relate to spatial planning and urban development in a given area: housing, mobility, commercial development, environment and biodiversity, energy, climate. https://www.fedescot.org/ (02.09.2026).

4.1 Strengthen metropolitan resilience by focusing on five strategic fields of action

We recommend focusing on the following five strategic fields of action as substantive entry points to address resilience at a metropolitan level:

> **Sustainable urbanisation:** introduce the following measures: zero-net land-take objectives, reduction of soil sealing, "grey-to-green" strategies and sponge-city models.

> **Critical infrastructures:** guarantee their redundancy, diversity and self-sufficiency as guiding principles (e.g. creation of bypasses and tangential routes in transport networks).

> **Natural and technological risks:** protect against floods through wider zones delimitated using a risk-based analysis and the introduction of "nature-based solutions" (e.g. risk-based zoning) and protect against cyberattacks.

> **Green and blue infrastructures:** place parks and other green elements at the centre of planning to prevent heat islands, manage health and pandemics (e.g. urban parks, green roofs, vertical gardens and Sustainable Drainage Systems to mitigate urban heat islands, public health and climate adaptation benefits, etc.).

> **Social vulnerabilities:** guarantee access to housing, basic services, food sovereignty and public safety; reduce socio-spatial inequalities and strengthen social cohesion, etc.

These five fields of action are important in relation to climate change, strongly interdependent and directly related to the three classical intervention areas of spatial planning, namely: urban space (built environment), open spaces (zoning for prevention of flood or other natural risks, such as soil erosion or geomorphological hazards) and infrastructures (transportation networks, but also other networks of linear technical infrastructures). Finally, in the context of territorial inequalities between attractive metropolitan cores and inner and surrounding peripheries, spatial planning also aims to bring greater social equality and ensure a just transition. All fields of action must consider the socio-economic impact of the specific policies to rebalance the material conditions that influence the quality of life of individuals and social groups, valuing the differentiated characteristics of territories.

4.2 Enhance metropolitan-wide networking capacities to manage shared risks and emerging threats

We recommend enhancing collaborative governance capacities to build trust, strengthen cross-sectoral cooperation and enable coordinated action across institutional and administrative boundaries at the metropolitan level. Bureaucratic inertias, conflicts and tensions between stakeholders and among different levels of government and administration often hinder coordination and cooperation, leading to decision-making silos, a lack of awareness regarding common risks and an inability to react in face of crisis (Farinós/Montiel 2021: 554). To overcome these limitations, new skills are needed in the field of territorial development policies and spatial planning, aimed at building trust and improving communication among stakeholders. In particular, the TOPP capacities (Technical, Operational, Political and Prospective) are needed to promote (1) social dialogue between key development actors, (2) public leadership that builds trust and collaboration, (3) coordination between different levels of government, (4) collaborative networks between government, private, academic and civil society sectors and (5) consensus building (Williner/Martínez 2025: 36). In the current context of *polycrisis*, new roles for spatial planners emerge, namely: coalition builders, navigators between institutions and facilitators of multi-stakeholder dialogues (Farinós/Gonzáles-Medina/Sarkar 2025).

4.3 Integrate resilience assessments and strategic foresight into all stages of policymaking

As preparedness requires not only capacities to react but also to assess, we recommend integrating resilience assessment and strategic foresight into policymaking and spatial planning to anticipate emerging risks, explore alternative futures and enhance the preparedness and adaptive capacity of metropolitan regions. This can be supported by using "resilience dashboards"[4] such as the ones launched by the European Commission based on synthetic resilience indicators that measure the overall relative situation of resilience capacities and vulnerabilities across four dimensions: (1) social and economic, (2) green, (3) digital and (4) geopolitical.

Resilience also requires enhancing the ability to imagine futures. Strategic Foresight (EC 2020, 2025) provides a structured framework for identifying emerging trends, assessing complex risks and exploring potential futures in response to *polycrisis*. It enhances decision-makers' abilities to navigate uncertainty and proactively shape a more resilient and sustainable future, understanding trends, signals and uncertainties in a broader context. Some forms of planning that target preparedness to react include the following elements (Armondi/Balducci/Galimberti 2022):

(a) the construction of scenarios,

(b) the protection of critical communication infrastructure,

(c) the provision of stores of devices that facilitate coping with different types of emergency,

(d) the commissioning of alarm systems that can be immediately activated,

(e) the design of coordination systems between different subjects and periodic verification of their operability.

Strategic foresight helps to shape a preferable future, tapping into collective intelligence in a structured and systemic way. Integrating this approach as common practice in policymaking and spatial planning would improve the capacity of territories to collaboratively innovate (Sørensen/Torfing 2018) and face uncertainties and changes. Strategic foresight combined with simulation tools (e.g. digital twins) and analysis of metropolitan metabolism and functionalities can provide knowledge on how the system works and therefore enable effective coordination.

4.4 Think, plan and act "metropolitan"

We recommend thinking, planning and acting "metropolitan" by strengthening cooperation across administrative boundaries, aligning policies with functional territories and developing shared visions and governance frameworks to address common risks and resilience challenges. Strengthening metropolitan resilience requires addressing problems and challenges with a clear supra-municipal nature, overcoming traditional administrative boundaries and involving neighbouring municipalities. For instance, in Europe some rivers (e.g. Rhine, Danube, Elbe) extend not only beyond municipal and metropolitan areas, but also across regions or even states, which makes it necessary to develop an approach to flood risk prevention through water planning and spatial planning from the perspective of interregional, national and even transnational (e.g. the Eurodelta Megaregion) coordination and cooperation[5]. This mismatch between functional

4 More information: https://datam.jrc.ec.europa.eu/datam/mashup/RESILIENCE_DASHBOARDS/ (02.09.2026).

5 An example for this is the adoption in 2021 of the *Länderübergreifender Raumordnungsplan für den Hochwasserschutz* (Federal Spatial Development Plan for Trans-State Flood Protection). Its provisions focus on cooperation mechanisms between the *Länder* (federal states) crossed by the same rivers, critical infrastructures of cross-border relevance and attention to the problem of differing situations and interests between upstream and downstream urban areas.

space and political-administrative space makes public action extremely complex and difficult (Hildenbrand 2017: 23f., 32f.).

In this context, the capability to think, plan and act at a metropolitan scale is essential. This requires cooperation between all the actors operating in the territory of a given metropolitan region. Within the framework of these alliances, the aim is to build a shared understanding (imaginary) of common risks, threats, opportunities and challenges, and to agree on a common project/vision for the future. In the Metropolitan City of Bologna, the ORMe[6] (metropolitan regeneration workshops) are an example of cooperation among local entities (unions of municipalities and the metropolitan city itself). This governance instrument manages urban regeneration action mainly through the implementation of the Metropolitan Equalisation Fund. This fund, established by the Territorial Metropolitan Plan in 2021, pools shared financial resources from the city's more attractive areas and uses them in regeneration projects in more fragile metropolitan territories.

4.5 Establish variable robust institutional frameworks according to local traditions to ensure coordinated and accountable governance of metropolitan resilience

We recommend establishing dedicated metropolitan resilience governance frameworks to coordinate action across sectors and jurisdictions, strengthen institutional accountability, engage stakeholders and ensure the strategic management of shared risks and critical infrastructures. Better governance towards resilience at metropolitan level requires *ad hoc* institutional settings that manage and account for such interventions at the metropolitan scale, depending on the state's own tradition and territorial organisation. There are different types of hard and soft models for organising governance. The hard governance model is characterised by a high degree of institutionalisation (Tomàs 2023: 50f.), for instance: a) Multi-sectoral metropolitan governments, created by law and therefore of a binding nature, exercising competences with a broad catalogue of issues, with dedicated administrative bodies and financial resources; or b) Sectoral metropolitan agencies, regulated by law for a specific task, for instance transport services, water supply or waste management. The soft governance model is represented by different forms of voluntary or informal cooperation between municipalities or other levels of governments, leading to the implementation of innovative planning schemes within "new" areas that are distinct from institutionalised administrative units, but tailored to specific issues: such operations are usually referred to as "new regionalism" or "soft space planning" (Perrin 2024). For example, in France more than 20 metropolitan poles were created as networks to implement collective actions, like Sillon Lorrain, Cap Azur, Côte d'Opale or Caen Normandie Métropole. In the Netherlands there are numerous *ad-hoc* and tailored cooperation agreements or structures between local authorities, more or less formalised, including the quite informal but highly strategic Metropoolregio Amsterdam and Metropoolregio Rotterdam Den Haag.

Regardless of the chosen model, resilience management must fall to an entity specifically created to respond to challenges with the aim of thinking about how to ensure territories emerge stronger from the changes they face. This institutional framework should integrate a) institutions that allow flexible decision-making and implementation, b) a focus on the essential functions and infrastructures in the metropolitan area, c) information and measurement systems at metropolitan level, d) stakeholder engagement to promote a shared awareness of risks and threats and community learning. Suggested measures include setting up Resilience Units at metropolitan level; organising according to specific threats/risks; *ad hoc* funding for critical infrastructures and

6 Italian acronym for metropolitan regeneration workshops which stands for *Officine per la Rigenerazione Metropolitana* and translates to English as "footsteps" or "traces". More information about the activities of the Metropolitan City of Bologna in the frame of the ORMe project is available at: https://www.cittametropolitana.bo.it/pianificazione/orme (02.09.2026).

for education and training programmes to raise awareness and preparedness; securing redundancy within metropolitan areas (some parts could cover fails in other parts); considering civil and military defence capacity as a new issue for urban planners; and the introduction of new zoning with new criteria/new land uses.

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https://doi.org/10.60683/df21-wn11

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https://doi.org/10.60683/z4qv-je63

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https://doi.org/10.60683/1az2-2j58

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eISSN 1611-9983