Toivonen, Saija

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# 11 The Resilient Urban Environment at All Levels and with All Its Actors

*Saija Toivonen*

## Introduction

We live in a VUCA world, where a variety of crises can emerge and take place as evidenced throughout this book. The typical characteristics of a VUCA world include volatile changes, lack of predictability, the complexity and interconnectedness of impacting forces and an ambiguity that thwarts us from developing a holistic understanding of prevailing and forthcoming situations (Bennett & Lemoine 2014; Heinonen et al. 2017; Karjalainen et al. 2022). This book demonstrates that crises are often caused by, experienced in and potentially coped with by the built environment. In countless ways, space and land play an important role in establishing the basis of our self-resilience, complemented by the surrounding neighbourhoods and communities and by the interplay between public and private places and actors. Therefore, the built environment should be seen not merely as a physical means to build resilience but also as a toolbox with a variety of possibilities – private and public, micro and macro, quick and slow, easy and demanding, cheap and expensive, immediate and long term – that contribute to the promotion of holistic resilience. This chapter ties together the various parts of this book and reinforces its main message: imagine possible futures and be prepared!

After the introductory part of this chapter, Covid-19 is cited as a case example of the central role of the built environment in a crisis situation. Next, the nature of future crisis impacts on real estate, space and land use are analysed and their further implications discussed in relation to their subjectivity, determining compensation and their connection to real estate market dynamics. The basis on which we can build resilience to future threats is then described, and a summary is provided of practically oriented solutions and action plans that aim to develop the holistic resilience of the built environment. This chapter refers to other chapters of the book but also introduces aspects that have not been previously covered.

## The Built Environment in the Era of Constant Crises and Uncertainty

At the end of 2019, the Covid-19 virus commenced its fatal spread and continued until it had grown into a pandemic that disrupted the daily lives of people around the world. In many ways, the situation seemed beyond control, but diverse means

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of managing and surviving were nonetheless proposed and urgently implemented. Suggestions were given and regulations established by public authorities, but, ultimately, significant responsibility was placed on individuals who implemented the given instructions according to their own capacities, aspirations and premises.

One of the main countermeasures adopted during the Covid-19 crisis was restrictions on physical interactions between people, as it was hoped that the recommended physical distancing would restrain the virus. In addition to their direct impacts on the spread of the virus, these restrictions had dramatic consequences on the built environment when space-use patterns changed quickly and dramatically. In response to the recommendation to work from home, a massive number of companies and their employees changed their working habits almost overnight. Previously, only 15% of employees in the EU had experienced remote working, a number that leapt to 40% of the workforce because of Covid-19 (Eurofound 2020). This also meant that workers who were not keen on working remotely had no choice, and work tasks that were not typically deemed suitable for working from home were relocated to private home environments (Toivonen et al. 2022).

This unprecedented, crisis-driven transformation in space use not only placed great pressure on the performance of workers and their families but also challenged physical settings and spaces alike. The multifaceted results were also witnessed in the real estate market environment (Toivonen et al. 2023). The entertainment and hospitality sectors faced challenges. The restrictions related to leisure activities, global travel and new working habits influenced not only the service sector and office use but also transportation, travel and people's overall physical activity patterns, leading to secondary impacts that were also experienced in the built environment. Many previously lively spaces were muted. At the same time, while some spaces were abandoned, others in the built environment become even more crucial than before the pandemic. First, more capacity was needed to support pandemic management, and spaces were converted into, for example, testing centres or temporary hospitals when space demand for these activities increased sharply. Also, public green spaces and multilocal living arrangements grew in popularity as people escaped crowded homes that lacked flexibility and did not necessarily offer possibilities of spending time outdoors (Pelsmakers et al. 2021). The digitalisation of everyday activities well demonstrated the importance of communication technology and virtuality as effective crisis solutions but, interestingly, also underlined the importance of physical location and the quantity and quality of physical spaces.

During the pandemic, many private homes turned into fortresses for coping with the crisis situation. This meant that homes became the central place for all everyday activities, including study, leisure and paid and unpaid work. As more time was spent at home, a greater variety of activities were conducted in the home environment, and spaces were simultaneously shared among several family members or with no one. As a result, the impacts were dichotomous: some spaces became overcrowded, whereas other people dealt with a heightened feeling of loneliness. This unique "human experiment" enabled the population to personally and concretely experience the limitations and pitfalls of existing space and land use as people were required to adapt to and cope with the circumstances that the built environment

provided them in a crisis situation. This book demonstrates that many possible crises are actually experienced at home or influence home environments. In our observation, crisis impacts that involve negative effects on home environments are perceived especially strongly (also see Hasu 2017; Tervo 2021). We argue in this book that issues related to social sustainability should be highlighted when planning urban resilience against future crises.

While the fight against the Covid-19 pandemic was still ongoing, two more crises – the war in Ukraine and the electricity crisis – crashed onto the scene, creating a polycrisis situation that further challenged societies. The built environment also played a significant role in both these new crises. In Ukraine, the war's massive destruction of the built environment was experienced as exceptional economic, emotional and cultural losses when the national wealth that was bound to the real estate stock vanished and people lost their homes and had to flee from their neighbourhoods. Also, the electricity crisis caused vulnerabilities because it challenged the ability of low-income households to sufficiently heat and use other energy services at an affordable cost.

These latter crises concretised once again, from the crisis management point of view, the ultimate vulnerability of the built environment, as real estate is immovable. The current building stock is locked to its location, meaning it must meet the conditions and consequences of crises, whatever they might be, and it is expected that future crises will challenge the resilience of the real estate stock even more. Many of this book's chapters underline flexibility as an important feature of resilience. Flexibility can relate to the amount or quality of space, to the capacity of space to be converted to different purposes and to its ability to simultaneously host several distinct space users. Flexibility can also be connected to the flexibility of real estate-related laws, market procedures and agreements as well as flexible crisis management plans. One of the more extreme suggested remedies is portable buildings (Toivonen 2011; also see Chapter 4).

## Crisis Impacts on Real Estate, Space and Land Use and Their Further Implications

In addition to being the culprit in the creation of several crises, the built environment is often heavily impacted by the crises that take place in society and the market environment. Space and land users are further impacted via the consequences experienced in the built environment as demonstrated throughout this book. In other words, there is a lot at stake.

The real estate business is typically considered a high-risk field. Risk is usually seen as the potential for economic loss due to, for example, factors related to business, finance, liquidity, inflation, tenants, management, interest rates, legislation and the environment (Brueggeman & Fisher 2011; Kaleva et al. 2017). Risks in the real estate field are often considered by dividing them into property-specific risks and market-specific risks (Wilkinson & Reed 2008). The risk associated with achieving the intended economic performance is managed in various ways, for example, by testing the sensitivity of the multiple components influencing

the future cash flows produced by the real estate in question. Thus, uncertainty regarding future developments and their impacts is a central and inherent element in real estate economics and when, for example, determining the value of real estate. However, the actual forces behind the possible negative outcomes of the components impacting future cash flows are not fully acknowledged or analysed (Toivonen & Viitanen 2015).

During the RESCUE project, it was shown that a great variety of crises can indeed have an impact on the built environment and the real estate market environment (Tähtinen et al. 2023). As the relevant crises are diverse, their possible impacts also vary. They may have material or immaterial consequences, and their appearance, duration, magnitude and scope can vary. The impacts on real estate may be experienced as the first-, second- or third-level impacts (etc.) of a crisis. In one study, Tähtinen et al. (2023) analysed 128 possible future crises and their possible impacts. According to the findings, crises' possible impacts on real estate can be divided into soft and hard impacts based on the nature of the experienced influence. Hard impacts include instant or gradual physical damage to building materials and structures and the unavailability of real estate-related systems, such as water, sewage, energy and transport infrastructure. The consequences affecting the quantity and quality of supply and demand are also included among the hard impacts. In addition, hard impacts have consequences on particular built environment elements that are related to, for example, food systems, manufacturing, healthcare, recreation, defence, education and green infrastructure. These elements have wider societal roles, so impacts on them are especially pertinent.

Soft impacts include impacts on the formal and informal institutional framework related to the built environment. They may, for example, relate to property rights or responsibilities. Soft impacts also include perceptions regarding safety, real estate value and the availability of tangible and intangible resources and services (e.g. know-how and maintenance). Clearly, many of the soft and hard impacts are connected to one another. What is most surprising is that, despite the great number of crises and their varying characteristics and origins, it has been possible to identify joint themes for potential crisis impacts. Consequently, rather than following the outdated tradition of focusing on a limited number of crises and building probabilistic, crisis-specific preparedness, we can and should promote "overarching" resilience to combat future crises regardless of their nature. In other words, by implementing crisis solutions that respond to the joint themes of the identified crisis impacts, the built environment could assist in fighting against several distinct crises, even simultaneously.

#### *Subjectivity and Locality of Crisis Impacts*

Some future crises are local, and their impacts are relevant only for a limited geographical area, whereas many crises have the potential to generate global consequences. At the same time, many of the crisis impacts are globally comparable, with physical destruction of the built environment and a high level of vacancy as examples. This book presents case studies and examples of resilience building

from many parts of the world, including Australia, Canada, Denmark, France, Finland, Japan, Sweden, Nepal, the Netherlands, New Zealand and Nigeria.

Crisis impacts depend on the observers, their agendas and the observers' existing circumstances and are consequently subjective and local (see Chapters 3, 4 and 5). The real estate market environment embraces a variety of actors, including ordinary households, office workers, real estate owners, firms occupying spaces and public sector representatives. They all have their own aims and aspirations concerning space and land. For example, a participant in one of the RESCUE project workshops argued that the "surveillance society" and its impacts should not be considered as negative developments, even though the RESCUE researchers had earlier identified them as a future crisis based on the conducted literature review. This participant pointed out that surveillance can, for example, increase safety and the feeling of safety. Thus, the same impact can be experienced very differently depending on the physical and mental capacities and standpoint of the observer as well as on the built environment and the overall society in which the crisis is experienced as discussed earlier.

This is in line with the view of Pursiainen (2018), who considers both exposure and vulnerability when defining and estimating risks. In other words, a given crisis impact can be addressed easily in one place, whereas identical crisis impacts may be devastating in another. As discussed above, a variety of vulnerabilities have been identified in the built environment context during recent crises, when an identical crisis was found to have different primary and secondary impacts depending on the physical setting where it was faced. This can be very concretely experienced with, for example, natural disasters. Typically, people who are already in a vulnerable situation before the disaster are hit hardest by a crisis, and the built environment is not able to protect them as it should. Furthermore, those who have fewer resources may lack opportunities to relocate as pointed out by Ira Verma in Chapter 2. This has an impact on their futures resilience.

#### *Crises Impacts on Real Estate Market Dynamics*

This book makes clear that many crises impact both the supply and demand of real estate. For example, pandemic countermeasures or the shrinkage of cities can change space demand patterns (Chapters 7 and 8). The supply of space can also decline instantly due the destruction wrought by natural disasters, such as earthquakes, wildfires and tsunamis (Chapter 9 and 10). The primary impacts of destruction may remain local, yet the changes in market dynamics caused by the crisis may be experienced both in the crisis area and in neighbouring areas and even other countries. For instance, the war in Ukraine caused massive destruction of buildings in certain parts of the country but also had far-reaching spatial impacts related to, for example, the demand for both emergency and long-term accommodation.

In addition to affecting the quantitative supply and demand of real estate, crises can change the qualitative preferences of real estate market actors (Toivonen et al 2023) as happened when, due to Covid-19, high-density areas lost their

popularity as people sought safety in less crowded places to avoid exposure to the virus (Liu & Su 2021; Rosenthal et al. 2022). Similarly, waterfront areas may be deemed unfavourable places to locate if the risk of future floods is expected to increase, and apartments with south-facing balconies may be avoided in preparation for a warming climate. This means that crises and even the fear of a possible crisis have the power to change even deeply rooted preferences related to the built environment and real estate.

The crisis impacts influencing real estate market dynamics that are described in this chapter make evident another vulnerability related to the real estate market environment: its inflexibility. Rapid changes and responses are often required in crisis situations, causing pressure and challenging the fundamental characteristics of the built environment. Because construction takes time, creating new space is inherently slow, making it difficult for the real estate stock to respond to rapid increases in space demand. Similarly, getting rid of vacant space is no simple matter for reasons such as complicated environmental, legal, social, cultural and economic considerations. In addition, it has been shown that even slowly developing phenomena, such as the shrinkage of cities, complicate the capability of building stock to respond to the changing demand for space and land (Kiviaho & Toivonen 2022; 2023). Thus, the current built environment cannot easily respond to either quickly emerging crises or the challenges of slowly developing ones. A typical result is increased levels of vacancy, the deterioration of building stock and a downturn in real estate value, which further weakens the private and public economic base and results in inefficient space use with several severe consequences (see more in Chapters 7 and 8, which propose possible solutions to crisis-induced vacancy and provide tools and global examples).

#### *Compensating Crisis Impacts*

One option for coping with crises is to transfer the risk of negative impacts to be borne by someone else (Berg 2010). For example, the 9/11 attack increased the popularity of terrorism insurance among real estate owners, but it did not seem to have long-term impacts on real estate preferences per se, such as a tendency to avoid skyscrapers or other monumental buildings (Toivonen et al. 2023). In the future, when the number and complexity of crises is expected to increase, the need for built environment-related insurance will also grow. One of the more pressing challenges is represented by areas that have already experienced a crisis and are therefore deemed to be at greater risk of another, which is especially the case in areas prone to natural hazards, such as floods and wildfires. These areas may be avoided by both space users and investors, making it difficult to sell or lease real estate in these areas. The perception of the potential risk may also prevent real estate owners from obtaining insurance or loans when insurance companies and financiers are unwilling to deal with real estate located in an area with a crisis history. This naturally negatively impacts the value of the real estate in question. As the number of such areas and such real estate increase in the future, the urgent question will be how and by whom these risks will be borne. Furthermore, how will

we compensate real estate losses that are experienced not only due to a crisis that has occurred but also due to the fear of a crisis yet to take place?

In recent years, natural hazards have caused a massive destruction in the built environment. Covid-19 did not result in an instantaneous physical destruction of space, but it may have initiated slow deterioration due to growing vacancy and falling real estate value. After the Ukraine war, there will be a tremendous need to reconstruct the destroyed built environment. This will also underscore very challenging questions regarding the assessment of crisis impacts, in this case, the war losses related to the built environment. It must be determined who will be compensated and how the value of compensation will be defined. In addition to the primary impacts (e.g. physical destruction of buildings and infrastructure), will the secondary and tertiary impacts be covered, including, for example, business losses related to the built environment? Because the built environment constitutes a significant amount of both private and public capital and greatly affects the surrounding society, these questions will be pivotal.

## Building Resilience to Future Threats

The first step in crisis management is to identify possible threats and build preparedness for them (Pursiainen 2018). As recent years have demonstrated, crises come in many forms and sizes. Chapter 1 discussed at depth the definitions, categorisations and characteristics of crises. There is no lack of definitions of crisis but rather an absence of holistic understanding in viewing the landscape of possible futures threats. Historically crisis management has concentrated on a limited number of crises that have been identified as significant regarding the magnitude of their potential impacts (Tähtinen et al. n.d.). Crisis management has also traditionally focused on crises that are deemed probable in the prevailing situation and based on historical development. Examples of crises typically considered probable can include periodic crises, such as floods. By contrast, the impacts of slowly developing, creeping crises may be more difficult to detect and therefore attract less attention and not necessarily be included in crisis management actions.

It also seems that previously experienced crises are more often deemed risks meriting preparation for the future than crises that have not been previously experienced (e.g. a zombie apocalypse). Our past crisis experiences and local knowledge impact our views of possible future crises, our futures crisis consciousness and, therefore, our futures resilience (see more in Chapters 2–4). In the past, for example, building fires were common and often related to the daily and domestic use of fire. Now, building-based fires occur less often than in the past, but we still typically prepare for them in many ways, such as ensuring the safer use of fire, choosing fire-safe building materials and structures, developing appropriate micro and macro layouts, ensuring the availability of fire emergency equipment and training space users in proper evacuation skills. Another example of history-inspired preparedness comes from Finland, which, due to its geographical location and past experiences of armed conflict, has long prepared for war by including civil defence shelters in the built environment (see more in Chapter 2). Such preparations have

taken place even though, at least before the Ukraine war, the likelihood of foreign invasion had been considered rather small. According to Ira Verma (see Chapter 2), this is explained by local memory, indicating that personal experiences of crises affect perceptions of the probability of crises recurring in the future. In connection with this, Anahita Rashidfarokhi promotes benefitting from the past experiences of local people and Indigenous knowledge when preparing for crises (Chapter 3).

Assuredly, evaluating and learning from past events is a crucial part of crisis management and resilience building as pointed out by several authors of this book. However, existing crisis management draws criticism for being too narrow-minded and backward-looking and consequently lacking a far-reaching perspective that would enable better preparedness for possible future threats – including novel and unprecedented crises – and promote the consideration of prolonged and indirect impacts. In the future, possible crises are expected to grow in number, in their interrelations and in their complexity (Castaño-Rosa et al. 2022; Iloniemi & Limnéll 2018; PwC 2021). This will make future crises even more challenging to assess and contain. As demonstrated in the chapters of this book, several future crises are connected to today's megatrends, such as climate change, urbanisation, ageing, digitalisation and segregation. Because the real estate market environment is tightly connected to society and its diverse forces of change (Toivonen & Viitanen 2015; 2016), future crises will also be relevant in this context, and the built environment will be exposed to new types of risks. An important notion is that the crises for which we should be prepared originate, emerge and exist in a variety of domains of society (Tähtinen et al. n.d.). This challenges all actors in the built environment to broaden their scope of understanding of possible future threats and encourages us to abandon the siloed, short-sighted and narrow-minded approaches favoured in the past.

Crisis management and the identification of possible future threats in particular are challenged by the great diversity of possible crises (see more in Chapter 1). Some are connected to the forces of well-known megatrends, which typically have broad, significant impacts, whereas others are born from less acknowledged forces, such as wild cards and black swans (Heinonen 2013; Hiltunen 2010; Petersen 1999; Taleb 2007). Despite their differences, both megatrends and wild cards can potentially bring radical future impacts (Kuusi & Kamppinen 2002; Hiltunen 2010), so both are important to consider when aiming to add resilience to the built environment. As pointed out before, increasing complexity will challenge probability-based resilience building. In addition to their probability and significance, the pace of development differs between crises. Some future crises may appear suddenly, whereas others have a longer development path. Creeping crises challenge our ability to detect underlying events and driving forces that slowly create societal pressure before reaching a breaking point. As discussed above, the built environment has already faced difficulties in responding to both slowly developing and instantaneous crises.

In addition to natural disasters, such as earthquakes and floods, it seems that in the future we will increasingly face slowly developing, creeping crises that challenge the capacity of actors in the built environment. We must also recognise that

such forces are relevant from the built environment point of view. For example, the significant increase in mental health problems has been identified as one of the more pressing challenges endangering our society (see Chapter 4, thesis 10). Another phenomenon, which is termed a new "pandemic", is obesity. At first glance, both these crises may seem irrelevant in the built environment context, but this is not the case; in the future, the central role of space and land needs to be recognised and harnessed to promote building holistic resilience against a variety of crisis born in diverse domains of society. The built environment can, for example, bring people together, create interaction and fight against marginalisation and alienation. It can also encourage physical movement and activity instead of a sedentary lifestyle. The built environment should be more often recognised as a proactive tool. When a crisis has already taken place, even more input may be needed to cope with its impacts. After a crisis, there may be an increasing need for modifications that require more resources and cause environmental impacts.

Even though future crises differ by such factors as their nature, origin, duration and scope, many are still interlinked. This means that the direct impacts can easily and rapidly lead to secondary and tertiary consequences, even without, for example, geographical or administrative boundaries or other restricting elements. As a result, a crisis can be universally relevant despite its originally limited geographical or field-specific place of origin. This requires futures orientation and a capacity for wide- and long-range monitoring and planning (see Toivonen 2021; Heinonen et al. 2023). Above all, we will need the skill to imagine alternative and possible futures, a skill that can be taught and learned (Toivonen 2021; Toivonen et al. 2021) and that must be taught and learned if we aim to achieve a greater level of resilience.

## Solutions for Real Estate Market Actors for a More Resilient Built Environment and Happier Societies

As demonstrated in multiple ways throughout this book, space and land play an important role in creating the basis of our self-resilience. When building resilience, however, the focus should not be limited to individual, separate properties but should acknowledge the surrounding neighbourhoods and communities and the interplay between public and private places and actors. As described in Chapter 1, public organisations have the power and responsibility to lay the foundation for creating a resilient built environment, and they play a key role before, during and after crisis activities. Their contribution is related to all the various levels of the built environment, including national and cross-national emergency planning, as well as to ensuring the safety of individual buildings, spaces and their occupants.

The public sector possesses multiple tools and resources to assist in this task. For example, it can use its power in the form of land use policies to steer and monitor the quantity and quality of urban development. It can establish building codes and permit systems that promote durability and the safety of materials, structures and layouts (see Chapter 9 on the development of building codes related to wildfire safety). The public sector can also steer the development of the urban structure and

prevent negative crisis impacts by, for instance, not allowing development on areas that are considered unsafe (e.g. areas prone to natural disasters) or that are believed to lead to negative development paths (e.g. segregation or increasing vacancy). In addition to the pivotal role of the public sector in strategic crisis management, real estate developers and architects are responsible for the creation of the spaces in which future crises will be experienced. Therefore, they are responsible for seeking the best, most holistic practices and implementing them in their creations. At a minimum, this requires resources to look for novel solutions as well as communication with other built environment actors.

While the aforementioned real estate market actors create the frames in which resilience can be nurtured, much responsibility still rests on the shoulders of individuals, the actual people occupying or managing the space. Space users need to know how to use the spaces before, during and after a crisis to promote their resilience. This is not necessarily easy, as only some of the activities are assisted or monitored by the public sector, and it may be difficult even to know what to do and when. Therefore, building resilience demands an active attitude to achieve up-to-date skills and diverse know-how. For example, a space user should not neglect maintenance procedures that safeguard the durability of building materials and during a chemical accident, the space occupant should know how to shut down the ventilation system. As buildings become more technical, the ability of occupants to react is also challenged. The same applies to contracts and other real estate-related rights, responsibilities and procedures that may require specialised know-how related to legal issues. For example, the European Green Deal and the development of the EU taxonomy increase the need to identify, monitor, evaluate and report sustainability impacts related to real estate. Many actors will need assistance in these tasks to reach the intended outcome and avoid negative impacts. In addition, when spaces are increasingly shared between diverse occupants and managers and used for a variety of purposes and when space users themselves occupy multiple spaces, it is increasingly necessary to monitor and to ensure that the right actions are taken when they should be taken. In other words, behaviour is as important as physical spaces.

To respond to this need, all space users could be provided with a "resilience manual" that compiles the key features and actions that space users can take to add resilience to the space they occupy. During a building fire, most of us are aware of the emergency guidelines stating that we should evacuate the building by following evacuation signs and by not using an elevator. During the Covid-19 lockdown, many of us had to figure out by ourselves, without outside assistance, how the built environment could foster our resilience and how our private spaces should be organised to minimise the negative impacts of the crisis. Events with a high risk of immediate casualties should still be underlined when planning for crisis management, but it is also important that, in the future, space users be supported against creeping crises and possess the know-how to enhance their resilience with the help of the built environment around them.

Because the aims, time perspectives and possible crisis impacts experienced or feared vary between the diverse actors in the built environment, resilience building

must seek to include them all. Multilevel, far-reaching and cross-cutting resilience planning should be employed and a silo mentality and hierarchal approaches eschewed (see more in Chapter 4). As stated at the beginning of this chapter, the built environment can be seen as a toolbox with a variety of possibilities – private and public, micro and macro, quick and slow, easy and demanding, cheap and expensive, instant and long term – that can all contribute to holistic resilience. Some actions are bigger and some smaller, but they are all important. Concrete, practically oriented suggestions and action plans are provided in each chapter of this book. To conclude, they are reprised below with complementary features as final suggestions to demonstrate that everyone in the built environment can start building resilient cities today.

### Identifying Possible Future Threats

- Lengthen and widen the horizon to scan for a variety of possible (and surprising) futures
- Apply a multilevel, cross-cutting approach in all crisis management activities
- Map crisis impacts and vulnerabilities to them (at micro, meso and macro levels) and plan responses considering the local context
- Favour proactive crisis management methods, and do not be blind to slowly developing, gradual changes
- Provide fair systems for assessing impacts and compensation
- Simulate crisis situations and test and award pilot solutions on a regular basis

### Guiding Principles

- Secure emergency response capability, critical infrastructure and other key functions and activities of the society
- Use existing spaces (e.g. public spaces, vacant stock)
- Foster flexibility (e.g. hybridisation, multilocation, portability, agile behaviour)
- Guarantee self-sufficiency, safety zones, alternative access and routes and civil defence shelters
- Ensure the constant development of building codes and other steering methods
- Also provide solutions for the existing building stock
- Favour nature-based and low-tech solutions
- Establish plan B options
- Promote greenery as a multipurpose tool to add resilience
- Acknowledge and train both physical and mental capacities to prevent, respond to and recover from crises

### Communication and Participation

- Identify key personnel and their responsibilities (public and private as well as voluntary and temporary work). Ensure backup personnel
- Collect and compare scientific, local and Indigenous knowledge and shared futures visions in crisis management

- Ensure up-to-date, transparent communication before, during and after a crisis
- Encourage creative, multichannel and accessible communication and information platforms
- Enhance existing social networks and create new ones to assist in local crisis response
- Foster community spirit and empower locals to take ownership of their own resilience strategies and implementations
- Share and pool resources and expertise
- Support transnational collaboration and share lessons learned

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