

***Resilience in the Context of Civil Protection and
Municipalities***

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1. Background and conceptual classification

Crisis resilience at the municipal level encompasses several disciplines that differ not only in terms of their concrete crisis objects, but also in their perspectives on crisis resilience. At the municipal level, several disciplines and thus also perspectives on resilience converge. On the one hand, there is an urban planning perspective, which is also examined in research in the context of so-called urban resilience. This involves settlement areas and typical perspectives from a spatial planning, urban planning or architectural perspective (Coaffee & Lee, 2017). Resilience is the longer-term design of the coexistence and functioning of cities as well as rural communities. This view, as well as a view in the environmental sciences, is influenced by the definition of resilience in ecology or ecosystem research (Gunderson & Holling, 2002; Holling, 1973). In this, resilience is understood as a study of the stability and dynamic development of environmental systems. Resilience is a fluctuating behaviour that, in contrast to a linear understanding of evolution, involves leaps, changes and collapses, while maintaining the core of the system, i.e. the functionality of the community in this case. The motto of the city of Paris with its municipal coat of arms expresses this understanding quite well: "It may fluctuate, but it will not perish" (*fluctuat nec mergitur*).

Another perspective on the definition of resilience in a municipal context is that of community resilience (S. L. Cutter et al., 2008; Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008; Tobin, 1999). It is the set of factors or capabilities of a community or group of people, or indeed of an administrative unit such as a municipality, to deal with crisis and change. This includes the totality of all capabilities before, during and after a crisis,

and a variety of types from rather passive absorption and resilience to progressive adaptation or even transformational capacity (UNDRR, 2022). There are certainly similarities in this understanding to the psychological understanding of resilience (see also the contributions by Dreßing and Gilan & Helmreich in this volume) and thus also to crisis management capacity, which can also be found in medicine, for example.

Another definition of the term in the municipal context is a scientific or engineering perspective, which understands resilience as a computational variable primarily with regard to the resilience and recovery capacity of material structures such as infrastructure or the built environment (Bogardi & Fekete, 2018). While vulnerability describes the degree of susceptibility to damage, resilience represents the degree or speed of recovery.

In the course of urban resilience or community resilience, however, the ability to transform is also increasingly emphasised, and it is possible that municipal resilience is also characterised by the ability to respond flexibly to constant change (Pelling, 2003, 2010). This approach draws on considerations from complexity research and understands the interaction between people and the environment as a complex, adaptive system (Becker, 2014), whose components pursue very different goals while constantly interacting with each other (Heylighen, Cilliers, & Gershenson, 2006). This approach suggests that there is no equilibrium in the sense of an optimally balanced state, rather the system is characterised by constant change (Pendall, Foster, & Cowell, 2010). The ability to continuously adapt to new conditions is resilience (Bergström & Dekker, 2014).

Cases of application of municipal resilience can be found on the one hand in response to various crises and hazards: to relatively sudden floods and other natural hazards as well as those of a different kind, such as the banking crisis, or also in the longer term in response to insidious risks or crises such as those related to climate change or in response to a pandemic. However, resilience is also an important issue in dealing with transformations such as the switch of municipalities to renewable energy or in response to ageing and the transformation of society through digitalisation (Fekete, 2022; Fekete & Rhyner, 2020).

2. Cities and municipalities in the context of crises and resilience

The Hyogo Framework from 2005 already presents the development and strengthening of capacities at the municipal level as a prerequisite for crisis resilience and calls for corresponding activities (UN/ISDR, 2005). Capacities can be understood as the totality of existing strategies, systems, resources and capabilities. These can be addressed at the institutional, organisational or individual level, but always interact with each other (CaDRI, 2011; Schulz, Gustafsson, & Illes, 2005). In order to successfully develop capacities, it is necessary to first understand the local context and the capacities that already exist (Hagelsteen & Burke, 2016). Relevant questions here are, for example, whether the local development strategy and legal framework support strengthening crisis resilience, whether organisations and businesses have financial and material resources and crisis-proof management systems, and whether employees or residents have relevant experience and skills to participate in community resilience-building processes.

Resilience is often discussed in terms of change processes in the management or governance of municipalities. For example, if a paradigm shift is to be made in disaster management or civil protection, away from a purely hazard-based approach and the protection of critical infrastructure towards resilience, then certain aspects of renewal are often listed here: Cross-sectoral or cross-silo thinking and thus much broader interdisciplinary collaboration between disciplines. This reflects a move away from pure specialism towards more generalism, as it can also be understood as a move away from 100% security promises or protection towards an accepted way of dealing with uncertainties. Individual expertise and specialists are still very much in demand in an integrative approach, in which existing protection concepts and also hazard mitigation measures, such as structural measures against floods, should not be completely shelved. Instead, these should be linked more with an equally strong emphasis on the impact chains and the vulnerability of society as well as infrastructure. This is also understood as integrated risk management. Resilience is sometimes *de facto* simply superimposed as a new term on the previous risk term (S. L. Cutter et al., 2008) and thus, similar to hazard prevention terms in civil protection, comprehensively describes all types of organisational and technical, structural and non-structural measures. Sometimes

resilience is also subsumed under what had previously been developed in social ecological systems or complexity theory: a combination of non-linear processes, with stochastic components and emergence of new states that were not foreseen before, close couplings and interdependencies (Lewin, 1992; Waldrop, 1992).

With this new understanding, cities and municipalities can, on the one hand, adapt to a new form of management, not only in hazard prevention. Instead of protection and defence measures, it is now possible to argue in a broader and more integrative way and to establish more cooperation between departments. However, this poses new challenges for many municipalities, as this is usually not included in the typical administrative structures and ways of thinking. Here, according to a further development of the organisational structures, resilience development can be promoted. Likewise, people are now needed who possess such competences in order to be able and allowed to think and work in an interdisciplinary manner. This can be done through further education and training as well as coaching and exchange in networks and platforms (CaDRI, 2011). However, there are many analogies to similar ways of thinking, for example in agile management or even in already established areas such as that in business continuity management. Here, too, the focus is on measures to respond to arbitrary crises with a lot of flexibility, as opposed to rigid hierarchical structures.

However, there are other measures that cities and municipalities can use to prepare for crises. Here it is not so important whether this is called resilience or risk. After all, the new German resilience strategy of the Ministry of the Interior also contains, in principle, many components from the 2015 Sendai Framework for Disaster Reduction (Die Bundesregierung, 2022). Thus, current thoughts on a risk-informed society with many components of risk analysis and risk management go hand in hand with ideas of smarter reconstruction after disasters (build back better) and a general understanding of resilience in many subject areas (United Nations, 2015). This also includes a better understanding of risks, which is important, for example, through better information procurement and thus also monitoring for cities and municipalities, not only in the case of floods, forest fires, pandemics and also civil protection requirements such as energy shortages. In the flood of 2021, the need for digital situation maps, warnings and other information bases became very clear in many

regions (Fekete & Sandholz, 2021). In order to do justice to the core idea of resilience, hitherto unknown or unusual hazards must be addressed in order to avoid a "lock-in", i.e. persisting in old patterns of thinking and behaviour (Pendall et al., 2010). Climate change is already making it clear that new types of hazards as well as already known hazards must be taken into account with a new intensity and frequency in order to make societies fit for the future. Another goal called for in the resilience strategy as well as in the Sendai Framework is better cooperation between a wide range of actors, within a municipality but also between municipalities and their neighbouring countries. Institutions also need to be strengthened, as does the business community, which needs to get more involved. After all, more than 80 % of the so-called critical infrastructure is in private hands and thus a great responsibility lies with municipalities as well as with the economy and the operators of such infrastructures (BMI, 2009).

Cities and municipalities can also be better prepared for crises if they combine new tasks such as the transformation towards more sustainability with crisis resistance. Reconstruction in regions affected by floods or forest fires can at the same time reduce energy consumption in the longer term or, by creating more shelter for the environment, simultaneously lead to a sponge city capability where floods and heavy rains are used to simultaneously create water storage for dry summers and hot spells. To this end, a number of scientists have already proposed five-point plans for the transformation of municipalities (Kuhlicke et al., 2021). Besides the physical-technical transformation of urban spaces, developments at the societal level can also contribute to strengthening crisis resilience. Social and economic factors such as educational opportunities, employment and income, health care, participation opportunities or access to public services thus increase the resilience of individuals and become drivers of societal resilience (S. Cutter, L., Burton, & Emrich, 2010).

3. Aspects of appropriate crisis management

A self-understanding of one's own importance as an actor and enabling various actors to develop competencies independently and to network is a good start for appropriate municipal crisis management. Crises affect a municipality comprehensively in many different fields and therefore require an independent capacity to act in many individual fields, as well as

the cross-sectoral cooperation already mentioned. This also requires an overall understanding of the system, which municipalities often have to create first. In crises with supply chain dependencies, for example, the pandemic or the blockade of the Suez Canal made it very clear how vulnerable the current supply of essential goods, as well as goods necessary for the economy, has become. Authorities and industry often lack simple overviews of the networks with suppliers and the dependencies they have created themselves. For this purpose, an actor mapping is necessary that shows the actors involved in the municipality and outside. Subsequently, a dependency analysis is carried out to reveal possible Achilles heels for the functioning of the individual companies and to gain an impression of potential impact chains across company and sector boundaries. As a measure, an organisational concept is then recommended which, in addition to the network and the interconnections of dependencies, also lists contact persons and alternatives that can be addressed as redundancy in an emergency. In the case of particularly sensitive critical infrastructures in the municipal sector, such as in health care, emergency plans must be drawn up that prepare the basic supply of water, electricity and information for various scenarios. In this preparation, however, it must also be taken into account when independent or supported emergency care is no longer possible and consequently an evacuation becomes necessary in order to avoid or reduce personal injury.

It is also important for 'good' crisis management to integrate both different actors and in the mindset of different phases of action, before, during and after a crisis. However, it is important to dovetail competences instead of continuing to maintain a pigeonhole thinking and to consider responsibilities separately.

Specialisation and division of labour is necessary for everyday efficiency issues, but in the event of a crisis it is sometimes a hindrance. Clear responsibilities and also the preparation of hierarchical management organisations such as staffs must continue to be maintained and practised on the one hand, also in the cooperation of different staffs and municipal actors. For example, a better link between risk management as an area of responsibility in planning and preparation before a crisis and crisis management from the moment of a crisis is necessary, to be practised and also financially supported.

Above all, however, the user perspective of the population must not be forgotten. Participation processes certainly have their limits, especially when it comes to disaster preparedness, but the overall understanding at the municipal level is still far too strongly characterised by top-down structures. Trust is placed in the hands of many volunteers and honorary staff, especially outside the big cities. In cities, on the other hand, much more of the municipalities' own responsibility and ability to act is handed over to the professional fire brigade and others. In the case of major crises and disasters, however, the limits quickly become clear, as was the case most recently with the floods of 2021. Therefore, an early involvement of the population in preparedness and training as well as information processing is necessary and also possible as participation in research projects, for example. Here, too, it becomes apparent that an increase in the willingness to act at the individual and organisational level strengthens society's ability to deal with crises. However, individuals must by no means be left to their own devices; rather, it is necessary to offer cooperation on an equal footing, provide information and support, as well as a willingness for mutual learning between the municipality and its citizens. It is also important to consider how good crisis management can better involve volunteers and spontaneous helpers in municipal work from the outset and also in disaster management with staff work. There are many guidelines and lessons learned documents on crisis management from the studies of the 2021 flood alone.

Universities and research institutions can support municipalities very well in the transfer of knowledge and competence between practice and science and back. Opportunities are available for jointly funded third-party projects, in which, for example, concepts for resilience for minimum supply in the event of a disaster for the failure of critical infrastructure such as electricity, water or heat have already been implemented in some regions (Fekete, Neisser, Tzavella, & Hetkämper, 2019). In addition to the effect of professional exchange on concrete methods and measures for action, such joint research projects between science and practice, but also joint workshops and conferences, above all create important networks and contacts. In this way, cross-municipal projects in particular can help some actors in emergency response to get together with operators of critical infrastructure and municipal administrations on such topics, often for the first time ever.

3.1 Civil protection and infrastructure

The issue of power outages and increasingly water shortages, but also the energy shortage due to the Ukraine war as well as attacks on railways or pipelines have once again highlighted the need to address the issue of critical infrastructure. Likewise, many municipalities are not only increasingly threatened by cyber attacks, but have actually already had to experience them.

An important first measure for action is to first identify the particularly important and thus critical infrastructures at the municipal level. To this end, civil protection authorities have already developed guidelines that enable municipalities to identify critical infrastructures on their own (BBK, 2017). There are also training courses and advanced training at the German federal academy BABZ (Bundesakademie für Bevölkerungsschutz und Zivile Verteidigung - Federal Academy for Civil Protection and Civil Defence). Finally, research projects are another way to carry out this cooperation with universities and often it is already possible to promote junior staff and enable them to work in the municipalities later on.

After a spatial identification of critical infrastructure, it is also possible to make this information available and visualise it for many departments, for example in the form of geographical information systems. It should be noted here, however, that in the case of particularly sensitive object types, it should be checked whether information about them should also be made public or should remain in the protected area. This is because failures due to sabotage must also be considered seriously and possible hostile actors should not be offered any opportunities for attack. However, a good information base is essential for repairing everyday damage caused by digging accidents or the like, and is also very important for the expansion of broadband and basic services. Likewise, one must then already be prepared for emergencies or disasters, in case one or more particularly important infrastructures fail and, for example, people have to be evacuated from hospitals and accommodated and cared for elsewhere. Bomb finds from the Second World War also cause some municipalities to have to carry out such temporary evacuations again and again.

Based on current research, it is also advisable to consider minimal supply concepts that can still guarantee minimal functionality in particularly severe crises in the understanding of resilience. In other words, infrastruc-

tures and also competencies and resources in the municipality must be identified that need to be particularly protected and prioritised so that they can help to supply others in a crisis and to prepare and accompany the reconstruction of functional capability. This includes emergency power concepts and grid replacement systems, as well as refuelling concepts and food reserves, as well as island capabilities of telecommunications and possibly also power and energy supply.

In addition to these aspects, modern civil protection must also deal with the possibility of simultaneous hazards, for example if a flood occurs in addition to a pandemic. Likewise, interdependencies of infrastructures and possible cascading effects must be planned for, if, for example, many other infrastructures can fail due to the failure of the power supply.

The identification of such interdependencies and cascading effects between different actors can be facilitated mainly through round tables or discussion groups. To start with, no complex staff framework exercises are necessary here, but a basic exchange about understandings of responsibilities and competences. To support this, or as a next step, a discussion of hypothetical scenarios can take place. Possible guiding questions can be:

- What happens to my system?
- Which specific infrastructures or services fail?
- Who depends on these infrastructures/services?
- How can these infrastructures/services be maintained or what redundancies/back-up levels are available?
- How can I reach other actors (also at night or on Sundays and public holidays) and who is the contact person?

These round tables can also be specialised for different tasks or areas to enable exchange at technical and organisational levels.

It is important to understand that for cross-organisational resilient risk and crisis management, basic factors and conditions must be met. This can be illustrated as in Figure 1.



Figure 1: Hierarchy of necessary factors for integrated risk management (Own representation).

First of all, there must be sufficient human, financial and time resources as well as other factors internal to the organisation, such as a proper awareness of responsibility and risk. On this basis, an organisation-internal risk management can be built up. The aim here is not to achieve a perfect system immediately, but to strive for constant improvement, similar to business continuity management or quality management. When there is finally a system with which an organisation has created the conditions internally to deal with risks and crises in a structured way, external actors can be involved and a cross-organisational risk management can be established.

There, communication with each other and with the population is particularly important in order to maintain a functioning system. Due to its great importance, this topic is dealt with in the following section.

3.2 Crisis communication and legitimacy in crisis mode

What constitutes good, appropriate communication in crisis mode? What should be considered here and what goals should be pursued?

Successful crisis communication is a central part of crisis management and essential for successfully managing a crisis (BMI, 2014). In crises, great expectations are placed on municipalities in terms of warning and

information from the official side. Digitalisation has increased the expectations even more, and rapid and reliable communication is expected at a faster pace than before. In addition to the speed and official character, the otherwise usual principles of good communication must also be observed, which can be easily read in guidelines at the Federal Office of Civil Protection and Disaster Assistance, for example (BMI, 2014).

However, the strong influence of social media on the current media landscape also places formal demands on crisis communication: In order to be seen on common social media platforms, reporting must follow the rules that apply there. This means not only the provision of content and information in real time, but also in particular the use of image and video material and the formulation of catchy messages in order to attract the attention of users in the first place (Bachmann & Ternès von Hattburg, 2021; Nolting & Thießen, 2008).

However, the floods of 2021 and the COVID-19 pandemic have highlighted special requirements for public relations and warnings. In addition to the pure dissemination of information, the two-way practice must also be strengthened so that citizens have an immediate point of contact in the event of a crisis, not only to receive information but also to be able to reflect it back. This can save an enormous amount of time in a crisis and save people if those affected and involved can use their smartphones or other means not only to make emergency calls, but also to send instructions for rescue operations.

For good communication, it is also necessary to optimise the organisation of communication. This also means that staff work should be more concerned with public relations and press work than in the past, and that communication with other actors in the community should be established permanently and from the outset. For example, access to information in the situation must be better shared with the municipalities, and care must also be taken to ensure that communication ladders up and down the hierarchical structures through the higher administrative units do not lead to a loss of time. Thus, cross-border cooperation between neighbouring municipalities under different district affiliations, for example, has been a problem so far. But the integration of local expertise into staff work in major disaster situations is also necessary.

As an example, it is already planned before crises whether and which liaison persons will be sent to other staffs in order to enable a direct exchange of information and expertise. The German Federal Agency for Technical Relief (THW), for example, has built up a broad network of expert advisors in Germany to inform and advise crisis teams about THW's options for action. But in order to make use of this service, it should be known in advance how to access such resources.

For municipalities, a close exchange with basic suppliers for energy and drinking water, for example, is relevant, but the importance of medical and civil protection infrastructure must not be neglected either. In the context of a blackout scenario, the following questions, among others, must be considered:

- Are local hospitals still functional?
- How long will fuel supplies last? In addition to buildings supplied with emergency power, this also concerns the emergency vehicles of the fire brigade and rescue service and should not be neglected under any circumstances.
- Is the hospital facing a critical decision of evacuation or clearance? If so, sufficient lead time for planning and execution must be considered.
- What are the channels of communication?
- What should be done if communication channels fail (telephone, internet, mobile phone, etc.)?

Finally, the technical possibilities for communication must also be improved; the use of digital radio in particular has been a problematic issue in civil protection for many years, as has the use of text-based messages (cell broadcasting) or other technical possibilities, which are not yet fully exploited in Germany compared to other countries. For the Warning Day in December 2022, the function of cell broadcasting was now tested for the first time in Germany in order to be able to use it in the future. And in addition to crisis communication, preparation and precaution through risk communication must also be taken into account (BBK, 2022).

Consequently, it can be seen that strong municipal resilience consists of the building blocks of effective and efficient risk and crisis management. In a holistic and integrated approach, different actors need to be involved in order to identify interdependencies. In addition, the civilian population - a major component of a community - should not be neglected. The best

preparation of authorities and organisations is useless if the population is not warned in crises, does not know how to act or does not know any contact points for emergencies or further information.

3.3 Communication with the participation of the population and the acceptance of political decisions by the population

Due to digitalisation and social media, but also due to a changed self-image of society, more and more forms of participation in communication are expected. However, the problems of participation formats are often not yet sufficiently discussed in public. With regard to democratic participation, two problems arise here. On the one hand, it can happen that people reject the responsibility for dealing with a crisis and do not take advantage of their opportunity for democratic participation. On the other hand, it can happen in the opposite way that decisions are made and communicated by the political side, but these do not find acceptance among the population.

Especially when it comes to crises and disasters, many people understandably have fears of contact or, especially in emergencies, think that responsibility should lie with the organisations set up for this purpose. Participation must therefore not only be made possible, but often it must first be advertised. And if one promises participation, one must also ensure that it is real participation and that success can also occur if one participates (Arnstein, 1969). Although these principles from participation research have been known since the 1960s, they are less widespread in Germany than in some other neighbouring countries, especially in the very hierarchically structured disaster management of the municipalities, also due to the established organisations. Conversely, this also leads to a certain passivity in disaster preparedness and in the ability of people in a municipality to act. Not only the authorities and organisations with security tasks must be aware of their responsibility, but also the population for self-protection and self-sufficiency.

On the other hand, social media in particular have also revealed new problems when certain groups of people seek out online forums that reinforce their own opinions and form a kind of echo chamber in which one finds mainly like-minded opinions. This can then become a problem if these are radicalising opinions or those that also spread anti-democratic

opinions or conspiracy theories. At the local level, it is important to be aware of how strong a link there can be to political opinion-making and thus a proximity to local politics. In principle, social media and their echo chambers are an extension of the regulars' table and must be taken into account when communicating about crises. Because otherwise, in addition to a crisis, the self-reinforcing effects of social discontent are added, which in the case of an escalation of a crisis can quickly also end up in the obstruction of emergency forces or in the acceptance of collective measures and in the blocking of the finding of a social consensus. On the other hand, freedom of opinion and critical debate are equally indispensable in a community and must therefore continue to be promoted and integrated. Thus, integrative thinking and a cross-sectoral mindset is already important here and it is advisable to cover the population as broadly as possible in an inclusive approach at an early stage and in the participation of the most diverse social groups.

Both challenges described make the relevance of comprehensive risk communication clear. In contrast to crisis communication, this is not carried out in relation to an acute situation, but continuously in order to inform citizens about risks in general and to enable them to make risk-conscious decisions and lifestyles (BMI 2014). This is also a measure for capacity development at the individual level. The risk literacy thus created can enable the population to be more responsible and willing to participate. Since the broader society often has a distorted understanding of risk, which is caused not least by disproportionate reporting, effective risk communication is particularly important to create a basic understanding of risks and to leave misinformation less of an influence (Nolting 2008). Realistic expectations also include the realisation that risk communication alone cannot prevent the emergence of societal conflicts, as different values and needs continue to lead to different opinions about risks and countermeasures (National Research Council, 1989). However, good risk communication can strengthen the public's trust in the communicating institutions and reputable sources and thus prevent the spread of conspiracy myths in crisis situations.

4. Conclusion and outlook

In summary, municipalities need the appropriate competencies of their staff for future crises, including the ability to think, plan and act across sectors. In addition, there must also be specialists who can deal with issues in depth and independently, even across changes of government. Both types of competence together also require a crisis management culture that promotes this broad and specialised thinking at the same time. This also includes an openness to constantly adapt to new crises and even overlaps of crises and to live with change. Strengthening the resilience of the organisation also still requires a suitable form of coordination and communication that combines both participation formats and clearly regulated structures. Technical aspects of all kinds also contribute to the resilience of, among other things, critical infrastructure and basic services, which have become indispensable in everyday life as well as especially in the event of a crisis.

Disaster preparedness as well as crisis management can lead to resilience, where not everything is predictable and damage as well as negative experiences occur, but one goes through a crisis together as a community and does not break apart as a community or municipality in the end. Analogous to the coat of arms of Paris, a commune may fluctuate and remain in flux and change, but not perish through cohesion despite disputes.

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