

WHITEPAPER

A SOCIAL-ECOLOGICAL SYSTEMS VIEW ON COVID-19:

*Research findings and
policy recommendations*



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Introduction & context

In an age marked by interlinked environmental and social crises of global scale, policymaking tools that account for such crises' complexity are urgently needed. The **social-ecological system framework (SESF)** offers one such tool (McGinnis & Ostrom, 2014). The concept of social-ecological systems – i.e., interlinked environmental and social systems – arose from the natural sciences, but has since found applications across the social sciences and policymaking. The COVID-19 pandemic exemplifies the complex properties of social-ecological systems, as well as the utility of the social-ecological systems framework in analysing and responding to crises. This white paper breaks down important aspects of the COVID-19 pandemic along the key domains of the social-ecological system framework:

- Governance systems
- Resource systems and units
- Actor systems
- Action situations

Drawing on data collected in ten European countries during the COVINFORM research and innovation project, this white paper offers actionable recommendations for how the social-ecological systems framework can be used to add structure and focus to crisis planning and policymaking.

Context and objectives

A social-ecological system is “**a complex, adaptive system** consisting of a bio-geophysical unit and its associated social actors and institutions” (Glaser et al., 2012, p. 4). Here, **complexity** refers to the intricacy and interdependence of the sub-systems that make up any given social-ecological system: the interactions between these sub-systems and their components can yield outcomes that are non-linear, and thus difficult to predict. An example is the relationship between economic globalization, environmental incursions, and the emergence of zoonotic diseases such as COVID-19. The **adaptivity** of social-ecological systems refers to the capacity of sub-systems, components, and actors to change their behaviour in response to changes in the system as a whole. An example is the so-called infodemic that accompanied the COVID-19 pandemic: interactions between human social media users, social media bots, and recommender system algorithms drove feedback loops that reinforced filter bubbles, aggravating the risk of mis- and disinformation.

The concept of social-ecological systems first arose in the natural sciences, but has since migrated into numerous disciplines, including economics, political science, and sociology. Nobel Prize-winning economist Elinor Ostrom made particularly significant contributions to the concept, developing the generalisable **social-ecological systems framework (SESF)** based on her prior work on institutional analysis and development. Ostrom's SESF has been used to analyse numerous systems and phenomena. While designed in the context of natural resource management, the SESF is also a natural fit to the analysis of complex social-ecological crises like pandemics: Ling et al. (2021), for instance, conducted an analysis of COVID-19 responses using selected variables from the SESF. Drawing on such precedents, the COVINFORM research and innovation project adopted the SESF as a framework for the comparative analysis of case studies on COVID-19 impacts and responses in ten European countries. Each case study focused on a particular vulnerable population group: for instance, migration-background nurses in Wales; health care workers in Italy; migration-background residents in Spain, Sweden, Germany, and Belgium; etc. (cf. COVINFORM deliverable D3.8). The SESF also guided the analysis of interviews conducted with low-socioeconomic-status women in ten municipalities in the target countries (cf. COVINFORM deliverable D6.8). Based on these interview findings, as well as supplementary data, this white paper makes recommendations on integrating the SESF into public health policymaking – especially with regard to pandemic planning and governance.

Methodology

This white paper is based on the findings of N=120 in-depth interviews with low-socioeconomic-status women conducted in municipalities in ten countries across Europe (February to May 2022), supplemented by N=50 in-depth interviews conducted with representatives of civil society organisations active in pandemic responses within the same municipalities (June to September 2022)¹. The paper also draws on several rounds of desk research into governmental policymaking processes, public health measures, civil society organisation responses, and participatory practices in the target countries and municipalities.

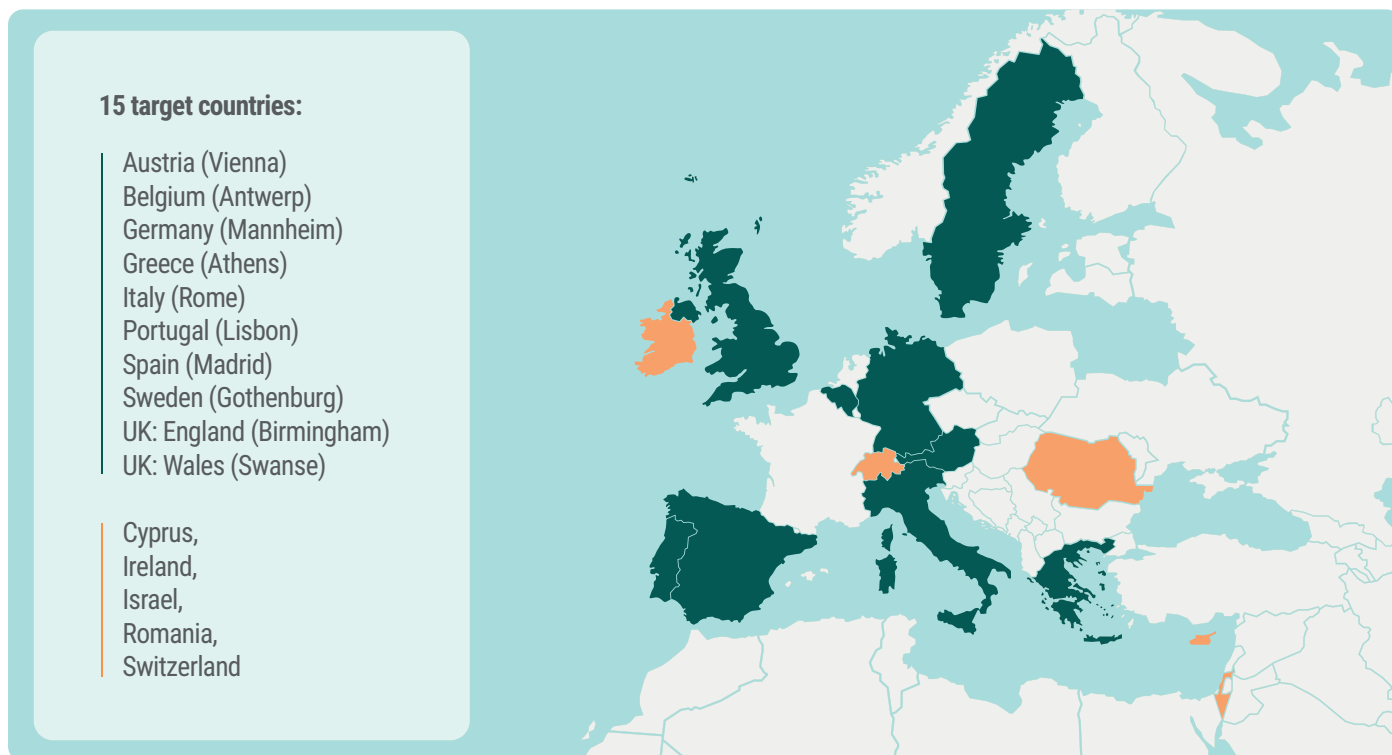


Figure 1. The COVINFORM research sites (empirical research: green; desk research only: orange)

The interviews with residents and civil society organisation representatives were pseudonymised in compliance with the GDPR and good practices in ethical research, then coded and analysed by the project partners using interoperable computer-assisted qualitative data analysis software packages. Throughout the coding and analysis process, the partners regularly held virtual meetings to discuss the findings and their implications. For a comprehensive discussion of the research design and methods, please see COVINFORM deliverable D6.8, “Synthesis and lessons learnt on community and citizen responses and impacts – Update M36”.

¹ Austria (Vienna), Belgium (Antwerp), England (Birmingham), Germany (Mannheim), Greece (Athens), Italy (Rome), Portugal (Lisbon), Spain (Madrid), Sweden (Gothenburg), Wales (Swansea).

Key message (Research and Analysis)

Governance, resources, actors, and interactions during the pandemic

The interview findings and secondary data analysis shed light on numerous aspects of governance and interaction within the research sites. Ostrom's social-ecological systems framework offers a structured means of understanding the relationships in play. The framework breaks down any given social-ecological system into a set of interlinked sub-systems, e.g.:

- **Governance systems** are made up of institutions, institutional norms, and legal/regulatory regimes that establish the basic rules of interaction within the geophysical unit – in this case, cities. Governance systems entail governmental and non-governmental organisations, property-rights systems, operational-choice rules, collective-choice rules, constitutional-choice rules, monitoring and sanctioning rules, etc.
- **Resource systems** and units comprise material and non-material goods and services used in the geophysical unit. Variables here are different sectors of productive activity and their size, productivity, boundaries, equilibrium properties, degree of predictability, etc.;
- **Actor systems** comprise all persons active in the geophysical unit. Variables here are actors' attitudes and practices, socioeconomic attributes, social relations, histories/past experiences, locations, resource dependence, etc.

These sub-systems converge in “action situations”, defined as complex interactions in which “actors in positions make choices among available options in light of information about the likely actions of other participants and the benefits and costs of potential outcomes” (McGinnis & Ostrom, 2014). Here, attention should be given to typical properties of complex adaptive systems, such as multidimensionality, cascading effects, network effects, and the difficulty of predicting outcomes (Edwards, 2022, pp. 6-12; cf. COVINFORM D6.4). The outcomes of action situations establish the conditions for the future performance of the system, and can be assessed using indicators – as exemplified by the COVINFORM risk assessment dashboard (<https://covidinform.triad.trilateral.ai/>).

Governance systems

Writing on human security, Huntjens & Nachbar (2015) suggest that adopting a multi-level governance model – that is, integrating a range of stakeholders from civil society and the private sector into governance processes – could assist in effectively responding to societal crises. By pushing governmental institutions to their limits (and in some cases beyond them), the COVID-19 crisis in a sense forced the emergence of multi-level governance practices. CSO representatives and low-socioeconomic-status women interviewed in the COVINFORM target sites both testified to the importance of numerous non-governmental actors in COVID-19 responses.

A significant finding is that while CSO representatives were aware of the wide range of activities taken by governmental organisations, residents often were not. Only the sub-group of interviewees who received direct support from state institutions assessed them as leaders in the pandemic response; the majority saw them as missing in action.

“I have not received any help from the government. It's all been on a private level [...] I am happy with the people I know, not with the government. The government, do you think that man is going to know how we are in every house?” (Resident_Interview_6_ESP)

“I think the state doesn't look after the poor.” (Resident_Interview_6_PT)

While CSOs appreciated the extreme pressure under which governmental institutions were put, they also bemoaned a lack of accessibility and coordination, both for themselves as fellow responders and for their vulnerable target groups.

“[Governmental services' lack of telephone accessibility] was absolutely catastrophic.” (Germany, CSO respondent 2).

“[Cooperating with the local government felt like] going on a ship after having been on the Titanic” (Italy, CSO respondent)

“[Access to benefits] was all so complicated that many either didn't even try or didn't make it.” (Germany, CSO respondent 5)

Conversely, residents and CSO representatives concurred on the importance of CSO activities. CSOs provided material and social support in highly visible ways in all ten research sites, eclipsing GOs in perceived importance.

“Caritas gave us a lot of [material] help.” (Resident_Interview_8_ESP)

“The Red Cross gave me a carton of about 50 masks, and one of the girls who lived here, they also gave her some hydrogel” (Resident_Interview_8_ESP)

A takeaway here is that most residents seemed unaware of the indirect impacts of GO initiatives that targeted the society and economy as a whole, specific sectors, or organisations, as opposed to individuals. The ‘invisibility’ of structural support measures must be interpreted within the context of low-SES women’s long-term experiences and perceptions of the state, which were often either ambivalent or negative. Many interviewees, for instance, described their everyday living conditions as radically insufficient: dense housing, poor physical and digital infrastructure, poor resource availability, highly bureaucratic social welfare systems, etc. Such insufficiencies are the outcomes of long-running governance processes and priorities – a fact of which low-SES women were well aware. Beyond the general perception that the state “doesn’t look after the poor”, some interviewees testified to concrete experiences of discrimination or even state violence. Needless to say, such experiences undermine trust.

Resource systems

Both CSO representatives and low-SES women confirmed the multiplicity of resource systems that must be taken into account in the analysis of crises such as the pandemic: not only public health systems, but also housing systems, child and youth services, social welfare services, transportation systems, digital infrastructures, and greenspace had pronounced impacts on everyday wellbeing. Many of the low-SES women interviewed lived in neighbourhoods with poor access to health and social resources alike. Specific problems mentioned by interviewees include cramped and dirty living conditions, a lack of greenspace, insufficient public transportation, and digital divides. A number of interviewees fantasised about living in more pleasant spaces during the pandemic.

“The living environment during Corona was connected with difficulties all the time [...] the environment outside where I go, it weakened my psyche a lot.” (Resident_Interview_3_AT)

“If I had a villa, there would have been no problems (laughs). But in such a small apartment? And it wasn’t possible to go to the park. I could just go to the shop to pick up bread. And then go directly home.” (Resident_Interview_6_BLG)

“Public transport was terrible. They were full and they would even leave you. So many people were left on the streets.” (Resident_Interview_1_IT)

“[We need] more gigabytes, more Wi-Fi, more frequency. So that everyone, especially people in poverty, can receive it for free. You have that in the library, sometimes you see children waiting outside for it. But then you have to be on the street.” (Resident_Interview_6_BLG)

Interviewees moreover pointed out the importance of social networks as resource systems. A number of interviewees stated that they received material and social-psychological support from individuals in their social circles. Interviewees also mentioned that they themselves had stepped up to provide resources to their neighbours during the crisis.

“There was a neighbourhood association that came and brought packages three times.” (Resident_Interview_1_IT)

“I have contact with my neighbour as well, I did her shopping and then she also helped me when I had to stay and quarantine.” (Resident_Interview_5_BLG)

The CSO representatives interviewed in the target cities confirmed that informal support networks were important for most residents, but especially critical for those with low exposure to formal social welfare systems. This can include refugees and other migrants, the houseless/homeless, persons suffering from addiction or mental illness, persons working in criminalised occupations, etc. Recognising social networks as resource systems, and social capital as a resource, could inform policies to better support such highly vulnerable groups.

Actor systems

Nearly all of the CSO representatives and low-SES women described actor systems in their neighbourhoods and cities as highly diverse: home to people with a wide range of ethnic, cultural, linguistic, and socioeconomic backgrounds. This brought a distinct set of challenges for both CSOs and residents. For example, residents in some sites pointed to a lack of multilingual information and services; likewise, for some of the CSOs interviewed, translating and culturally adapting COVID-19 information provided by the state was a priority.

“I don’t speak the language so well. So, it is difficult to watch the news. So, they should add extra subtitles in different languages or something.” (Resident_Interview_9_BLG)

“I just called my Austrian friends and asked like, ‘yes, I saw this but could you please tell me..?’ Because you are reading this, and you understand the details, I just on see the surface meaning of the words but I’m not sure how I should understand it.” (Resident_Interview_1_AT)

“There are no opportunities for people that doesn't speak the language [...] For example, my mom, she wanted to join some activities and things about wellbeing, but some places don't have an interpreter.” (Resident_Interview_5_W)

While most of the interviewees framed the diversity of their neighbourhoods in positive or neutral terms, some did point to instances of inter-group tension. Interviewees with a migration background often reported instances of discrimination, sometimes extending to verbal or even physical violence. Other sources echo this finding (cf. Slaats, 2020; SOS Mitmensch, 2021).

“People were already very cautious of ethnic minorities [...] when the pandemic came, it has probably just gotten worse.” (Resident_Interview_6_W)

“I've been yapped at so many times that I'm a dirty foreigner who doesn't follow the rules because of the mask [...] I was also almost thrown off the train once by two older men [...] It wasn't so bad before, but now it's much worse. People's cohesion has been so broken.” (Resident_Interview_12_DE)

“Schönau just has a lot of multiculturalism [...] and] excuse me for saying this, but some people didn't give a damn [about the rules].” (Resident_Interview_8_DE)

Socioeconomic divides were also identified as a problem: most interviewees understood the pandemic in clear terms as having had worse effects on those who were already vulnerable, and especially on the poor.

“In the pandemic, not everybody's equal. Because rich people had an easier pandemic and poor people had a really difficult pandemic.” (Resident_Interview_1_W)

“While the Coronavirus was actually global, the impact of the Coronavirus is not equal. It has a more negative impact on poor people than on rich people.” (Resident_Interview_12_BLG)

However, the interviews also revealed another perspective. Throughout the pandemic, not only challenges but also a heightened sense of gratitude often emerged. A number of interviewees expressed a new appreciation for things previously taken for granted, such as health, home, family, and social connections, while others testified to enhanced cohesion within their neighbourhoods.

“What I felt is that with all those people living in the neighbourhood, is that we felt closer, like a family.” (Resident_Interview_6_GR)

“Neighbors with whom I had never had any contact [...] young kids and so on, they did ask me if we needed anything. The people at that time became very good and very supportive. I mean, you noticed that there was something in people that made you think that people are not as bad as they seem [...] And now we're friends and we say hello, and those things have changed.” (Resident_Interview_1_ESP)

The formation of new social connections and mutual aid practices during a multidimensional societal crisis provides an unprecedented opportunity for both local policymakers and CSOs to observe how and why people self-organise to help one another and themselves under challenging conditions.

The SESF as a tool in crisis planning and 'crisis-aware' policymaking

Coding and analysing the COVINFORM findings within the social-ecological systems framework helped the research team to find patterns and actionable insights in a very large qualitative dataset (N=170 interviews total, i.e., hundreds of thousands of words). Similarly, the SESF can contribute structure and focus to the crisis planning process. For instance:

- When **assessing risks**: threats, vulnerabilities, and resilience factors per domain (governance systems, resource systems, actor systems) can be identified and their potential interactions mapped.
- When **defining roles and responsibilities**: liaisons can be nominated and resourced to oversee interaction with specific institutions within the governance system and sub-groups within the actor system.
- When **planning response protocols**: the resource needs and pain points of sub-groups within the actor system can be identified, and contingencies can be developed and responsibilities assigned in advance – including to trusted non-governmental actors, such as CSOs.

Perhaps the most meaningful contribution of the SESF to crisis management is its emphasis on the complex interaction between domains. For instance, the framework shed light on the long-term impact of governance in the COVINFORM target sites on resource availability (e.g., structural inequality) and the interactions between sub-groups of actors (e.g., structural discrimination). Adopting the SESF in policymaking during inter-crisis periods could help prepare the way for less fragmented responses during crises themselves. The following recommendations emphasise this long-term perspective on 'crisis-aware policymaking', while also linking to concrete examples of COVID-19 responses that took systemic complexity into account.

Recommendation 1: Get proactive about multi-level governance

The COVINFORM findings show that multi-level governance on a municipal level is already a reality: not only GOs, but also CSOs and residents themselves played important roles in local COVID-19 responses. However, in most of the target sites, this occurred in an ad-hoc way. Often, CSOs found themselves stepping in to “put out fires” rather than coordinating with governmental response planners; when they did try to coordinate, their counterparts were sometimes difficult to reach. This is a problem that must be addressed prior to, rather than during, the next public health crisis.

The first step is **inclusive planning**: CSOs should be involved early in the development of response strategies, policies, and procedures. Mechanisms for this could include focus group discussions, public calls for input on document drafts, or multi-stakeholder working groups. Official communication channels, such as dedicated GO/CSO liaisons, should be established during the planning phase and earmarked with sufficient resources to ensure that they are not overwhelmed once a crisis sets in. On the CSO side, capacities and resources should be inventoried and shared with governmental response planners. This would allow for an informed discussion of roles and responsibilities, improve the efficiency of resource allocation, and reduce the chance that efforts are duplicated during a crisis.

An important aspect of communication between GOs and CSOs is openness and trust. CSOs’ proximity to vulnerable groups gives them an intimate understanding of the human impact of structural inequality – which is, of course, the result of past policy. This can lead to a critical perspective on the state. Building a trusting relationship with CSOs means accepting constructive criticism, taking it seriously, and acting on it when possible, while also being honest about the realities of power within local and broader governance systems. Establishing **bi-directional feedback channels** during a crisis and encouraging CSOs to document their experiences can allow response strategies to be improved in real-time, while also providing local policymakers with ‘ammunition’ to lobby for higher-level interventions to alleviate structural inequality.

Examples of initiatives in the COVINFORM target countries that aimed to improve inclusive multi-level governance follow. Notably, the first example was initiated from the top down, and the second from the bottom up:

- A microgrant programme organised by the [Swansea Council for Voluntary Services \(CVS\)](#) in Wales, an umbrella organisation for civil society groups. Practices funded and coordinated under the programme include a food bank, a food and medication delivery service, an initiative to purchase defibrillators, informational and other support services for migrants and international students, and digital capacity building for the National Autistic Society
- [Antwerpen Helpt](#) and [Solidarité 1080 Solidariteit](#), two Belgian platforms, which started as grassroots volunteering initiatives and were later sponsored by the public authorities. The platforms connect people in need of support during lockdown with those offering help.

Recommendation 2: Treat social networks and capital as ‘system-critical’ resources

The COVINFORM findings prompt an acknowledgement of the diversity of resource systems that played a role in the pandemic response – including social networks. For many residents, especially those with limited exposure to formal welfare systems, social networks were the go-to source for material, social, and psychological support when things got bad.

Accordingly, **investments in social and community capital** should be considered an integral part of crisis planning and preparation. Governments can promote social interactions and enhance social capital on a neighbourhood level by improving infrastructure (e.g., community centres and community gardens), organising opportunities for networking (e.g., festivals and events), building capacities (e.g., through training and mentorship programmes) – and, last but not least, providing funding and recognition for CSOs and self-organised groups. While such priorities should be set in pre-crisis phases, crisis-specific measures aimed to enhance social capital, such as online platforms and microgrant schemes for participatory initiatives, should also be taken into consideration.

In the case of public health crises like COVID-19, social networks must also be taken into consideration when planning non-pharmaceutical interventions. Both CSO representatives and low-SES women stated that **lockdowns severely disrupted social networks** in the target sites – thus also disrupting mutual aid practices. In many sites, lockdowns were moreover imposed during phases in which governmental institutions were most under pressure, meaning limited or no in-person services, reduced telephone services, etc. This meant that at the exact time when access to formal support systems was most limited, the informal support networks to which vulnerable individuals would normally turn were also cut off. For some interviewees, this total failure of formal and informal safety nets was devastating. While the need for social distancing measures during a pandemic is not up for debate, serious consideration must be given to how to avoid such outcomes in the future.

Examples of initiatives in the COVINFORM target countries that aimed to foster social capital are:

- [*Gatans lag*](#), an Swedish organisation that works with people who have suffered from addiction, mental illness and people with criminal background, which arranged activities outdoors during the pandemic for their members to meet and talk.
- [*QuarantineChat*](#), a platform initiated by residents in Portugal which connects people from all corners of the world by putting them on the phone with strangers.
- [*Plaudertischerl*](#), an initiative in Vienna, Austria, which enables users to schedule either zoom chats or face-to-face meetings in local cafés (depending on regulations at a given time).

Recommendation 3: Go beyond buzzwords on diversity and inclusion

While the COVINFORM interviewees almost universally expressed appreciation for the diversity of their communities, they also recognised intra-community difference as a pressure point. The pandemic exacerbated existing inequalities and tensions, and sometimes gave rise to new ones.

Like investments in social capital, **investments in combatting inequality and discrimination** must be treated as part of crisis preparation. Local governments can begin by publicly committing to inclusivity, diversity, and non-discrimination as core principles of policy and practice. Anti-discrimination laws should be reviewed, augmented when insufficient, and rigorously enforced – especially in instances of discrimination by public employees. Here, safe and anonymous reporting mechanisms (such as an ombudsperson programme) and effective hate crime tracking systems are key. Cultural competency training for public employees (including incentives to learn languages) and recruiting efforts within minority communities should also be boosted, not just at the front-line level but throughout institutional hierarchies. While diverse representation within local governments and institutions at the decision-making level is not a guarantee of inclusive policymaking, it is a step in the right direction.

Diversity and inclusion initiatives during pre-crisis phases may help mitigate inequalities, but cannot eliminate them. Policymakers must thus plan for **how to address the risk of an unequal crisis** during crises as well. A particular challenge is addressing vulnerable groups that have experienced discrimination and social exclusion, as they may distrust the government and other dominant social institutions. Here, CSOs and residents themselves can play a crucial role. Among the most successful practices reviewed by the COVINFORM researchers were those that leveraged CSOs' bonds of trust and residents' social networks to distribute accurate COVID-19 information and encourage health-protective behaviour among marginalised groups, such as migration-background residents of economically disadvantaged suburbs in Gothenburg, Sweden and Gypsy, Roma, and Traveller communities near Swansea, Wales (for more information on both examples, see Edwards, 2022, pp. 15-16). While not every such example is transferable to every site, incorporating a review of good practices into crisis planning – preferably together with CSO representatives and residents themselves – could improve the concreteness of the strategies devised.

Examples of initiatives in the COVINFORM target countries that aimed to boost the resilience of diverse communities are:

- ① [*Refugees for Refugees Videos*](#), an initiative of Refugees of Stuttgart, which created written information and explanatory video clips on hygiene and health-protective behaviour in seven languages; these were published on the website of the City of Stuttgart.
- ① [*Multilingual Helpline Wales*](#), a national helpline established by several CSOs and GOs which provides information and referrals for health and social services. It is oriented especially toward ethnic minorities who may not be fluent in English and/or face other barriers to finding credible information about the pandemic.

Conclusion

The social-ecological systems framework (SESF) has been adopted across academic disciplines and within policymaking circles as an effective analysis and planning tool. This white paper illustrates the relevance of the SESF to crisis planning and policymaking through an application to qualitative data on COVID-19 impacts and responses in ten European municipalities. It examines how civil society organisation representatives and low-socioeconomic-status residents in these municipalities perceived the performance of multi-level governance systems, the accessibility of health and social resources, and the relationships between diverse actors during the pandemic. By providing a framework within which to examine complex interactions across

these domains, the SESF enabled the researchers to deduce actionable insights for practice and policy. The framework's most significant contribution lies in its ability to shed light on how governance decisions can impact structural distributions of affordances and resources, which then establish the context for future decision-making by policymakers and other actors alike. Accordingly, this white paper advocates adopting the SESF as a guideline for crisis planning as well as research: thinking in a structured way about the interactions between discrete sub-systems can assist planners and policymakers in developing 'crisis-aware' governance practices, leveraging informal as well as formal resource networks, and ensuring that diverse actors are heard and addressed.

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Deliverables

D3.8, Final case study reports and comparative report - update M34

D6.4, Synthesis and lessons learnt on community and citizen responses and impacts

D6.8, Synthesis and lessons, learnt on community and citizen responses and impacts - update M36

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The COVINFORM project

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