

engage

Engage Society for
Risk Awareness and Resilience



Deliverable 2.3 – Informal solutions to improve societal resilience

Authors: Labaka, Leire (TECNUN), Elkady, Sahar (TECNUN), Borges, Marcos (TECNUN), Hernantes, Josune (TECNUN)

Contributors: Iturriza, Marta (TECNUN), Martina Ragosta (SINTEF), Asbjørn Lein Aalberg (SINTEF), Matthieu Branlat (SINTEF), Alberto Pasquini (DBL), Ilaria Bonanno (DBL), Jan Verlin (ENS), Bruria Adini (TAU), Nathan Stoloro (TAU), Artzai Morante (ERTZ), Javier Vilarin (ERTZ), George Manea (DSU), Francesca de'Donato (ASL), Alexis Gizikis (EENA), Marta Azevedo (EENA), Marita Hoel Fossen (TRC), Peter Berggren (KMC), Rachele Gianfranchi (EVBG), Anne Marie Cabrini Føyen (EVBG).

Abstract: ENGAGE aims at linking the resilience capacities naturally inherent in civilians with the work of authorities and emergency organizations to prevent, prepare for, respond to, and recover from disasters. It brings together 14 partners from 8 countries aiming to show how individuals and local practices can interrelate effectively with planned preparedness and response, practitioners, and technology. In this deliverable, we identified a set of informal solutions that first responders would

apply when faced with uncertainties and unknown situations. These solutions have been classified based on the solution type, in which phase of the disaster they should be implemented and the interaction purposes they address. In total, 75 solutions were identified. They were equally distributed over the following interaction purposes: Improve communication, improving information and knowledge sharing and governance and leadership.



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AUTHORSHIP & APPROVAL INFORMATION

EDITOR

Marcos Borges / TECNUN

DATE

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CONTRIBUTORS

Leire Labaka / TECNUN
Sahar Elkady / TECNUN
Josune Hernantes / TECNUN
Marta Iturriza / TECNUN
Martina Ragosta / SINTEF
Asbjørn Lein Aalberg / SINTEF
Alberto Pasquini / DBL
Ilaria Bonanno / DBL
Jan Verlin / ENS
Bruria Adini / TAU
Nathan Stolerio / TAU
Artzai Morante / ERTZ
Javier Vilarin / ERTZ
George Manea / DSU
Francesca de' Donato / ASL
Alexis Gizikis / EENA
Marta Azevedo / EENA
Marita Hoel Fossen / TRC
Peter Berggren / KMC
Rachele Gianfranchi / EVBG
Anne Marie Cabrini Føyen / EVBG

DATE

23 April 2021

REVIEWED BY
Nathan Stolero / TAU
Jesús Alberto Alonso Velasco / ERTZ

DATE
27/04/2021

APPROVED BY
Matthieu Branlat / SINTEF

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Members of the ENGAGE Consortium

	Stiftelsen SINTEF (SINTEF) NO-7465 Trondheim Norway www.sintef.com	Project Coordinator: Matthieu Branlat Matthieu.Branlat@sintef.no
	Deep Blue Srl (DBL) IT-00198 Rome Italy www.dblue.it	Contact: Alberto Pasquini alberto.pasquini@dbblue.it
	University of Navarra (TECNUN) SP-31009 Pamplona Spain www.tecnun.unav.edu	Contact: Leire Labaka llabaka@tecnun.es
	Tel Aviv University (TAU) IL-6997801 Tel Aviv Israel www.english.tau.ac.il	Contact: Bruria Adini adini@netvision.net.il
	Trondheim Red Cross (TRC) NO-7465 Trondheim Norway www.rodekors.no/en/	Contact: Marita Hoel Fossen marita.fossen@redcross.no
	European Emergency Number Association (EENA) BE- 1060 Brussels Belgium www.eena.org	Contact: Alexis Gizikis ag@eena.org
	Ministry of Internal Affairs, Department of Emergency Situations (DSU) RO- 010086 Bucharest Romania www.dsu.mai.gov.ro	Contact: Raed Arafat arafatr@smurd.ro
	Everbridge Norway (EVBG) NO-0663 Oslo Norway www.everbridge.no	Contact: Håkon Straume Haakon.Straume@everbridge.com
	Ecole Nationale Supérieure (ENS) FR-75005 Paris France www.ens.psl.eu	Contact: J. Peter Burgess james.peter.burgess@ens.psl.eu
	ERTZAINZA - Departamento de Seguridad – Gobierno Vasco - (ERTZ) ES- 01010 San Sebastian Spain www.ertzaintza.eus/wps/portal/ertzaintza	Contact: Jesús Alberto Alonso Velasco 06090@ertzaintza.eus





Cittadinanzattiva (CA)
IT- 00183 Rome
Italy
www.cittadinanzattiva.it

Contact: Annalisa Mandorino
a.mandorino@cittadinanzattiva.it



Azienda Sanitaria Locale Roma 1 (ASL
Roma 1)
IT- 00198 Rome
Italy
www.aslroma1.it

Contact: Francesca de'Donato
f.dedonato@deplazio.it



Katastrofmedicinskt Centrum (KMC)
SE-58330 Linköping
Sweden
www.lio.se/kmc

Contact: Carl-Oscar Jonson
carl-oscar.jonson@regionosterqotland.se



NTNU Social Research Ltd. (NTNUSR)
NO- 7491 Trondheim
Norway
www.ntnu.edu

Contact: Stian Antonsen
stian.antonson@ntnu.no



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Executive summary

Background: Civilians play a crucial role in dealing with disasters and they have to take part in the preparation, response, and recovery processes of the crisis. To utilize in full the potential of the civilians in dealing with crises, it is essential to improve the collaboration and interaction of authorities and emergency organizations with the civilians to efficiently respond and recover from crises. For that to happen, authorities and emergency organizations set and use a group of practices, guidelines, techniques, tools, methods, etc. that help them reach the civilians and involve them in the crisis management. In this project, we use the term “solutions” to refer to this set of means that emergency responders and authorities can use and implement to reach out the civilians and improve the interaction with them. These solutions can be either formal or informal based on whether they have been defined and developed beforehand to be used in a given situation or on the contrary, they have been created on the fly because a formal solution is inexistent or not suitable to handle the given situation. This separation is further explained in the Term Definition Table and in the Methodology sections. The analysis of the collaborative interactions with civilians is also classified according to their purposes.

Goal: This deliverable aims at identifying informal solutions that emergency organizations and authorities develop and implement to improve their interaction with civilians when facing emergencies. These informal solutions are captured during the interviews and workshops that involved end-users dealing with problems in hypothetical scenarios to allow for creative and innovative solutions. These solutions were described in detail and classified based on the solution type, on the crisis phase in which they are implemented, and on the interaction purposes they contribute to. In this first step, we collected the different solutions that are already used by the end-users with the aim of afterward (in WP3) make a selection of the most promising solutions based on their effectiveness and depending on the contextual factors of each region.

Methodology: we applied two methods to capture informal solutions. Both methods – interviews and workshops – aimed at capturing information from the end-users. We made use of an end-user workshop, a KI-CoP workshop, and semi-structured interviews to capture these informal solutions. As a result, we could identify 75 solutions, some more general, others associated with the situation described in the scenarios. Seven scenarios, all related to Covid-19, were used in the workshops. Based on these specific scenarios, the end-users were asked to provide solutions they would use to handle the situations posed to them. Finally, in the semi-structured interviews with external end-users, different informal solutions used by the participants were collected. More than 50 end-users feed these solutions, the majority from interviews.

Results: In total, 75 informal solutions were obtained from these three of sources of information, 22 came from the end-user workshop, 32 from the KI-CoP workshop, and 21 from the semi-structured interviews. These informal solutions were classified into different types of solutions: the majority were associated with strategies and planning (30), services to reach society (15), and awareness and training sessions (12). Regarding the interaction purposes addressed by the informal solutions, most of them were classified into three main purposes: improving knowledge and information sharing with the society (33), improving communication with the society (34) and governance and leadership practices (33). All these results are presented in the tables depicted throughout the report.

Conclusions: This deliverable identifies the informal solutions that could be adopted by authorities and emergency organizations to enhance their interaction with the society. We gathered these informal solutions from different sources and they have been classified based on the solution type, the crisis phase in which they could be implemented, and the interaction purposes they address. The distribution of solutions across purposes gives us a good idea of which solutions serve which kind of benefit and which purposes are lacking solutions. This study presents the first step in this process and in the future a more detailed analysis about in which cases these solutions are effective



and in which cases they are not should be carried out to select the most promising solutions for each situation and perhaps incorporating the informal solutions in the formal set of solutions or part of recommended practices/guidelines. The results obtained with these exercises are presented in summary in the main body of the report, and in details in the Appendices. This deliverable should be used in subsequent tasks of the project, particularly in WP3. The experience we gained with the workshops will also be useful for the future workshops planned in the project.



1 INTRODUCTION

1.1 SCOPE OF THE DELIVERABLE

Civilians play a crucial role in dealing with disasters and they have to take part in the preparation, response, and recovery processes of the crisis. To utilize in full the potential of the society in dealing with crises, it is essential to improve the collaboration and interaction among the authorities and emergency organizations with the civilians to efficiently respond and recover from crises. For that to happen, authorities and emergency organizations set and use a group of practices, guidelines, techniques, tools, methods, etc. that help them reach the civilians and involve them in crisis management. In this project, we use the term “solutions” to refer to of the various means that emergency responders and authorities can use and implement in order to reach out to the public and improve the interaction with them. We define solutions as anything we can apply to reach a desired outcome. This deliverable aims at identifying and describing the existing solutions to enhance this interaction of the authorities and emergency organizations with the civil society.

These solutions can be either formal or informal based on whether they have been defined and developed beforehand for a given situation or, on the contrary, they have been created on the fly because a solution is inexistent or not suitable to handle the particular situation. This separation is further explained in the Term Definition Table and in the Methodology sections. In this deliverable, we will present the informal solutions identified through three main sources, solutions captured by the two workshops with end-users and solutions extracted from the interviews with end-users from the seven participating countries.

Furthermore, to define how each solution contributes to this interaction of emergency organizations and authorities with the civil society, we define eight specific interaction purposes that these solutions contribute to when implemented in practice. These interaction purposes are closely related to the target aspects that help to improve societal resilience.

1.2 OBJECTIVES

The main objective of this deliverable is to identify and describe the informal solutions that aims at improving the interaction of emergency organizations and authorities with the civil society. This will allow us to analyze the benefits these solutions have on the engagement of the society in reducing the severity of the outcomes of disasters. However, this will always be analyzed under the perspective of the interaction between emergency organizations and authorities with civilians, as only acting together, we can reach benefits beyond the simple preparedness and response, in other words, a high level of societal resilience.

The specific objectives of this deliverable are:

- To establish a clear separation between formal and informal solutions, based on an objective definition.
- To identify and describe the informal solutions to improve the interaction of emergency organizations and authorities with the civil society.
- To characterize the specific procedures embedded in these solutions for improving the interaction.
- To analyze the requirements that these solutions imply for implementing them as part of the process.



1.3 SIGNIFICANCE

The overall aim of the ENGAGE project is to amplify the inherent capacity of the society through better involving them in disaster management. In this vein, it is essential to improve the collaboration and interaction of emergency organizations and authorities with the civil society in order to foster society's involvement and better use the capacities of the society in dealing with disasters.

1.3.1 CONTRIBUTION TO THE FIELD OF STUDY

In this deliverable, we studied the already existing solutions such as tools, applications, methods, guidelines, practices, and strategies that are used and implemented to improve the collaboration and interaction of emergency organizations and authorities with the civil society. We identified a set of formal and informal solutions to capitalize on the relationship of emergency organizations and authority with the civil society.

Furthermore, this deliverable defines for each solution the specific purposes that are achieved through this interaction. These purposes are related to the target aspects that should be improved to facilitate the interaction of emergency organizations and authorities with the civil society.

This deliverable lists the informal solutions identified and explains when each solution should be used, what stakeholders each solution involves, and what specific interaction purpose each solution addresses.

1.3.2 SPECIFIC CONTRIBUTION TO THE ENGAGE PROJECT

This deliverable proposes a set of informal solutions gathered from three different sources. The first source was the workshop with the end-users who participate in the project. The second source was the second workshop, this time with the participation of invited end-users, not directly involved with the project. Finally, we use the result of the interviews to capture the informal solutions mentioned by the interviewees. This deliverable provides input to the analysis of the approach we are adopting in the ENGAGE project, providing the different types of solutions and what purposes they aim at.

This deliverable contributes directly to the second objective of the ENGAGE project "Identify existing formal and informal solutions for enhancing societal resilience transferable across contexts". Furthermore, it also serves as an input for the third objective of the project "Produce validated actionable knowledge on societal resilience by demonstrating the benefits and impact of the project solutions in different types of disasters [...] and geographic conditions".

Related to these objectives, the deliverable will contribute to the following results that the ENGAGE project expects to obtain: Catalogue of solutions for societal resilience (R5), Validated ENGAGE solutions, and examples of applications (R6), ENGAGE knowledge platform (R1).

1.4 FIT WITHIN ENGAGE

D2.3 identifies informal solutions end-users adopted in the occurrence of unexpected events and situations. They differ from formal solutions as those have been previously defined and probably tested for the situations faced by the end-users. Informal solutions are mostly based on knowledge acquired by previous experience, improvisation or expertise-based intuition. Both types of solutions, however, have the same objective as to improve the interaction of emergency organizations and authorities with the society, defining which stakeholders are involved, in which phase of the crisis the solution should be implemented and what interaction purposes each solution covers. It is related



to other work packages and deliverables, mainly, WP1, WP2, WP3 and WP4. As input for this deliverable, we use the results obtained in the following deliverables:

D1.1: Preliminary model for assessing and methods for improving societal resilience: the contextual aspects described in D1.1 were used to define the interaction purposes we defined in D2.3 in order to determine the specific aim of each solution in improving the interaction.

D1.2: Local perceptions, risk awareness, needs, and expectations about societal resilience: The constructs and scales defined for the questionnaire were used in order to define the interaction purposes we defined in D2.3.

Furthermore, the results presented in this deliverable (D2.3) will be used in the following near-future tasks:

T3.1: Selection of promising solutions: the list of solutions presented in D2.3 will help for the selection of the solutions which are candidates to become formal to compose the catalog of societal resilience solutions that will be presented in D3.1.

T3.2: Exploration of innovative use of communication and social media technologies: the list of solutions presented in D2.3 should help to establish additional solutions that will need to be developed to improving communication.

T4.2: Initial validation of solutions: the three validation exercises that will be conducted in WP4 will cover solutions from the ones provided in D2.2 and D.2.3.

Furthermore, in order to collect information for this deliverable, we collaborated with the KI-CoP members (WP5). The first workshop with the KI-CoP conducted in March was used to identify solutions, formal and informal, that are currently implemented by the end-users in the field. The results obtained from this workshop are explained in section 3.3.2 of this deliverable.

1.5 DEFINITION OF TERMS

Table 1: Definitions of the main terms

Term	Definition
Solutions	We define solutions as any kind of mean or instrument that emergency organizations and authorities can apply to reach the public and improve the interaction with them. This set of means or instruments can be guidelines, practices, processes, strategies, methods, technologies, tools, applications, etc. that afford the aforementioned aim.
Formal solutions	A solution is formal when it is replicable, defined, and developed beforehand to be used in a given situation, having studied its suitability to be applied in these established situations and with specific goals. Normally, these solutions are part of the recommended policies by authorities and different entities to be used in a situation.
Informal solutions	A solution is informal when it is created on the fly because a formal solution is inexistent, or not suitable to handle the situation, or because it cannot be applied due to some specifics of the context. They can also be formal solutions applied in ways that are different from what was planned, they are used in a new way that was not foreseen. Informal solutions are defined and developed based on the intuition and experience of the end-users and implementers.
Interaction purposes	Interaction purposes are the different aims that the emergency organization and authorities pursue when improving their interaction

	<p>with the civilians. We define the following 10 interaction purposes when enhancing the interaction:</p> <ul style="list-style-type: none"> • improve the communication with the society, • enhance society' risk awareness, • facilitate the resources allocation from/to society, • improve the information and knowledge sharing with the society, • enhance the preparedness of the society to deal with crises, • capitalize upon social networks and relationships among the society, • improve the society's health and mental outlook, • increase the level of trust of the society towards authorities and emergency organizations, • improve the involvement of the society in dealing with crises, • empower society in governance and leadership activities.
Authorities	Officials at national, regional, or local level governments who are responsible for managing emergencies and disasters.
Emergency organizations	Any entity with the ability and responsibility to be on the front line in the event of an emergency or a disaster. They also provide help for the public maintaining their safety and wellbeing in current situations.
Civilians / civil society	Ordinary people, part of the overall population, without a specific responsibility in case of emergencies or disasters.
End-users	End-users refer the authorities and emergency organizations responsible for designing, developing and implementing the formal solutions presented identified in this deliverable
KI-CoP	Knowledge and Innovation Community of Practice. An open association including practitioners, NGOs, Virtual Operations Support Teams, scientists, researchers and citizens' representatives supporting ENGAGE as users and co-owners of its solutions.

2 SCIENTIFIC BACKGROUND

2.1 CONCEPT OF SOCIETAL RESILIENCE

A huge body of research addressed the concepts of societal resilience and community resilience (in this research we will use both terms societal resilience and community resilience interchangeably); its definition, components, assessment methods, conceptualization, and relationship to other related concepts such as vulnerability (Wilson and Wilson 2019; Jacinto, Reis, and Ferrão 2020; Ran et al. 2020; Cutter, Ash, and Emrich 2016; Cutter, Burton, and Emrich 2010). In this sense, there are many definitions of societal resilience (Patel et al. 2017), the one we adopt in this deliverable is “the capability of a community to face a threat, survive and bounce back or, perhaps more accurately, bounce forward into normality newly defined by the disaster-related losses and changes. Community resilience is, in effect, a reflection of people's shared and unique capacities to manage and adaptively respond to the extraordinary demands on resources and the losses associated with disasters” (Cox and Perry 2011).

One way to view societal resilience is that it is an intrinsic ability of a community that is highly shaped by its pre-existing conditions (Cutter et al. 2008; Burton 2015). A group of these pre-existing conditions is the community stakeholders themselves, their conditions, actions, and interactions. Individuals, authorities, emergency services, and civil society organizations represent the main stakeholders of a society when handling a disaster. The interaction between those different parties influences the resilience level of a society (Kruse et al. 2017; Norris et al. 2008). Not only that but also some researchers argue that these interactions especially on a local level hold as a buffer against disasters (Kruse et al. 2017).

Here, we define the interaction as any interplay within one group of stakeholders, or between two or more community stakeholders, that influences their resilience in a way. This interplay can range from a simple exchange of conversation or knowledge to a more engaging action such as sharing and exchanging financial resources or engaging in international agreements.

Given that societal resilience is an inherent feature of a society (D1.1), we pay special attention to the interactions and relationships between different members of a society. In this direction, it is important to investigate two main societal resilience frameworks that capture these kinds of interactions: (Kruse et al. 2017) and (Norris et al. 2008).

2.2 SOCIETAL RESILIENCE FRAMEWORKS

Kruse et al. (2017) proposed a societal resilience framework. In this framework, they consider resilience as a relational evolving property resulting from the interaction between individuals and environmental, and technological systems. It is propagated and built through social interactions. They argue that these interactions especially on a local level hold as a buffer against disasters. As expected, however, the framework deals mostly with formal aspects of the resilience.

Another framework worth mentioning is the one developed by Norris et al. (2008). In their research, they define resilience as “a process linking a set of adaptive capacities (resources with dynamic attributes) to a positive trajectory of functioning and adaptation after a disturbance”. While societal resilience is defined as “a process linking **a network** of adaptive capacities to adaptation after a disturbance or adversity.” The only difference between both definitions is the word “network” which emphasizes the idea that interactions and relations are at the heart of societal resilience.

Adaptive capacities could be defined as resources that possess dynamic attributes, namely, robustness, redundancy, and rapidity. Robustness is described as resource strength coupled with a low probability of resource degradation. While redundancy is the availability of substitutes for a



resource in case of damage, rapidity presents the speed at which a resource can be accessed and used. As we can see in Section 2.5, these adaptive capacities while desirable, are not always available. In these cases, another type of adaptation is required.

2.3 COMMUNITY RESILIENCE THEMES

Patel et al. (2017) conducted a literature review to identify the main elements of societal resilience. They found nine main elements: local knowledge, community networks and relationships, communication, health, governance, resources, economic investment, preparedness, and mental outlook. All the elements and their sub-elements could be found in Table 2. These elements represent a different point of view for the categorization of societal resilience factors.

Table 2 The elements of societal resilience (adapted from (Patel et al. 2017))

Community resilience element	Sub-elements		
Local knowledge (Understanding existing vulnerabilities)	<i>Factual knowledge</i> (disaster education, ex. first aid knowledge)	<i>Training and education</i> (local knowledge capacity)	<i>Collective efficacy and empowerment</i> (community's belief about overcoming hardships)
Community networks and relationships	<i>Connectedness</i> (social networks)	<i>Cohesion</i> (the type of social ties)	
Communication	<i>Effective communication</i> "the creation of common meanings and understandings and the provision of opportunities for members to articulate needs, views, and attitudes"	<i>Risk communication</i> (providing accurate information about threats)	<i>Crisis communication</i> (up-to-date information to community members about the ongoing disaster impact and relief efforts)
Health (Tackling health systems liabilities helps in developing resilience before a catastrophe and reduce long-term problems after one)	<i>Health services</i> (facilities and capacity building to handle mass casualties)	<i>Physical and mental health</i> (post-traumatic stresses and depression)	
Governance and leadership	<i>Infrastructure and services</i>	<i>Public involvement</i>	<i>Support</i>
Resources (not only having the resources is important but also their utilization and allocation)			
Economic investment	<i>Post-disaster distribution of financial resources</i>	<i>Post-disaster economic programming and ensuring cost-effectiveness of interventions</i>	<i>Post-disaster economic development of infrastructure</i>
Preparedness			
Mental outlook (Attitudes and feelings toward uncertainty and the search for meaning)	<i>Hope</i>	<i>Adaptability</i> (capacity and willingness to adjust while knowing that things will be different)	

2.4 INTERACTIONS PURPOSES

Building on our previous discussion and the idea that communities can be viewed as a cyclic system with a feedback loop between its inputs (resources) and outputs (disaster mitigation phases; preparedness, response, and recovery) (Dhawal 2018), we believe that societal resilience can be represented as shown in Figure 1. Where the inputs of the system are the main themes of factors affecting societal resilience (Sharifi 2016); natural/environmental, social, economic, institutional, and physical/infrastructure and the outputs are disaster preparedness, response, and recovery. To get from the inputs to the outputs, there are some processing and interaction between several adaptive capacities, these capacities and the processing part in the figure are adapted from (Norris et al. 2008). Moreover, there is a feedback cycle between outputs and inputs so we can capture the interaction that happens between both the outputs and inputs of the system.

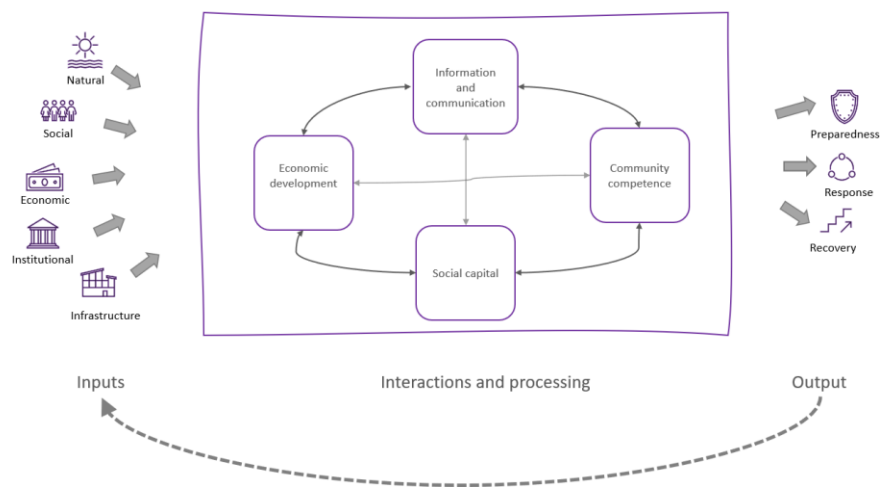


Figure 1 Societal resilience system

Two main parties of a community's stakeholders are individuals on one hand, and authorities and emergency responders on the other hand. The collaboration between these two parties does exist in normal situations -where there is no disruption- but it is magnified in case of a disaster. Citizens play a role in helping authorities and first responders facing a crisis; during a crisis, by cooperating with them in evacuation and relief work, sharing information about damage places. Before a crisis, by attending training sessions, acquiring first aid knowledge. And after a crisis, by adapting to the new situation and changing their attitudes. In the same manner, authorities provide individuals with shelters, share facts about the occurring crisis, give them the needed resources to overcome a temporary disturbance, etc.

Considering the elements of societal resilience listed in Table 2, the interactions among first responders and authorities with the population could serve the following purposes:

- improve the communication with the society,
- enhance society' risk awareness,
- facilitate resource allocation from/to society,
- improve knowledge and information sharing with the society,
- enhance the preparedness of the society to deal with crises,
- capitalize upon social networks and relationships among the society,
- empower society in governance and leadership activities.
- improve the society's health and mental outlook,

2.5 THE NEED FOR DECISIONS THAT LEADS TO INFORMAL SOLUTIONS

It is impossible to predict everything when planning for responding to complex situations, such as a disaster. Some events are revealed only during its occurrence, often affecting the previously developed plan. No matter the level of resilience we try to develop, some events may lead to unforeseen situations, which, in their turn, may lead to disruptions. Disruptions make it more difficult for previously developed plans to proceed as expected (Diirr & Borges, 2016). As a result, they may become no longer applicable (Figure 2).



Figure 2. Adaptation in unforeseen situations (Diirr & Borges, 2016)

Unforeseen situations may arise due to various causes: the lack of knowledge that impacts plan completeness; inappropriate decisions and poorly executed actions; concurrency of procedures for handling simultaneous events; the occurrence of unexpected events etc. These situations compel the response team to observe the operating conditions, identify the new set of goals to be achieved, and use creativity in identifying alternative treatments and make decisions at runtime (Alexander, 2016; Böhringer, 2010; Carvalho et al., 2015; Cordeiro et al., 2015; Glarum & Adrianopoli, 2019; Ley et al., 2014).

However, handling unforeseen situations is not trivial. The response team deals with a considerable amount of information, making variations that may not be clear, neglected, or only evident when the phenomenon has already evolved to a considerable extent. Besides that, the response team may not have a clear understanding of what this unforeseen situation really is, thus hampering the diagnosis of its impacts on procedures. The response team should decide on the level of adjustment that the plan requires to handle the observed situation as well as to gain information and tools that effectively allow this adjustment. Most informal solutions are adopted in the context of unforeseen situations. In Table 3 we reproduce some of the sources for unforeseen situations. Note that some situations generate favourable outcomes (those marked with a + sign).

Table 3. A non-exhaustive list of unforeseen situations affecting variables (adapted from Diirr & Borges, 2016)

Variable	Unforeseen situation	Variable	Unforeseen situation
Response Teams	- Insufficient people	Required material resources	- Allocated to another action
	- No required skill		- Broken
	- Allocated to another action		- Unavailable
	+ More people		- Out of date
	+ Early deallocation		+ More material resources
Information	- Unavailable	Estimated elapsed time	+ Early deallocation
	- Out of date		- Expired
	- Incomplete	+ Available	
	- Unreliable	Estimated cost	- Lack of money
- Not working	+ Additional money		
Systems	- Lack of functions	Action result	- Rate lower than expected
	- Out of date		+ Rate higher than expected

Working in complex environments requires being prepared for adaptation, especially when handling irregular phenomena. Aspects such as dynamic execution, unexpected restrictions, and unpredictable decisions impose new difficulties in identifying straightforward ways to handle these phenomena. To be resilient means to be prepared to handle unexpected situations and in unforeseen situations that means be prepared to adapt.



3 METHODOLOGY

3.1 OVERALL METHODOLOGY

This research collects informal solutions that are applied to improve the interaction of emergency organizations and authorities with the society, when a formal solution does not exist or is not suitable to the situation. The methodology used to collect the formal solutions followed a triangulation approach that combines several methodologies: first, the review of scientific literature, second, a survey to the partner end-users through a form to collect the solutions that are already used in practice, and finally the solutions gathered through semi-structured interviews and two workshops with external end-users. The effectiveness of the triangulation process rests on the assumptions that the strengths of one specific method will counter-balance the weaknesses of another (Jick, 1979). It was clear, however, that some of these sources, such as the literature review, is more suitable for finding formal solutions. Informal solutions are usually adopted in the presence of a new situation when a formal process does not exist or was judged as inappropriate to the situation. Therefore, although the sources were the same, informal solutions were more common identified in the workshops and in the semi-structure interviews.

3.2 COLLECTING INFORMATION FROM THE END-USERS

The aim of this second phase of the methodology was to identify the solutions that the emergency organizations and authorities already used to improve their interaction with the society. Identifying tools, practices, methods, strategies, applications, and guidelines already applied in practice and that their usefulness is evaluated is the aim of this second phase. Furthermore, these solutions are defined at a very operational level and provide more information about in which context and for which specific benefit when improving interaction is used. First, a survey was carried out with the partner end-users to collect information about the solutions they are already using for this specific aim. Second, two workshops were carried out the first one with partner end-users and the second one with the KI-CoP members to identify solutions that could be used in a given specific scenario. Finally, semi-structured interviews with external end-users were carried out in 7 countries (France, Norway, Israel, Sweden, Romania, Italy, and Spain) to identify more solutions suitable for enhancing the interaction of emergency organizations and authorities with the society.

3.2.1 END-USER PARTNERS' SURVEY

As a first step, a form was created and distributed among the partner end-users of the ENGAGE project. The aim of this form was to collect the already used solutions to improve the interaction of emergency organizations and authorities with the civilians. We asked the users to describe the solution, who the users of the solutions were, in which phase of the crisis the solution was implemented, and which of the benefits the solution contributed to. In total, 35 solutions were obtained through this form.

3.2.2 WORKSHOPS

We organized two workshops – the first one with the partner end-users of the project and the second one with the KI CoP - aimed at identifying solutions the emergency organizations and authorities adopt when interacting with civilians to solve the problems posed by the situation. In both workshops, we used scenarios to describe the situations in a less hypothetical way. On one hand,



this approach helped to get more concrete solutions; but on the other, it restricted the solutions to the situation at hand. The first workshop served as a preparation for the second, thus, we introduced some changes in the second workshop to resolve the problems we encountered in the first exercise. In both workshops we used the MIRO tool to register the contributions and ZOOM to support voice interaction. The complete report of each workshop is presented in separate documents in the Appendix.

The End-user workshop took place on February 17th, 2021 with remote participation of Engage Project members, being 12 end-users (ASL, ERTZ, EVERBRIDGE, KMC, DSU, and TRC), 5 academics who work as observers (EENA, DEEP BLUE, SINTEF, and TAU), and the 4 facilitators from TECNUN. They all joined a single group. The first workshop was meant to get feedback from the remote interaction in order to evaluate the dynamics and correct eventual problems for the next workshop. The interaction itself was organized around two scenarios, which were distributed previously to participants.

The KI-CoP Workshop took place on March 9th, 2021 with remote participation of 11 external end-users plus 5 team members of the Engage Project Team, besides the 4 facilitators from TECNUN. The list is shown in the KI-CoP workshop Report in Appendix 9.2. We divided the participants into three subgroups, according to their profiles. The exercise consisted of a general session for the initial and final presentations by the Project Coordinator and Facilitators, and three sub-sessions (rooms) to support the sub-groups interaction, all using ZOOM.

3.2.2.1 End-user Workshop

We designed three scenarios from which we chose two of them. For each of the scenarios, we described the background, the situation at hand, the purpose of the exercise and the questions the participants were expected to answer. We also provided a list of issues to take into consideration for the proposed solutions, including the description of barriers to the solutions. We also defined an event that was planned to release during the exercise, but we only used it in the second scenario. The scenarios used were:

» Scenario 1: Overwhelmed hospital occupation, reached the limit.

In the first scenario, there were four questions. The participants described 24 solutions in this scenario, an average of six solutions per question. They also described 13 barriers associated with these 24 solutions.

» Scenario 2: Infrastructure for food production/distribution

In the second scenario, there were three questions. The participants described 25 solutions in this scenario, an average of eight solutions per question. They also described 12 barriers associated with these 25 solutions.

After the solutions and barriers were completed for both scenarios, we asked participants to vote on the solutions proposed for each problem. The aim of the voting was not to elect the best solution, but to induce participants to read all the contributions. With the voting results, we could discover the relative importance the end-users give to their solutions.

3.2.2.2 KI-CoP Workshop

We defined a single scenario - Adapting to the "new" normal situation- and three different situations/questions to address this scenario. During the first part of the exercise, each group worked on the solutions for two of the problems. In the second part, each subgroup received the solutions presented by the other two subgroups to the problem that subgroup didn't work. The members of the subgroup added the implementation challenges the group believes it exists for these solutions. The summary of the exercise is described in Table 4.



Table 4- Division of Tasks among the sub-groups

	Sub-group 1	Sub-group 2	Sub-group 3
First-Round	Solutions to Problem 1 & 2	Solutions to Problem 2 & 3	Solutions to Problem 1 & 3
Second-Round	Implementation Challenges to Problem 3	Implementation Challenges to Problem 1	Implementation Challenges to Problem 2

A total of 52 (22 classified as FORMAL, 13 as INFORMAL, and 17 Undetermined) solutions were generated during the first round of the interaction, although we cannot consider all of them as solutions. The second round generated 34 implementation challenges; one challenge for every two solutions. However, the challenges were not uniformly distributed. The majority of solutions had no challenge associated with, but several solutions shared the same challenge.

3.2.3 SEMI-STRUCTURED INTERVIEWS WITH EXTERNAL END-USERS

Finally, as the last step, we performed semi-structured interviews with external end-users with the following aims: to identify solutions to improve the interaction of emergency organizations and authorities with the civilians (the results from this part are included in Deliverables D2.2 and D2.3), to identify communication channels and guidelines to reach the society (the results from this part are included in Deliverable D2.4), and finally, to identify needs and expectations from society for emergency organizations and authorities to deal better with crises (the results from this part are included in Deliverable D2.1). In the appendix A of Deliverable 2.4 the interview guide used for conducting the interviews and in the appendix B the template to collect the information are included.

The participants were selected from different nationalities and profiles to ensure the heterogeneity of the results. The seven countries selected to carry out the surveys conducted in WP1 in Task 1.2 and in WP2 in Task 2.1 were also selected to conduct the interviews. In each country, between 4-5 interviews were carried out and the selected profiles were national or regional authority, local authority, end-user from the law enforcement field, end-user from the health sector and end-user from the emergency response field. In total 30 interviews were carried out: 4 in Spain, 5 in Romania, 5 in Norway, 4 in Sweden, 4 in Italy, 3 in France, and 5 in Israel. As for their profiles, 6 of them are Authorities, 4 are from Law Enforcement Forces, 11 are Emergency Responders, and 9 are members of Health Services.

Before the interview, the participants received the script of the interview with the questions that would be addressed and discussed. The interviews were conducted online and they were recorded to be used afterwards to gather the information to be extracted from the interviews. A template was developed for the researchers to know what information they should extract from the interviews to have everything completed with the same structure. These templates were afterwards analyzed by researchers in TECNUN to gather interesting solutions for the ENGAGE project.

3.3 ANALYSIS OF THE COLLECTED INFORMATION

After conducting all these processes to gather information about the already existing solutions to improve the interaction of emergency organizations and authorities with the civilians, we extracted the following specific information for the analysis and description of these solutions:



- » the name of the solution
- » the description and aim of the solution
- » the entities/stakeholders that interact through this solution
- » the phase of the crisis in which this solution is used and,
- » the specific benefits this solution pursue in improving the interaction of emergency organizations and authorities with the civilians.

However, for the case of solutions gathered through Workshops and semi-structured interviews, we obtained fewer details about the solutions. In many cases, just the name and the aim/description of the solution were obtained. In these cases, based on the description, we inferred the rest of the needed information: the entities that interact through this solution, the phase of the crisis in which the solution is used, and the specific interaction purposes the solution contributes to.

3.3.1 FORMAL AND INFORMAL SOLUTIONS

After collecting all the information for each solution, the first thing we did was to classify the solutions based on formal and informal solutions. We defined formal and informal solutions as follows.

We say that **a solution is formal** when it is replicable, defined and developed beforehand to be used in a given situation, having studied its suitability for applying in these established situations and with specific goals. Formal solutions are used based on the situation the end-users have to handle; they choose the solution that best fits to achieve the desired outcome. Normally, these solutions are part of the recommended policies by authorities and different entities to be used in each situation.

Conversely, we say that **a solution is informal** when it is created on the fly because a formal solution is inexistent, or not suitable to handle the situation, or because it cannot be applied due to some specifics of the context. They can also be formal solutions applied in ways that are different from what was planned in advanced, they are used in a new way that was not foreseen. Informal solutions are defined and developed based on the intuition and the experience of the end-users and implementers.

This deliverable D2.2 describes the formal solutions gathered from all sources and D2.3 (this report) describes the informal solutions collected from the Workshops and Interviews..

3.3.2 CLASSIFICATION OF THE SOLUTIONS

Once this information was obtained, the solutions were classified based on their nature. Very different types of solutions were obtained based on the source. On the one hand, the solutions gathered from the scientific field were more theoretical providing solutions oriented towards providing guidelines, collaborative methods, framework, governmental programs, communities of practice etc.

On the other hand, the solutions collected from the end-users were more practical to be implemented in practice and more specific to the characteristics of each region. The types of solutions identified were mobile apps, web platforms, training campaigns, alert systems, specific services to reach society, social media accounts, disaster management plans etc.

3.4 ETHICAL CONSIDERATIONS

Semi-structure interviews entail several ethical risks, especially when coping with emergencies and disasters. First, the interviewees are not always aware about the data they share with the interviewer due to the nature of a friendly conversation. Furthermore, sensitive issues can cause inconvenience to the interviewee, making interviewer responsible for these inconveniences that can alter their health and well-being.

Following the protection measures of ENGAGE, which were set in deliverable 6.1, in the analysis of the interviews we excluded all types of information that could identify the interviewee. All interviewees signed an informed-consent form and a data privacy document.



4 RESULTS

4.1 SOLUTIONS IDENTIFIED IN THE SCIENTIFIC LITERATURE AND PROJECT REPORTS

This sub-section describes the solutions identified in the scientific literature. As it was previously explained, three main sources were used in order to collect the solutions: systematic literature review, revision of the European research projects and international reports, and analysis of case studies. The report on Formal Solutions (D2.2) reproduced the full table. As it can be seen there, all solutions were categorized as FORMAL. Some are theoretical others are practical solutions, but all of them are based on some previous defined process. Therefore, we decided not to reproduce the table here.

We applied the same criteria for the solutions extracted from the analysis of European research projects and international entities related to crisis management. The analysis also covered the solutions identified in the review of case studies. Concretely, these solutions were obtained from the Utoya terrorist attack case and the Fukushima nuclear accident case. In these reports we didn't identify any solutions that could be classified as INFORMAL.

4.2 SOLUTIONS IDENTIFIED BY THE END-USERS

This sub-section describes the solutions identified by the end-users. These solutions were collected from the following sources: end-user workshop organized with partner end-users of the ENGAGE project, KI-CoP workshop organized with KI-CoP members of the ENGAGE project, survey to the partner end-users, and semi-structured interviews to external end-users. In the following sub-sections we will explain the solutions identified from these sources. To enable a uniform comparison of informal solutions we used the same classification for solution types.

4.2.1 SOLUTIONS IDENTIFIED FROM THE PARTNER END-USERS WORKSHOP

In this workshop, 12 end-users participated, together with 5 observers and 4 facilitators, all from the project. Only the end-users contributed with solutions. All the others input some comments and oriented the participation. We initially identified 49 solutions directly extracted from the exercise. In order to classify the solutions we read all the descriptions produced and concluded for 20 formal and 9 informal solutions. Another 20 solutions were classified as undetermined, because there were not sufficient elements in the description for the categorization. Although we separated the undetermined from the formal and informal solutions, for statistics and analysis purposes we considered them as informal.

In a second round of analysis, we merged informal solutions that are similar and we reduced the number of informal solutions to 22. Table 5- A summary of Informal solutions from the end-users workshop classified for type and purpose In Table 5, we show a summary of the distribution of informal solutions according to the solution type and purpose. All solutions were assigned to a single type, but to none or more purposes. Note there aren't Informal solutions assigned to the types: Application, Platform and Alert Systems. The complete list of solutions are split into Figure 3 and Figure 4.



Table 5- A summary of Informal solutions from the end-users workshop classified for type and purpose

Solution Type/Purpose	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of Solutions
Application									
Platform									
Alert Systems									
Awareness and Training sessions	2	2	2	2	1	1	1	1	3
Service to reach society	5		9	4		5	4	1	10
Social media	1					1		1	1
Guidelines	2			1			1	1	2
Strategies and Planning	2	2	2	3	2	1	3		6
Total	12	4	13	10	3	8	9	4	22

Solutions from the end-user Workshop	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of solutions
Awareness and Training sessions	2	2	2	2	1	1	1	1	3
Awareness Campaign Traditional channels: TV, radio, newspapers (online included), social media. Use all available sources, "influencers" should be directly contacted and recruited.		1	1						
Testimonials from covid survivors or relatives of died persons collaborate in information campaign raising awareness in the need to calm people and do rational choices. Direct contact with citizens with use of loud speakers in areas of high density population	1	1	1	1		1			
Find a way of visualizing and communicating how return to normal is progressing, sort of supporting how everyone's actions and behaviours adds up. Communicate de-escalation of efforts and restrictions.	1			1	1		1	1	
Service to reach society	5	0	9	4	0	5	4	1	10
Participatory groups and counseling through neighborhood outdoor meetings. A weekly outdoor meeting is organized in the neighborhood with a facilitator to identify critical situations, moods, and better addressing the following communication.	1			1		1	1	1	
Identifying needs by use of communication between beneficiaries and the volunteer orgs. Food centrals may be distribution channels of surplus food to beneficiaries.	1		1	1		1			
Those that manage non-profit organizations are related to social food banks			1			1			
Large surface supermarkets/producers/distributors feedback. Local store could collect needs and offers			1						
An emergency number will be open for two aims: the local needs detection and the planning of an emergency transportation using electricity vehicles(e.g. trains).	1		1						
Communication facilitators at local markets and grocery shops provide information on the importance to buy just the amount needed without making shortages.			1	1		1			
The Public Administration can elaborate census of public needs to define the part of the population in greater need.			1	1			1		

Figure 3 - Summary of Solutions from the end-user workshop (Part 1)



Solutions from the end-user Workshop	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of solutions
Service to reach society (continued)	5	0	9	4	0	5	4	1	10
Advertising for non-combustible transportation resources	1		1						
Volunteers need to be involved both in population information at groceries and in food transportation from train to local groceries with trucks together with military by using low-fuel consuming engines or electric cars.			1				1		
Gift certificates may be a dignified way for the beneficiaries to get support, instead of the org pre-destination of the beneficiaries need.	1		1			1	1		
Social media accounts	1					1		1	1
A passive monitoring through social media exploited by artificial intelligence methods to active survey sample of population minorities and socio-disadvantage groups.	1					1		1	
Guidelines	2			1			1	1	2
In this stage also institutional communication may be used, it has to be trusty emphatic scientific experts; need to be mediated by communication experts; population needs regularly monitored	1			1					
Highlight the value of the volunteers tasks so there is a sense in that a real difference can be made	1						1	1	
Strategies and Plan	2	2	2	3	2	1	3	0	6
Communicate escalation roadmap for mitigation efforts. "In the event we are faced with a Crisis like X, we are going to respond like this. If that fails, we'll do Y".	1	1		1					
Education in home-care to postpone hospital care need		1							
Establish an understanding of a whole-community approach (Before)	1				1	1	1		
Ad hoc community volunteer organizations as mediators			1				1		
Integration in Crisis Agencies' operations				1	1		1		
Non-combustible vehicles to be facilitated by Government			1	1					
TOTAL	12	4	13	10	3	8	9	4	22

Figure 4 - Summary of Solutions from the end-user workshop (Part 2)



4.2.2 SOLUTIONS IDENTIFIED FROM THE KI-COP WORKSHOP

In the second workshop, we had the participation of 11 end-users who were not members of the project. We also had 5 members of the project who, at this time, were allowed to contribute with solutions. The same four facilitators of the end-user workshop also participated in this workshop. As mentioned before, due to the different dynamics introduced in the KI-CoP workshop, we had more solutions in this exercise. A total of 52 solutions were extracted from the exercise: 22 classified as formal, 13 as informal and using the same process, we could not categorize 17 of the solutions, leaving them as undetermined. Giving the nature of the workshops and the objective of this report, we will consider all Undetermined solutions as Informal, as there are no evidences in the description there is a defined process to perform the actions embedded in the solutions.

Giving the nature of the workshops and the objective of this report, we will consider all Undetermined solutions as Informal, as there are no evidences in the description there is a defined process to perform the actions embedded in the solutions.

For this exercise, the second round of analysis did not generate a different set of solutions.

Therefore, we kept the same number and classification of solutions. Table 6 reproduces the results. The solution types are the same as in the first workshop. Figure 5, Figure 6, and

Solutions from the KI-CoP Workshop	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships
Strategies and Plan	5	2	7	6	2	7
It is important to assess/analyze and plan responsibilities in line with the participants skills.			1	1	1	
Test new solutions to track the actual status of the population and see how it is possible to open some part of the economy.				1		
Self Testing: People can test themselves by buying it in the supermarket			1			1
Start from the stakeholders since they are the ones in interest. They should stimulate population more than the government						1
Find solutions to new criminality		1				
Focus on upcoming holidays, later benefits, to accept restrictions during first holidays.	1					
Immunity passport will allow you to participate in social activities (theater, malls, study on campus).			1	1	1	
Certification of info: coming from official source	1			1		
Use participatory elements for detecting infection risks - citizen science. A building, a neighborhood could identify zones where infections are likely to occur.		1	1	1		1
Use co-creation methods and tools to facilitate meaningful activities with citizens.			1	1		
Use community leadership. We need to identify who would influence best the meta-communities and who would motivate them to take responsible action.			1			1
If we want to involve citizens we must treat them not just as a victim but as an active action and make them know we trust in them.	1					1
Communication through local organizations (football teams, chess clubs, scouts, etc.) can strengthen trust in the information provided.	1					1
Establish a communication strategy and the necessary channels between authorities and citizens. Previous practice shows that established and well known non-emergency numbers help reduce the call load.	1		1			1
TOTAL	14	8	8	12	2	10

Figure 7 shows the description of the solutions. We had to divide the figure into 3 parts for readability



Table 6- A summary of Informal solutions from the KI-CoP workshop classified for type and purpose

Solution Type/Purpose	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of Solutions
Application	1	3		2				3	3
Platform									
Alert Systems									
Awareness and Training sessions	2	2	1	1			2	1	4
Service to reach society	5	1		1		2			5
Social media	2			1			2		3
Guidelines	1			2		1	3		3
Strategies and Planning	5	2	7	6	2	7	5	1	14
Total	14	8	8	12	2	10	10	5	32

Solutions from the KI-CoP Workshop	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of solutions
Applications	1	3	0	2	0	0	0	3	3
App to show tested positive, or app to track vaccine		1		1				1	
Use the App for genomic surveillance and track the variants		1		1				1	
Supports peace of mind beyond immediate beneficiaries (e.g. family)	1	1						1	
Awareness and Training sessions	2	2	1	1	0	0	2	1	4
Adapt the communication to the tiredness of people, for example with small reminders and no big campaign.	1								
Educate people on how to handle communication, how to do remote work			1				1		
Ensure stakeholders have a complete and timely view of risks impacting their assets, including other threats such as civil unrest and natural disasters.	1	1		1					
Enhancing education about health aspects: infection, vaccination		1					1	1	
Service to reach society	5	1	0	1	0	2	0	0	5
It is getting hard to reach people with social media, there is a need of a new way to communicate and engage with the people.	1								
Using volunteers to engage people more through a different communication	1					1			
Mass alerting to improve last minute availability of vaccines	1								
Communicate uncertainties to citizens and highlight worst and best possible consequences when different infection scenarios are chosen.	1	1		1					
Giving the citizens a sense of participation and a possibility to influence decisions might increase the compliance of the needed behavior and actions.	1					1			

Figure 5 - Summary of Solutions from the KI-CoP workshop (Part 1)



Solutions from the KI-CoP Workshop	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of solutions
Social media	2	0	0	1	0	0	2	0	3
Using popular social media channels to communicate with youths.	1						1		
Best way to prevent Fake news is share the information available and to avoid informative silence. This doesn't eliminate the problem but limit the consequences.	1								
Locate those who spread false and incorrect information and make them aware of their responsibilities.				1			1		
Guidelines	1	0	0	2	0	1	3	0	3
Focus on persevering for a small amount of time. Focus on the liberty afterwards.							1		
Communicating on measures, guidelines, i.e., monitor and share situation.	1			1			1		
Develop solutions based on input from local leaders of communities and organizations. Being sensitive to the context and trends.				1		1	1		

Figure 6 - - Summary of Solutions from the KI-CoP workshop (Part 2)



Solutions from the KI-CoP Workshop	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of solutions
Strategies and Plan	5	2	7	6	2	7	5	1	14
It is important to assess/analyze and plan responsibilities and the participants skills.			1	1	1		1		
Test new solutions to track the actual status of the population and see how it is possible to open some part of the economy.				1			1	1	
Self Testing: People can test themselves by buying it in the supermarket			1			1			
Start from the stakeholders since they are the ones in interest. They should stimulate population more than the government						1	1		
Find solutions to new criminality		1					1		
Focus on upcoming holidays, later benefits, to accept restrictions during first holidays.	1								
Immunity passport will allow you to participate in social activities (theater, malls, study on campus).			1	1	1				
Certification of info: coming from official source	1			1					
Use participatory elements for detecting infection risks - citizen science. A building, a neighborhood could identify zones where infections are likely to occur.		1	1	1		1			
Use co-creation methods and tools to facilitate meaningful activities with citizens.			1	1					
Use community leadership. We need to identify who would influence best the meta-communities and who would motivate them to take responsible action.			1			1	1		
If we want to involve citizens we must treat them not just as a victim but as an active citizen and make them know we trust in them.	1					1			
Communication through local organizations (football teams, chess clubs, scouts, etc.) can strengthen trust in the information provided.	1					1			
Establish a communication strategy and the necessary channels between authorities and citizens. Previous practice shows that established and well known non-emergency numbers help reduce the call load.	1		1			1			
TOTAL	14	8	8	12	2	10	10	5	32

Figure 7 - Summary of Solutions from the KI-CoP workshop (Part 3)



4.2.3 SOLUTIONS IDENTIFIED FROM THE INTERVIEW WITH END-USERS

We performed 30 semi-structured interviews with external end-users. The interviews aimed at: identifying solutions to improve the interaction of emergency organizations and authorities with the civilians (the results from this part are included in Deliverables D2.2 and here in D2.3), identifying communication channels and guidelines to reach the society (to be included in Deliverable D2.4), and finally, identifying needs and expectations from society for emergency organizations and authorities to deal better with crises (to be included in Deliverable D2.1).

The participants were selected from different nationalities and profiles to ensure the heterogeneity of the results. In each of the seven countries, between 4-5 interviews were carried out. The selected profiles were national, regional, or local authority, end-user from the law enforcement field, end-user from the health services and end-user from the emergency response field. In total 30 interviews were carried out: 4 in Spain, 5 in Romania, 5 in Norway, 4 in Sweden, 4 in Italy, 3 in France, and 5 in Israel. The distribution of the interviewees based on the job profile is depicted in Figure 8. We considered the main profiles according to the following description: Health services (includes health services and paramedics, Other: (NGOs, red cross)); Law enforcement (includes police and coastguards); Emergency responders (includes firefighters and civil protection, Other: (Army, UME)); Authorities (includes local, regional, and national governments).

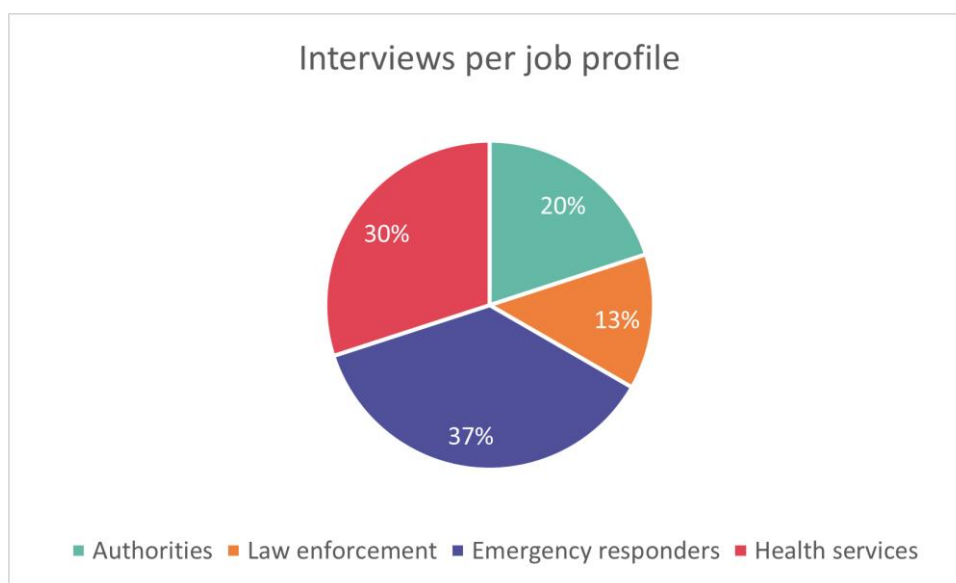


Figure 8 - Distribution of interviews according to the job profile

From those 30 interviews, we extracted 21 solutions, which were classified as Informal. They are listed in Table 7. When interviewed, people tend to talk about established solutions either because is how they were trained for or if in the past if they successfully adopted an informal solution they would probably be converted to a formal procedure. Most of them cover only one aspect of the problem. The complete list of solutions was divided into three parts, for easier visualization, and is reproduced in Figure 9 (Part 1), Figure 10 (Part 2) and Figure 11 (Part 3). Note that Spain is not listed in the Tables because none of the solutions mentioned in the interviews were classified as Informal.

Table 7 - A summary of Informal solutions from the End-Users Interviews classified for type and purpose

Solution Type/Purpose	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of Solutions
Application		1		1			1		1
Platform	1	1		1			1		1
Alert Systems	1			1			2		3
Awareness and Training sessions	1	2		2	1	1	2	1	5
Service to reach society									
Social media									
Guidelines							1		1
Strategies and Planning	3	2		5	1	1	5		10
Total	6	6		10	2	2	12	1	21



Solution description	Country	Improve communication	Enhance risk awareness	Facilitate resource allocation	Improve information knowledge sharing	Enhance preparedness	Capitalize upon social networks	Increase trust, involvement governance	Improve health and outlook	Number of Solutions
Application			1		1			1		1
Voluntary social media surveillance unit called VIZOV (Virtual operations support team) that monitors social media communication with French authorities in cases of crisis.	France		1		1			1		
Platform		1	1		1			1		1
Informing people about safety and access through French association of radio amateurs (ADRASC), who participate in crisis communication. They communicate information during a crisis that could not be transmitted otherwise.	France	1	1		1			1		
Alert Systems		1			1			2		3
Posting online that a company using an electricity generator (that produces smoke, similar to a fire for non-expert eyes), could prevent people from calling the fire fighters.	Italy	1			1					
Depending on unorganized volunteers in the time of ad-hoc decisions (eg in searches for missing people or in evacuation situations)	Norway France Italy							1		
Extreme weather condition could cause road blocks. Then, policemen asked volunteers on the field to help in warning people (cars) not to move forward.	Israel							1		
Service to reach society										0
Awareness and Training sessions		1	2	0	2	1	1	2	1	5
Information exchange between first responders and the public	Romania				1					
Very common in Italy to have FB Group for villages and town where people discuss events and report emergencies. Mayors are often part of it	Italy	1			1		1	1		
Bringing new elements in approaching communication with the society, especially on social media networks, events where you can see the intervention and rescue equipment - ambulances, helicopters, etc. This is still awareness, but from another perspective.	Romania		1							
Society's preparedness through participation in different activities with emotional impact, learning resuscitation maneuvers, acquiring new information and experiences.	Romania					1			1	



Figure 9 - The complete description of informal solutions obtained from the interviews (Part 1)

Solution description	Country	Improve communication	Enhance risk awareness	Facilitate resource allocation	Improve information knowledge sharing	Enhance preparedness	Capitalize upon social networks	Increase trust, involvement governance	Improve health and outlook	Number of Solutions
Awareness and Training sessions (continued)		1	2	0	2	1	1	2	1	5
Cooperation with civil society on awareness campaigns, requesting an innovative opinion on how to reach a greater impact. Public consultations on how to implement awareness campaigns without inducing panic at the society.	Romania		1					1		
Social media										0
Guidelines								1		1
For society involvement you can use groups that already exist, how to use the groups depends on the crisis.	Sweden							1		
Strategies and Planning		3	2		5	1	1	5		10
Bringing former employees who retired to help in case of a disaster.	Sweden				1					
Call community leaders to reach out for minority groups. For example, to reach out to Muslims, one can use imams who have high credibility.	Sweden	1	1		1					
Using personal contacts to handle a crisis	Sweden				1		1			
Ask people we see in the surrounding of the emergency if they can help us with the information we need.	Italy France				1					
During a crisis, Fire Department officials alert the regional operative cluster by calling the halls of operation, which then send an official email to track the action. After 15 minutes they call back to know if they received the email.	Italy	1						1		
Volunteers organizations and NGOs transmit messages and information with those who doesn't know the language	Italy	1	1		1					
Signing cooperation protocols with civil society organizations (both at national and local level, or with organizations that have a national coverage);	Romania					1		1		
Taking advantage of the community involvement, i.e., asking support for emergency intervention with food or accommodation for a limited period of time);	Romania							1		

Figure 10 - The complete description of informal solutions obtained from the interviews (Part 2)



Solution description	Country	Improve communication	Enhance risk awareness	Facilitate resource allocation	Improve information knowledge sharing	Enhance preparedness	Capitalize upon social networks	Increase trust, involvement governance	Improve health and outlook	Number of Solutions
Strategies and Planning (continued)		3	2		5	1	1	5		10
Involving the Church usually brings positive benefits and it has been observed mostly in the Moldavian region. For example, in the case of floods, the Church had a major impact in covering the time up to the arrival of first responders and provided food and accommodation for the flood victims	Romania							1		
Mapping and identifying other civil society organizations that can offer social support and/or help within an emergency situation (means of transport, oversized equipment, sandbags to create dams, etc.).	Romania							1		
TOTAL		6	6	0	10	2	2	12	1	21

Figure 11- The complete description of informal solutions obtained from the interviews (Part 3)



The solutions we have identified have most in common, as they aim to respond the same scenario problems. In the analysis, we group all solutions we thought are similar in nature. We did this by trying to group them into categories according to the purpose and analyze the roles they would play to improve it. The Table 8 presents the total of solutions by type and purpose. As for the type, there is prominent number of solutions of the type "Strategies and Planning" (40% of the solutions). This is somehow expected. In the absence of a formal procedure, most people follow general strategies and plans. The next two types were "services to reach society" and "awareness and training sessions".

Regarding the purpose, we identified a total of 176 assigned to the 75 solutions, i.e., an average of 2,3 purposes for each solution, from a maximum of 8 purposes. The solutions were spread among these 8 purposes with a concentration on "Improve communication" (34), "Improving knowledge and Information sharing" (33) and "Governance & Leadership" (33).

Table 8 - A summary of all informal solutions

Solution Type/Purpose	Improve communication	Enhance Risk Awareness	Facilitate resources allocation	Improve knowledge and Information sharing	Enhance preparedness	Capitalize social networks & relationships	Governance & Leadership	Improve health and mental outlook	Number of Solutions
Application	1	4		3			1	3	4
Platform	1	1		1			1		1
Alert Systems	1			1			2		3
Awareness and Training sessions	5	6	3	5	2	2	5	3	12
Service to reach society	10	1	9	5		7	4	1	15
Social media	3			1		1	2	1	4
Guidelines	3			3		1	5	1	6
Strategies and Planning	10	6	9	14	5	9	13	1	30
Total	34	18	21	33	7	20	33	10	75

For each of these categories we will analyse the benefits they produce and what the experts propose. We will also provide examples extracted from the sources we used. In some cases, we will also describe the barriers and the challenges to adopt and implement these solutions.

5.2 SOLUTIONS TO IMPROVE COMMUNICATION

From the three sources, a little less than 50% of the solutions serves the purpose of improving communication between the first responders and the civilians. This purpose is without doubt the main target for performing joint and coordinated actions. In addition, the communication should work in both ways: from the society to first responders and vice versa. In many cases, it is an essential requirement for achieving efficient and effective results.

Below we reproduced excerpts from how solutions were described in the workshops and interviews in relation to this purpose.

- *"It is getting hard to reach people with social media, there is a need of a new way to communicate with people and engage with them."*
- *"Informing people about safety and access through French association of radio amateurs (ADRASC)... They communicate information during a crisis that could not be transmitted otherwise, because very few French municipalities have satellite phones"*
- *"In this stage also institutional communication may be used, it has to be trusty emphatic scientific experts; need to be mediated by communication experts; population needs regularly monitored"*

5.3 SOLUTIONS TO ENHANCE RISK AWARENESS

These informal solutions aim at people who are not following the news closely or not aware of the meaning of the message. They are also communicating with the society, but perhaps the message is stronger in this case, as it can conclude from the excerpts.

- *"Testimonials from COVID survivors or relatives of died persons collaborate in information campaign raising awareness in the need to calm people and do rational choices."*
- *"Ensure stakeholders have a complete and timely view of risks impacting their assets, including other threats such as civil unrest and natural disasters."*
- *"Cooperation with civil society on awareness campaigns, requesting an innovative opinion on how to reach a greater impact. As well, public consultations on how to implement awareness campaigns without inducing panic at the society level."*

5.4 SOLUTIONS TO FACILITATE RESOURCES ALLOCATION

Resources, both human and material, are essential to respond to disasters. The allocation of the appropriate resource where it is most need is a challenge. The society can be of great help in indicating where and how resources should be used are demonstrated by these excerpts:

- *"The Public Administration can elaborate census of public needs to define the part of the population in greater need"*
- *"Identifying needs by the use of communication between beneficiaries and the volunteer orgs. Food centrals may be distribution channels of surplus food to beneficiaries"*
- *"Use community leadership. We need to identify who would influence best the meta-communities and who would motivate them to take responsible action"*

5.5 SOLUTIONS TO IMPROVE KNOWLEDGE AND INFORMATION SHARING

The lack of information and knowledge generates much uncertainty in dealing with disasters. Therefore, one of the main purposes of a solution is to provide the information and knowledge needed to reduce the risk and increase the effectiveness of the actions. This purpose is one of the three most allotted by the solutions, a little less than half of them. These excerpts extracted from the workshops and interviews confirm this importance.

- *"We ask people we see in the surrounding of the emergency if they can help us with the information we need"*



- *"Find a way of visualizing and communicating how return to normal is progressing, sort of supporting how everyone's actions and behaviors adds up. Communicate de-escalation of efforts and restrictions".*
- *"Develop solutions based on input from local leaders of communities and organizations. Being sensitive to the context and trends".*

5.6 SOLUTIONS TO ENHANCE PREPAREDNESS

This purpose was the one less mentioned in the solutions. However, we can say this purpose is implicit in the adoption of informal solutions, as they are usually adopted in the absence of a established procedure. Therefore, informal solutions used during a situation points to the need of enhance the preparedness for the next similar event. These three excerpts illustrate this.

- *"It is important to assign / analyze and plan responsibilities in accordance with the participants skills."*
- *"Integration in Crisis Agencies' operations".*
- *"Signing cooperation protocols with civil society organizations (both at national and local level, or with organizations that have a national coverage)."*

5.7 SOLUTIONS TO CAPITALIZE UPON SOCIAL NETWORKS

The growth of social networks in recent years has been exponential. It is estimated that half of the world population uses Social Media. Facebook is the biggest social network worldwide with an estimated 2.7 billion monthly users. These numbers make social networks an important communication media, but its potential for emergency services communication is yet to be fully explored. We captured the solutions that capitalize upon this communication potential. We believe there is still a lot to be done towards this usage. Still, there were several solutions that we could identify from the sources we used. Below we reproduce some excerpts.

- *"Very common in Italy to have Facebook Groups for villages and towns where people discuss events and report emergencies. Mayors are often part of it."*
- *"Use community leadership. We need to identify who would influence best the meta-communities and who would motivate them to take responsible action".*
- *"In this stage also institutional communication may be used, it has to be trusty emphatic scientific experts; need to be mediated by communication experts; population needs regularly monitored."*

5.8 SOLUTIONS TO IMPROVE GOVERNANCE & LEADERSHIP

During a crisis, the role of Command & Control at some level of centralization is essential. The hierarchical nature of operations ensures a coordinated action from a more holistic perspective, avoiding duplicate efforts and achieving a more effective result. For both formal and informal solutions, end-users should also rely on local governance and leadership. However, as these roles may not be identified *a priori*, they usually play informal roles for most of the purposes. In the Table that reproduces the summary of solutions, 33 solutions mentioned this purpose. Many end-users rely on local governance and leadership to interact with the communities in a quick and effective way, as demonstrated by excerpts of solution descriptions.



- *"For society involvement you can use groups that already exist, how to use the groups depends on the crisis".*
- *"Mapping and identifying other civil society organizations that can offer social support and/or help within an emergency situation (means of transport, oversized equipment, sandbags to create dams, etc.)".*
- *"Develop solutions based on input from local leaders of communities and organizations. Being sensitive to the context and trends".*
- *"Use community leadership. We need to identify who would influence best the meta-communities and who would motivate them to take responsible action".*

5.9 SOLUTIONS TO IMPROVE HEALTH AND MENTAL OUTLOOK

In a disaster situation, besides performing effective actions, it is very important to broadcast the results to the society in order to keep the moral high. The lack of actions aimed at improving health and mental outlook gives space to fear and panic, in some cases complicating the relationship between emergency services and the society. This is particularly important when a high level of uncertainty is detected among members of the society. Some excerpts extracted from the solutions expose this purpose.

- *"Supports peace of mind beyond immediate beneficiaries (e.g. family)".*
- *"Participatory groups and counseling through neighborhood outdoor meetings. A weekly outdoor meeting is organized in the neighborhood with a facilitator to identify critical situations, moods, and better addressing the following communication".*
- *"Society's preparedness through participation in different activities with emotional impact, learning resuscitation maneuvers, acquiring new information and experiences".*

6 STRENGTHS & LIMITATIONS

6.1 STUDY LIMITATIONS

This study, though methodologically correct, did not engage as many end-users as desirable, for both the workshops and interviews. These sources produced a relevant sample of solutions, but a larger number of participants and perhaps, mostly importantly, a diverse set of participants would generate a more comprehensive result.

For the time allocated to the workshops, we were able to generate a very large number of solutions. However, most of them were described briefly and sometimes it was difficult to understand the proposition. With more time, we could perhaps extract a more detailed description of the proposed solutions.

In the workshops, we asked participants to describe the barriers and the implementation challenges of solutions, which they did. However, we failed to associate the barriers and challenges to the respective solution. Although some are obvious, we should explicitly ask to link them to the solutions.

In both the workshops and the interviews, we did not have an equal distribution of participants according to the gender. Although this was not completely under our control, this is an issue that needs to be considered in the future exercises.

6.2 STUDY STRENGTHS

The feedback we received from the workshops and interviews were very relevant due to two important decisions. The participants were experts and experienced professionals, and in the case of the workshops, we used scenarios to provide context to their thinking of solutions. This helped to obtain realistic solutions.

We used three different sources in the case of informal decisions, involving more than 50 professionals from emergency services. The solutions obtained from each source addressed a very similar set of issues, as demonstrated in Section 5.1. We believe we should follow this diversity of sources in future exercises. General analysis of the results

We learned several lessons in these exercises that have been incorporated in our body of knowledge. In some cases, we assimilated these lessons in the following exercises and we should continue to do so in the next project steps.



7 CONCLUSIONS AND FUTURE STEPS

As we mentioned at the beginning of this report, informal solutions are adopted when, responding to a situation/problem, a formal solution was not applicable or was inexistent. An informal solution can be seen as an alternative to “do nothing” attitude. Applying either an informal solution or a “do nothing” attitude carry some risk of worsening the situation. Therefore, a decision of what to do should be carefully considered and an informal solution should be adopted only when all the formal, well-defined and previous-tested solution have been discarded. Time is also crucial, as taking too long to decide might have the same result as “do nothing”.

Ideally, the use of informal solutions should be rare or inexistent. However, the level of uncertainty, and sometimes novelty, intrinsic to emergencies, make impossible to plan everything beforehand and be prepared to all possible situations. Thus, emergency personnel should be prepared to apply solutions that have not been formalized; they are called here “informal solutions” but also referred as improvised or intuitive solutions. On the other hand, as the consequences of informal solutions are unknown and can result in human losses, in reality, emergency personnel only use them as a last resource or when they do not generate losses. Finally, informal solutions are rarely completely new. In most cases, they result from adaptations of formal solutions, previous experiences or expertise-based intuition (Neiva et al. 2018).

The identification of informal solutions is not an easy task, as we have to create a situation, in which formal solutions do not exist or apply. Moreover, we also need to create uncertainties and a sense of urgency. That is what we tried by defining scenarios that were at the same time new to the end-users participants and complex. We were successful only in part, as most of the solutions described were formal. Still, we were able to collect a significant number of informal solutions, mostly from the workshops. The richness of the results is directly related to the scenario situations, used as the motivation for describing solutions to respond to the specified problems. Therefore, a careful planning of scenarios is certainly a recommendation for the next exercises.

The benefits of having these solutions identified are not so much on the solutions themselves, but rather on the identification of situations, which we need further analysis to develop proper and well-defined responses. Of course, the informal solutions described can serve as a starting point to this process. We believe that the association of uncertainty situations with solutions, either formal or informal, should be beneficial when performing the evaluation (WP4).

The remote work imposed by the pandemic created some difficulties and opportunities. The remote interaction supported by the ZOOM software helped to overcome some difficulties, but created others, particularly when there are too many people involved. We also had problems with the MIRO application. Some people prefer to speak than to write. That probably inhibit some participation, although we believe that writing is easier than speaking in a non-native language. MIRO also created some problems due to our inexperience with the application. Most of these problems were corrected in the second workshop, but the environment for gathering solutions still requires some improvement.

We believe we generated results that will be useful to the subsequent actions. We also generated practical knowledge that will be useful for the future workshops in the project. In particular, the clustering of solutions into types and purposes should be considered a starting point for the revision of proposed solutions to first responders which is part of the task 2.5.

This set of informal solutions will provide to the authorities and emergency services a list of potential solutions that they could implement in practice to improve their interaction with the civilians. In turn, the solutions which are best fit to the specific requirements and needs in each situation should help the authorities and emergency services to decide about their potential to be implemented.

This catalogue of solutions will be validated with end-users in WP4 and they will be incorporated into the ENGAGE knowledge Platform. This platform will allow the authorities and emergency



services to select the most suitable solutions for the specific situation they are coping with based on the contextual and target aspects of the case.



8 REFERENCES

- Alexander, D. (2016). How to write an Emergency Plan. Dundeein. <https://doi.org/10.18869/nrip.hdq.1.4.215>
- Böhringer, M. (2010). Emergent Case Management for Ad-Hoc Processes: A Solution Based on Microblogging and Activity Streams. International Conference on Business Process Management Workshops, LNBIP 66, 384-395. https://doi.org/10.1007/978-3-642-20511-8_36
- Burton, Christopher G. 2015. "A Validation of Metrics for Community Resilience to Natural Hazards and Disasters Using the Recovery from Hurricane Katrina as a Case Study." *Annals of the Association of American Geographers* 105 (1): 67–86. <https://doi.org/10.1080/00045608.2014.960039>.
- Carvalho, J., Santoro, F., Revoredo, K. (2015) A method to infer the need to update situations in business process adaptation. *Computers in Industry*, 71, 128-143. <https://doi.org/10.1016/j.compind.2015.03.014>
- Cordeiro, K., Campos, M. L., & Borges, M. (2015). aDApTA: Adaptive approach to information integration in dynamic environments. *Computers in Industry*, 71, 88-102. <https://doi.org/10.1016/j.compind.2015.03.002>
- Cox, Robin S., and Karen-Marie Elah Perry. 2011. "Like a Fish Out of Water: Reconsidering Disaster Recovery and the Role of Place and Social Capital in Community Disaster Resilience." *American Journal of Community Psychology* 48 (3–4): 395–411. <https://doi.org/10.1007/s10464-011-9427-0>.
- Cutter, Susan L., Kevin D. Ash, and Christopher T. Emrich. 2016. "Urban–Rural Differences in Disaster Resilience." *Annals of the American Association of Geographers* 106 (6): 1236–52. <https://doi.org/10.1080/24694452.2016.1194740>.
- Cutter, Susan L., Christopher G. Burton, and Christopher T. Emrich. 2010. "Disaster Resilience Indicators for Benchmarking Baseline Conditions." *Journal of Homeland Security and Emergency Management* 7 (1). <https://doi.org/10.2202/1547-7355.1732>.
- Cutter, Susan L, Lindsey Barnes, Melissa Berry, Christopher Burton, Elijah Evans, Eric Tate, and Jennifer Webb. 2008. "A Place-Based Model for Understanding Community Resilience to Natural Disasters" 18: 598–606. <https://doi.org/10.1016/j.gloenvcha.2008.07.013>.
- Dhakal, Subas P. 2018. "Analysing News Media Coverage of the 2015 Nepal Earthquake Using a Community Capitals Lens: Implications for Disaster Resilience." *Disasters* 42 (2): 294–313. <https://doi.org/10.1111/disa.12244>.
- Diirr, B. & Borges, Marcos R. S. "Shaping Procedures to deal with Complex Situations". In: 2016 IEEE International Conference on Systems, Man, and Cybernetics. Los Alamitos, EUA: IEEE Computer Society, 2016. v. 1. p. 1-8. <https://doi.org/10.1109/SMC.2016.7844557>
- Glarum, J., & Adrianopoli, C. 2019. Decision Making in Emergency Management. Butterworth-Heinemann. <https://doi.org/10.1016/C2017-0-03809-0>
- Jacinto, R., E. Reis, and J. Ferrão. 2020. "Indicators for the Assessment of Social Resilience in Flood-Affected Communities – A Text Mining-Based Methodology." *Science of the Total Environment* 744: 140973. <https://doi.org/10.1016/j.scitotenv.2020.140973>.
- Jick, Todd D. 1979. "Mixing Qualitative and Quantitative Methods: Triangulation in Action." *Administrative Science Quarterly* 24 (4): 602. <https://doi.org/10.2307/2392366>.



- Kruse, Sylvia, Thomas Abeling, Hugh Deeming, Maureen Fordham, John Forrester, Sebastian Jülich, A. Nuray Karanci, et al. 2017. "Conceptualizing Community Resilience to Natural Hazards &Ndash; the EmBRACE Framework." *Natural Hazards and Earth System Sciences Discussions*, no. May: 1–20. <https://doi.org/10.5194/nhess-2017-156>.
- Ley, B., Ludwig, T., Pipek, V., Randall, D., Reuter, C., & Wiedenhoefer, T. (2014). Information and Expertise Sharing in Inter-Organizational Crisis Management. *Computer Support Cooperative Work*, 23, 347-387. <https://doi.org/10.1007/s10606-014-9205-2>
- Neiva, F.W.; França, J. B. S.; Dias, A.; Vivacqua, A.S.; Borges, Marcos R.S. . Agnosco: Transferring Intuition from Individuals to Collaborative Teams. In: IEEE International Conference on Computer Supported Cooperative Work in Design (CSCWD), 2018, Nanjing, China. p. 1-6. <https://doi.org/10.1109/CSCWD.2018.8465378>
- Norris, Fran H., Susan P. Stevens, Betty Pfefferbaum, Karen F. Wyche, and Rose L. Pfefferbaum. 2008. "Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness." *American Journal of Community Psychology* 41 (1–2): 127–50. <https://doi.org/10.1007/s10464-007-9156-6>.
- Patel, Sonny S, M Brooke Rogers, Richard Amlôt, and G James Rubin. 2017. "What Do We Mean by 'Community Resilience'? A Systematic Literature Review of How It Is Defined in the Literature." *PLoS Currents* 9: 1–32. <https://doi.org/10.1371/currents.dis.db775aff25efc5ac4f0660ad9c9f7db2>.
- Ran, Jing, Brian H. MacGillivray, Yi Gong, and Tristram C. Hales. 2020. "The Application of Frameworks for Measuring Social Vulnerability and Resilience to Geophysical Hazards within Developing Countries: A Systematic Review and Narrative Synthesis." *Science of the Total Environment* 711: 134486. <https://doi.org/10.1016/j.scitotenv.2019.134486>.
- Sharifi, Ayyoob. 2016. "A Critical Review of Selected Tools for Assessing Community Resilience." *Ecological Indicators* 69: 629–47. <https://doi.org/10.1016/j.ecolind.2016.05.023>.
- Wilson, Geoff A., and Olivia J. Wilson. 2019. "Assessing the Resilience of Human Systems: A Critical Evaluation of Universal and Contextual Resilience Variables." *Resilience* 7 (2): 126–48. <https://doi.org/10.1080/21693293.2018.1539205>.



9 APPENDICES

9.1 END-USER WORKSHOP REPORT

Authors: Labaka, Leire (TECNUN), Elkady, Sahar (TECNUN), Borges, Marcos (TECNUN), Hernantes, Josune (TECNUN)

Contributors: Participants of the Workshop

Abstract: ENGAGE aims at linking the informal resilience naturally inherent in citizens with the formal work of authorities to prevent, prepare for, respond to, and recover from disasters. It brings together 14 partners from 8 countries aiming to show how individuals and local practices can interrelate effectively with planned preparedness and response, practitioners, and technology.

This document is part of the Deliverable 2.3 – Informal Solutions. It reports the result of the first workshop aimed at this deliverable.



9.1.1 INTRODUCTION

9.1.1.1 Scope of the workshop

The end-user workshop was organized in a way to prepare for the KI-CoP Workshop. The workshop took place on February 17th, 2021 with remote participation of 12 end-user members plus 5 observers of the Engage Project Team besides the 4 facilitators from Tecnun. The first workshop was meant to get feedback from the remote interaction in order to evaluate the dynamics and correct eventual problems for the next workshop. We used ZOOM to support voice interaction and for the initial and final presentations of the Project Coordinator. The interaction itself was carried out using the MIRO tool and it was organized around two scenarios, which were distributed previously to participants.

9.1.1.2 The Agenda

The entire exercise lasted for three hours accord to the following schedule:

Activity	Time	Performed by
Initial presentation	5 min	Coordinator
Explaining MIRO and the Interaction	10 min	Tecnun
Present Scenario 1	5 min	Tecnun
Work on Solutions and Barriers	30 min	Participants
Debriefing	10 min	All
Live Discussion (Zoom)	15 min	All
Break	15 min	All
Present Scenario 2	5 min	Tecnun
Work on Solutions and Barriers + Event	30 min	Participants
Voting	15 Min	Participants
Debriefing	10 min	All
Live Discussion (Zoom)	15 min	All
Final Discussion	15 min	Coordinator

9.1.2 THE SCENARIOS DESCRIPTION

We designed three scenarios from which we chose two of them. For each of the scenarios, we described the background, the situation at hand, the purpose of the exercise and the questions the participants were expected to answer. We also provided a list of issues to take into consideration for the proposed solutions, including the description of barriers to the solutions. We also defined an event that was planned to release during the exercise, but we only used it in the second scenario. In what follows, we describe the two scenarios based on this template.

SCENARIO 1: OVERWHELMED HOSPITAL OCCUPATION, REACHED THE LIMIT

BACKGROUND

The number of infected people requiring hospitalization has been growing fast because a very contagious variation of the virus spreads and hospitals after reorganizing the care priorities have no other available ways to increase care capacity. The temporary hospital facilities have been installed, but they are also saturated, and they cannot expand due to lack of personal and equipment. The number of vacancies for other urgent pathologies has been drastically reduced and hospitals have not been able to cope with the demand. Prediction of this situation made government to adopt a general restraint two weeks before, but these measures have not reduced the demand, yet. The total general occupation has reached 90% at the minimum in all regions, making the transfer or use resources elsewhere impossible.

SITUATION AT HAND

People are getting seriously ill (both covid-19 and other pathologies), but have not been admitted to hospital. People are dying without care and there are signs of rebellions, adding chaos to an already danger situation.

PURPOSE

Analyze what else could have been done before, and assuming the current scenario, what should be done during and after this chaotic situation. How to communicate with the public and what attitude are expected from the citizens to better overcome this situation.

WHAT TO DO (QUESTIONS)?

- 1) Besides restraint, what else could have been done BEFORE THE CHAOS that involves citizens' participation?
- 2) The situation is expected to improve gradually, but it will take at least three weeks to get back to a near normal. How to interact with the citizens in this scenario, particularly to explain the extreme measures, to reduce the chaos and to demonstrate that all possible actions have been done?
- 3) How to deal with protests, rebellions and chaos created by people trying to get access to care?
- 4) How to involve the population with the measures to gradually return to normality in the smoothest way?

EVENT

The funeral service has also saturated, delaying the releasing of hospital beds (**not used**).



ISSUES

- Prioritize use of resources (hospital care)
- Use of resources (e.g., medical personal of primary attention)
- Dealing with angry and revolt from the population

OTHER ISSUES

- What are the barriers and limitations of possible solutions (actions)?
- How to involve the public in the discussion and implementation of these solutions given the short time available for implementing them?

SCENARIO 2: INFRASTRUCTURE FOR FOOD PRODUCTION/DISTRIBUTION

BACKGROUND

The pandemic is widely spread among the population and there has been a serious disruption in the food production and distribution chain, causing shortage of products in shops. As the problem became public, many people started to stock food two weeks before, making the shortage worse. Strategic stocks are also short. The situation is expected to last for some time (weeks) but it is uncertain. There are many people who have little or nothing left, for a variety of reasons.

SITUATION AT HAND

There is a big dispute for food causing disturbance every time a supply arrives in a shop. Some people are desperate because they don't have any food, other are trying to secure their stock because of the uncertainty of the situation. The authorities are working in three fronts: 1) provide means to increase the production and facilitate the distribution; 2) organize the supply to the most needed, and 3) appealing to solidarity of the population for making available (in return to a compensation) their current surplus to people in real need. In this exercise, we focus on fronts 2 and 3.

PURPOSE:

To analyze ways to handle the situation with the population using communication to share information and to induce a solidary attitude. To analyze ways to involve the population in producing a truly balance between offer and demand.

WHAT TO DO (QUESTIONS)?

- 1) How to capture the information about the needs and surplus in a fast and accurate way?



- 2) How to interact with the population to organize an effective distribution of food production?
- 3) How to support the work of volunteers in promoting and implementing solidary actions?

EVENT:

After 2 weeks part of the production is restored in some regions of the country but there is shortage of combustible that causes severe problems in distribution.

ISSUES:

- Reduce the shortage of food among the population by means other than increase production
- Avoid complete disruption in cities
- Keep people informed of the situation without causing chaos
- Support voluntary organizations

OTHER ISSUES:

- What are the limits of keeping the order in desperate situations?
- How to keep the situation under control despite of the disparity and inequality?



9.1.3 THE RESULTS

In the first scenario there were four questions. The participants described 24 solutions in this scenario, an average of six solution per question. They also described 13 barriers as illustrated in the Figure 1.

End-user Workshop 1

Scenario 1 - Overwhelmed Hospital Occupation



QUESTIONS	How to interact with the citizens to explain the extreme measures and to demonstrate that all possible actions have been done?	How to deal with protests, rebellions and chaos created by people trying to get access to care?	How to involve the population with the measures to gradually return to normality in the smoothest way?	
SOLUTIONS	<p>Besides restraint, what else could have been done BEFORE THE CHAOS that involves citizens' participation?</p> <ul style="list-style-type: none"> AWARENESS CAMPAIGN Communicate CITIZEN PATROL Education Information and education Emphatic information 	<p>How to interact with the citizens to explain the extreme measures and to demonstrate that all possible actions have been done?</p> <ul style="list-style-type: none"> Daily briefings Information Principle of proximity Social Media participatory groups 	<p>How to deal with protests, rebellions and chaos created by people trying to get access to care?</p> <ul style="list-style-type: none"> Proportional use of Force Filing of Reports Provide Information PoC (Point of Care) Open Interaction with opposing forces Monitor social reactions Whole-community approach 	<p>How to involve the population with the measures to gradually return to normality in the smoothest way?</p> <ul style="list-style-type: none"> Step by step deescalation AWARENESS of de-escalation Communicate deescalation Reassure by giving valid information Visualize progress of return to normal institutional communic
BARRIERS	<ul style="list-style-type: none"> Lack of understanding Elderly people 	<ul style="list-style-type: none"> Not all measures might be effective Valid information Coordination across agencies/actors Different priorities 	<ul style="list-style-type: none"> Conspiracy believers Economics STATE OF NECESSITY 	<ul style="list-style-type: none"> DENIERS POPULAR EXHAUSTION Different opinions



In the next pages we present the details of each question, solutions, and barriers. Some contributions for the discussion are more detailed than others. In some cases, we did some edition to make the contributions clearer, for example, abbreviating the title of the contribution and moving the original title to the description. In any case, we deleted any part of the contribution.

SCENARIO 1 - PROBLEM 1

What else could have been done BEFORE THE CHAOS that involves citizens' participation?	
Proposed Solutions	Descriptions / comments of the solution
Awareness campaign	AWARENESS CAMPAIGN THROUGH ALL CHANNELS AVAILABLE Traditional channels: TV, radio, newspapers (online included) social media (showing crude reality of what is happening, people suffering, dying...) Use all available sources, "influencers" should be directly contacted and recruited.
Citizen Patrol Awareness Campaign	Direct contact with citizens with use of loud speakers in areas of high density population
Information and education	Information regarding ongoing situation (SoMe, web). Offer the population knowledge on self-preparedness, first aid and infection control - digital courses. Cooperation between governmental authorities and volunteer organisations
Covid emphatic information	Covid emphatic information Testimonials from covid survivors or relatives of died persons collaborate in information campaign raising awareness in the need to calm people and do rational choices. Expert communicators, scientific journalists and psychologist are involved in defining contents and means.
Communicate escalation roadmap for mitigation efforts	"In the event we are faced with a Crisis like X, we are going to respond like this. If that fails, we'll do Y and so on"
Education in home-care to postpone hospital care need	
Barriers	Description of the barriers
Lack of understanding	Lack of understanding of characteristics of "the next crisis"



Elderly people	Digital competence might be a barrier to spread information. Might not reach elderly people by SoMe/web.
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SCENARIO 1 - PROBLEM 2

How to interact with the citizens to explain the extreme measures and to demonstrate that all possible actions have been done?	
Proposed Solutions	Descriptions / comments of the solution
Daily briefings	Daily briefings on interpretation of the situation and assumptions on how measures will improve the situation
Social Media	Do not solely rely on press conferences or web pages. Make sure to directly involve influencers with different backgrounds. Unify them and their followers. Fashion, home styling, e-gaming, wilderness/hunting/fishing, preppers, gun-nerds. make sure that all of them get abbreviated texts to spread in their channels.
Principle of proximity police	Our task as LEA tries to be pedagogical before adopting coercive measures like sanctions, complaints, reports. 1 to 1 conversation with citizen
Participatory groups	<p>Participatory groups and counseling through neighborhood outdoor meetings. The activity involves two activities:</p> <p>One virtual meeting with neighborhood representatives with psychologist and communicators and public health experts on the emergency situation and the importance to be calm and make rationale solutions the learning is about the early detection of covid-19 symptoms and undertaking correct information for isolating and protecting families the learning is also about recognizing and early management of life-threatening conditions such as stroke or heart attack</p> <p>a weekly outdoor meeting is organized in the neighborhood with a facilitator (psychologist, public health expert, communicator expert) to identify critical situations, moods, and better addressing the following communication subsequent virtual meeting and knowledge sharing events about the critics emerged.</p> <p>Comments: Is this something you apply already in your context? No but NO, but there is some evidence base from the Cochrane library evidence Aid, not specific to covid but it could be transferred to the covid context.</p>



Barriers	Description of the barriers
Effective measures	All measures are assumed to be effective, but might prove not to be from one day to another
Valid information	Make sure the information is valid, no "fake news"
Different priorities	Valid information (reliable information) Different priorities are in conflict with one another, which might prove hard to communicate
Coordination across agencies/actors	

SCENARIO 1 - PROBLEM 3

How to deal with protests, rebellions and chaos created by people trying to get access to care?	
Proposed Solutions	Descriptions / comments of the solution
Proportional use of Force	We are always having in mind that the chaos is created by people in real need. In this case relation with citizens will be comprehensive and use of force as the last resource.
Provide information	Provide information about the current situation (uses of resources) Informing the public about the current situation and what Resources are working with this. Also, try to visualize the extent that the Resources are used. For example, "99% of nurses are occupied with managing patients."
Open Interaction with opposing forces	Engage identified strong voices of belligerent opposition in open communication in public forums. Admit fault if true, and explain that further aggressive / destructive actions aggravates the situation and that even less people can get much needed aid in that way.
Whole-community approach	Establish an understanding of a whole-community approach (Before)
Monitor social reactions	a passive monitoring through social media exploited by artificial intelligence methods to active survey sample of population minorities and socio-disadvantage groups to maintain a psychological help line where also to receive claims
PoC (Point of Care)	Use of volunteer org as PoC: Example: The Red Cross used gift certificates that was handed out to public in need of money/food as an opportunity to get in touch with agitated people. That made us able to reassure and calm the public.



Filing of Reports	LEA field agents will file reports on what they are witnessing in the streets in order to translate this info eventually to decision makers and seek for more efficient measures from a top down approach
Barriers	Description of the barriers
Conspiracy believers	Persons with alternative views on what is happening, why it is happening and their trust in public actors
Economics	A solution that uses volunteer org as PoC demand economic support to the org. From company's/government.
STATE OF NECESSITY	A real state of necessity among the population can create huge problems while trying to manage hostile rebellions



SCENARIO 1 - PROBLEM 4

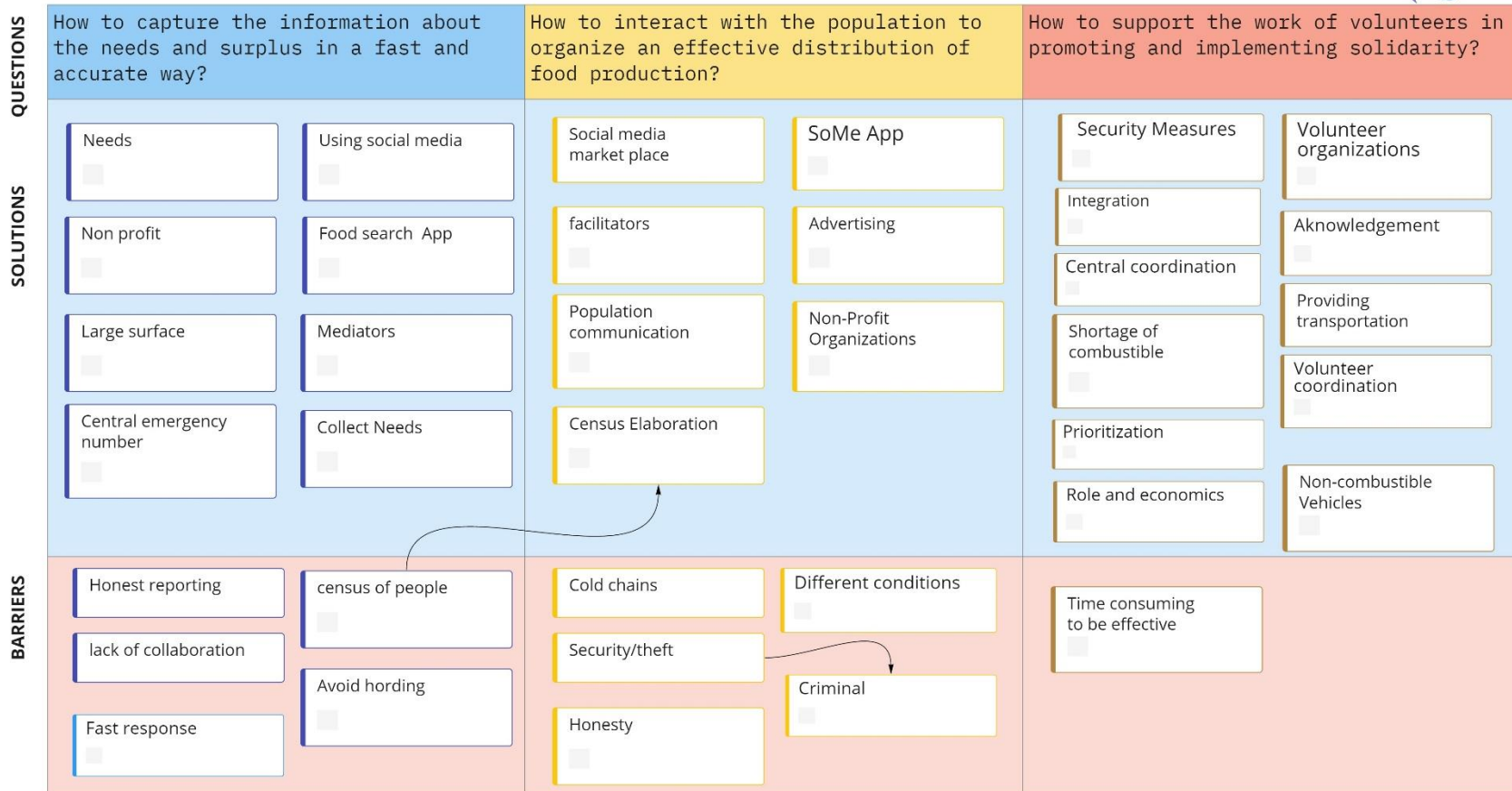
How to involve the population with the measures to gradually return to normality in the smoothest way?	
Proposed Solutions	Descriptions / comments of the solution
Step by step de-escalation	Develop a step by step de-escalation process based on triggers
Communicate de-escalation	<p>Communicate de-escalation of efforts and restrictions</p> <p>When whatever measures are implemented they should be time limited (known time) and/or tied to an outcome a measurement.</p> <p>They should be removed in a stepwise manner and relate to fulfillment of the outcome goals. Always clearly communicated from the authorities.</p> <p>The community can gradually see and feel the improvement when restrictions are removed or sense of normalcy is increasing and get a sense of accomplishment and team spirit and take individual responsibility for the greater good.</p>
Visualize progress of return to normal	Find a way of visualizing and communicating how return to normal is progressing, sort of supporting how everyone's actions and behaviours adds up
institutional communication	<p>in this stage also institutional communication may be used, it has to be trusty emphatic</p> <p>scientific experts need to be mediated by communication experts</p> <p>population needs regularly monitored</p>
Reassure by giving valid information	Valid information to be given the population, de-scaling the situation.
Awareness of de-escalation importance	<p>Make people understand the critical situation, the risk faced, not trying to embellish the situation.</p> <p>all channels available should be used: Traditional channels, social media, direct contact...</p>
Barriers	Description of the barriers
DENIERS	
POPULAR EXHAUSTION	
Different opinions	Different opinions/expert judgements on if it's the right time or not



This is the map of contributions. The details of questions, solutions and barriers are presented in the tables that follow the map. Observe that we created two connections to depict the co-relation of the contributions involved.

End-user Workshop 1

Scenario 2 - Infrastructure for food production/distribution



In the tables that follows, we present the contents of these solutions and barriers:

SCENARIO 2 - PROBLEM 1

How to capture the information about the needs and surplus in a fast and accurate way?	
Proposed Solutions	Descriptions / comments of the solution
Needs	Identifying needs by use of communication between beneficiaries and the volunteer orgs Use the various volunteer orgs to get feedback on the populations needs Food centrals may be distribution channels of surplus food to beneficiaries Volunteers gets feedback from beneficiaries regarding their needs, and may deliver surplus food from the food central
Non-profit	for NEEDS Nonprofit Organization follow up on social food banks
Large surface	for SURPLUS Large surface supermarkets/productors/distributors feedback
Using social media	Use social media to collect/capture needs of Citizens/actors
Food search App	Using a food search and reach App A mobile phone App should receive requests only from registered users (social services, deprived families) while answers can be provided by everybody in the community and by food grocery
Mediators	Ad hoc community volunteer organizations as mediators
Collect needs	Local store owners could collect needs and offers
Central emergency number	An emergency number will be open for two aims: the local needs detection and the planning of an emergency transportation using electricity vehicles (e.g., trains) All trains both military and civil will be involved in the emergency transportation of food
Barriers	Description of the barriers
Honest reporting	
Avoid hording	Reassure the population that they will get deliveries, and rationing may be needed.
Census of people	The census of people most in need is needed in this step Mutated from a card from question 2, it is very important a central census of deprived persons that can access the App for requests
Lack of collaboration	
The fast response is a challenge	

SCENARIO 2 - PROBLEM 2

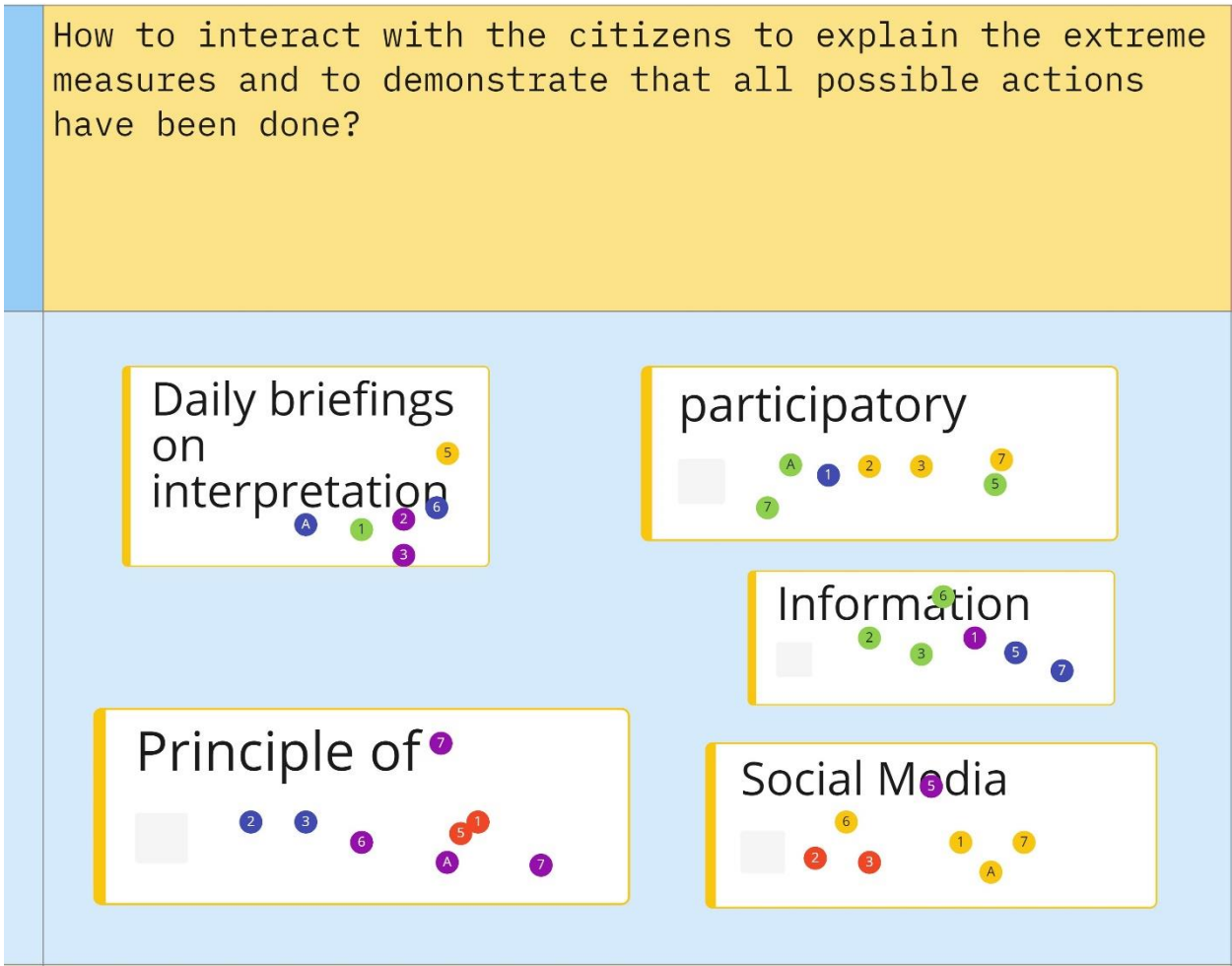
How to interact with the population to organize an effective distribution of food production?	
Proposed Solutions	Descriptions / comments of the solution
Social media marketplace	
Facilitators	communication facilitators at local markets and grocery shops provide information on the importance to buy just the amount needed without making shortages spot media campaign to promote responsible buying volunteers networks helping communicators facilitators
Non-Profit Organizations	ADDRESSING NON-PROFIT ORGANIZATIONS Those that manage/are related to social food banks
Census Elaboration	CENSUS ELABORATION OF PEOPLE IN NEED The Public Administration can elaborate census to define the part of the population in greater need
Population communication	Population communication of crisis population needs to be reassured to avoid extreme reactions population needs also be informed on what is in plan and already in action local groceries need to be involved in effective population communication
Advertising	Advertising for non-combustible transportation resources
SoMe	Use of SoMe and web Volunteers do shopping/deliver food to beneficiaries (have been a task for volunteers during CoVid19 in Trondheim)
Barriers	Description of the barriers
Cold chains	Food that need to be in the refrigerator???
Security/theft	
Criminal	Criminal organisations try to seize control over distribution
Different conditions	Different conditions in rural/urban/socially challenged areas
Honesty	If shopping/delivering of food is a task, honesty is important, both for the volunteer and the beneficiary. Few volunteers for the task may be a challenge.
Few volunteers	Few volunteers for the task may be a challenge.

SCENARIO 2 - PROBLEM 3

How to support the work of volunteers in promoting and implementing solidarity?	
Proposed Solutions	Descriptions / comments of the solution
Security measures	Proper security for volunteers -security of the process of food delivery
Integration	Integration in Crisis Agencies' operations
Central coordination	Central coordination, specific funding and means (e.g. for food transportation) volunteers need to be coordinated with institutional efforts specific funding to reimburse their deliveries (e.g. fuel) specific means (mobile phones, autocar for transportation) specific training to deal with stressed persons lacking with primary food
Shortage of combustible	Governmental rationing supply.
Prioritization	Prioritized quota of combustibles
Volunteer coordination	Emergency crisis coordination also of volunteers volunteers need to be involved both in population information at groceries and in food transportation from train to local groceries with trucks together with military by using low-fuel consuming engines or possibly electric cars
Role and economics	Facilitation for volunteers (employee in the org) is important. Clear roles of employee and volunteer is critical. Economics: Important that economical support for the org is in place, so the effort is in helping, not found raising. Gift certificates may be a dignified way for the beneficiaries to get support, instead of the org pre-destination of the beneficiaries need. It's also a better logistic solution for the org. Giving authorities feedback on needs in the population.
Use existing volunteer organizations	Use existing infrastructures. For example, the Red Cross, Missing People, etc.
Acknowledgement	Highlight the value of the volunteers' tasks so there is a sense in that a real difference can be made
Providing transportation	
Non-combustible vehicles	Non-combustible vehicles to be facilitated by Government/administration
Barriers	Description of the barriers
Time consuming to be effective	It will take time to increase levels of solidarity in chaotic times. Very challenging

9.1.4 THE VOTING SESSION

After the solutions and barriers were completed for both scenarios, we asked participants to vote on the solutions proposed for each problem. The aim of the voting was not to elect the best solution, but to induce participants to read all the contributions. We illustrate the voting process in the figure below, but we didn't compile the results.



9.1.5 OBSERVATIONS FROM THE EXERCISE DYNAMICS

We now list the issues we observed during this workshop. As we mentioned before, the goal was to feed the planning for the KI-CoP workshop that scheduled to take place three weeks after. Here are the main issues we observed and the effect they will have on the preparation of the KI-CoP Workshop.

- **Division into sub-groups**

This exercise had 12 end-users and some observers. The interaction was confused sometimes and made it hard to follow the work. We decided to work on smaller groups and divide the participants into subgroups.

- **Too many scenarios and questions.**

The workshop had two scenarios and 7 questions. It was considered too many and distracting. We decided to have only one scenario and three questions. Each subgroup will initially work on two of these questions and in the second part, the subgroup will work on the other question, which would be filled with the contributions of the first interaction.

- **No voting**

The voting session was considered confusing and unnecessary. It should be removed.

- **Expand the analysis and commenting session**

Using a single scenario, we can divide the interaction into two sessions. In the first it discusses some of the problems; in the second, it discusses a problem that has been discussed by another group. This way, we ease the interactions and cover all the problems.

- **Complement the contribution in Miro with live discussion using Zoom**

Some participants pointed out the type-only action is not sufficient; they want to be able to interact via voice. To address this issue we can create rooms in Zoom and assign the participants of a subgroup to a session in the corresponding room.

- **Planning and Timing**

Some activities took more time than initially planned. We also had difficulty in setting-up the sessions as we didn't receive the list of participants with anticipation. This has to be improved for the KI-CoP Workshop.

- **Plenary sessions**

Allow more time for the general discussion and brainstorming. We noticed the interaction during the plenary sessions had not occurred as planned, perhaps due to the language barriers. For the KI-CoP this might be worse. We need to find ways to promote interaction beyond the MIRO environment.

- **Discussion about the solution implementation**

Although we had an area for discussing the barriers for applying a solution, this was not considered enough. Perhaps, instead of discussing barriers, we should discuss the implementation issues. To be analyzed in more details.

9.1.6 CONCLUSIONS

Despite of the problems, which we considered minor, the workshop went well and produced the results we expected; the main one being the feedback for the preparation of the KI-CoP workshop. We intend to address the issues listed in the observations, and improve the use of the MIRO environment as a supporting tool.

With the result of the KI-CoP Workshop, we will be able to draw conclusions about the adequacy of the exercise supported by collaborative tools.

ANNEX 1 – INSTRUCTIONS SENT TO PARTICIPANTS

Dear Participants of the End-User Workshop,

Thank you for your time that will be spent at the workshop. Hope you find it a valuable experience. The workshop will last three hours with a small break in the middle.

In what follows we will give you some instructions to facilitate your understanding

1) We will start in Zoom. The meeting address is reproduced below:

Marcos Borges is inviting you to a scheduled Zoom meeting.

Topic: Engage End-User Workshop

Time: Feb 17, 2021 01:00 PM Paris

Join Zoom Meeting

<https://unav.zoom.us/j/93787723844?pwd=OFVVRZ3hrSkZKK2pYNFFiQ0h6cEtvUT09>

Meeting ID: 937 8772 3844 Passcode: 395646

2) We will explain the dynamic and the schedule of activities. We will be using MIRO to present the instructions and describe the two scenarios we will be working on. We will send you an invitation to join the Miro (www.miro.com) session tomorrow. In the meanwhile, you can either download Miro to use in your computer or tablet or you can sign up to use it through the Web.

3) Although the tool is quite easy to use, we understand you might have difficulties and we will be there to help you. We will also work as facilitators and organizing the working between sessions.

4) **Besides a general description that is attached to this email**, we defined four questions to each scenario that we expect that you present the solutions from your perspective assuming a local operation. You can present as many solutions as you want to each problem. You can also comment on others participant's solutions and reply to comments made in the solutions you presented. This exercise will last 30-35 minutes.

5) After we conclude the solution step, we will have a debriefing session and a live discussion session lasting 15 minutes each. During the debriefing we plan to have a prioritization exercise.

6) We expect to work for 60-70 minutes in each scenario with a 15-minute break in between them. The 180 minutes will be completed with the introduction at the beginning and a closing session at the end of the workshop.

Please, let us know before or during the workshop if you have any doubts.

Thank you again and see you tomorrow!

Leire, Marcos, Sahar, Josune

ANNEX 2 – POTENTIAL LIST OF PARTICIPANTS

Besides the people in the list the four members of Tecnun also participated as facilitators:

PARTNER	END USER / NOT
ASL	End-user
ERTZ	End-user
ERTZ	End-user
EENA	academic
EENA	academic
DEEP BLUE	academic
SINTEF	academic
SINTEF	academic
TAU	academic
TAU	academic
EVERYBRIDGE	End-user
KMC	End-user
KMC	End-user
KMC	End-user
ENS	academic
DSU	End-user
DSU	End-user
TRC	End-user
TRC	End-user
TRC	End-user

9.2 KI-CoP WORKSHOP REPORT

Authors: Labaka, Leire (TECNUN), Elkady, Sahar (TECNUN), Borges, Marcos (TECNUN), Hernantes, Josune (TECNUN)

Contributors: Participants of the Workshop

Abstract: ENGAGE aims at linking the informal resilience naturally inherent in citizens with the formal work of authorities to prevent, prepare for, respond to, and recover from disasters. It brings together 14 partners from 8 countries aiming to show how individuals and local practices can interrelate effectively with planned preparedness and response, practitioners, and technology.

This document is part of the Deliverable 2.3 – Informal Solutions. It reports the result of the second workshop aimed at this deliverable.

9.2.1 INTRODUCTION

The KI-CoP Workshop took place on March 9, 2021 with remote participation of 11 end-users plus 5 team members of the Engage Project Team, besides the 4 facilitators from Tecnun. We divided the participants into three subgroups, according to their profiles. The exercise consisted of a general session for the initial and final presentations by the Project Coordinator and Facilitators, and three sub-sessions (rooms) to support the sub-groups interaction, all using ZOOM. The contributions by workshop participants was carried out using the MIRO tool.

We defined a single scenario and three different situations/questions. During the first part of the exercise, each group worked on the solutions for two of the problems. In the second part, each subgroup received the solutions presented by the other two subgroups to the problem that subgroup didn't work. The members of the subgroup added the implementation challenges the group believe it exists for these solutions. The summary of the exercise is described in Table 9.

Table 9 - Division of Tasks among the subgroups

	Sub-Group 1	Sub-Group 2	Sub-Group 3
First Round	Solutions to Problem 1 & 2	Solutions to Problem 2 & 3	Solutions to Problem 1 & 3
Second Round	Implementation Challenges to Problem 3	Implementation Challenges to Problem 1	Implementation Challenges to Problem 2

9.2.1.1 The Agenda

The entire exercise lasted for three hours according to the following schedule:

Activity	Time	Performed by
Initial presentation (Zoom)	20 min	Coordinator
Introducing yourselves (Zoom)	10 min	All
Explaining MIRO and the Interaction	15 min	Facilitators
Present Background Scenario (Zoom)	15 min	Facilitators
Work on Solutions (Miro)	30 min	Subgroups
Debriefing (Zoom)	10 min	All
Break	20 min	All
Work on Implementation Challenges (Miro)	30 min	Subgroups
Discussion (Zoom)	15 min	All
Conclusion	15 min	Coordinator

9.2.2 THE SCENARIOS DESCRIPTION

We designed a single scenario for the KI-CoP workshop. We described the background, the situation at hand, and the purpose of the exercise. We also presented three questions. .

SCENARIO: ADAPTING TO THE "NEW" NORMAL

Background: Good news in the horizon! The number of infections has been drastically reduced. In Europe, it is expected to fall below 50 cases per 100.000 inhabitants within two weeks. Accordingly, the pressure on hospital care for COVID-19 patients has consistently reduced over the past three weeks. The vaccination is increasing fast. New vaccines have been approved and the overall production is reaching records every week. The goal of having 70% of the population immunized by beginning of July is now a plausible achievement. There is a high optimism among the citizens.

Situation at hand: With such a favorable situation, people start to relax and to adopt less careful behavior. There is strong pressure to return to the situation before the crisis, by allowing all economic activity to resume fully, including travel for business and leisure. The sanitary system is going through a different pressure. The postponed non-emergency care is charging the bill with many people waiting in line to get primary care.

However, experts keep saying the vaccine does not prevent coronavirus infection. It helps protect against serious illnesses but if you get infected, it may not prevent you from spreading the virus to others. Experts advise people, whether they are vaccinated or not, to continue wearing a mask, washing their hands, and maintaining safe physical distancing

Also on the stage, there are the new variants of the Covid-19 virus; some experts saying it may be 70% more transmissible and deadly. Some cases infected with these variants started to surge, but there is no conclusion, yet. Worse, some vaccines do not effectively protect against the variants, although most laboratories are working on improving their vaccines. The authorities are cautious, trying to avoid the potential return to chaos.

Purpose: The goal is to make participants to analyze this hypothetical scenario and generate possible solutions to the questions posed, first in sub-groups and after accessing contributions from other participants. The solutions should try to address the problems from the perspective of the relationship between first responders and citizens.

What to do (questions)?

What would be the problems you expect to occur from the citizen´s behavior and how would you react to them in this new scenario?

How to communicate with the public about their new procedures, to deal at the same time with the feelings of hope and anxiety, and keeping the need of protective measures?

In this new scenario, there is still a high degree of uncertainty. How would you involve citizens to adopt a responsible attitude according to the evolution of the situation, for the better or the worse?

As we already mentioned, each subgroup will work on the solutions of two of the three questions in the first part, and in the second part on the implementation challenges

9.2.3 THE RESULTS

In the first part of the exercise, each subgroup presented solutions to two of the questions. The subgroups generated 65 solutions to these three problems: 24 for the first; 22 for the second; 19 for the third problem. The maps are reproduced in Figure 15, Figure 16, and Figure 17.

Workshop KI-CoP
Group 1 - Questions 1 and 2



Questions

What would be the problems you expect to occur from the citizen's behavior and how would you react to them in this new scenario?

How to communicate with the public about the new procedures, dealing at the same time with the feelings of hope and anxiety, and keeping the need of protective measures?

Solutions/Suggestions

<p>New way to communicate and engage with people</p> <p>☰</p>	<p>Emotional reactions</p> <p>☰</p>	<p>Unify communication efforts</p> <p>☰</p>	<p>Using volunteers to engage people</p> <p>☰</p>
<p>People are hesitant due to the poor quality of information</p> <p>☰</p>	<p>People don't feel like being part of the solutions</p> <p>☰</p>	<p>Targeting the people</p> <p>☰</p>	<p>Change Communication Strategy</p> <p>☰</p>
<p>Polarisation in the opinions, fake news</p> <p>☰</p>	<p>Lack of confidence and trust</p> <p>☰</p>	<p>App to show tested positive, or app to track vaccine</p> <p>☰</p>	<p>Test new solutions to track the population</p> <p>☰</p>
<p>Bad information handling</p> <p>☰</p>	<p>People's attitude against institutions</p> <p>☰</p>	<p>Self Testing</p> <p>☰</p>	<p>Involve Stakeholders</p> <p>☰</p>
<p>People are tired of new solutions</p> <p>☰</p>	<p>Criminality changed, new criminal activities are occurring</p> <p>☰</p>	<p>Use App for variants</p> <p>☰</p>	<p>Find solutions to new criminality</p> <p>☰</p>
<p>Hard to understand how to support weak people</p> <p>☰</p>	<p>Riots</p> <p>☰</p>	<p>Educate people on communication</p> <p>☰</p>	<p>Create tools to control the fake news like NewsBrief</p> <p>☰</p>

Figure 15 - Solutions presented by Group 1

Workshop KI-CoP
Group 3 - Questions 1 and 3



Questions

What would be the problems you expect to occur from the citizen's behavior and how would you react to them in this new scenario?

In this new scenario, there is still a high degree of uncertainty. How would you involve citizens to adopt a responsible attitude according to the evolution of the situation, for the better or the worse?

Solutions/Suggestions

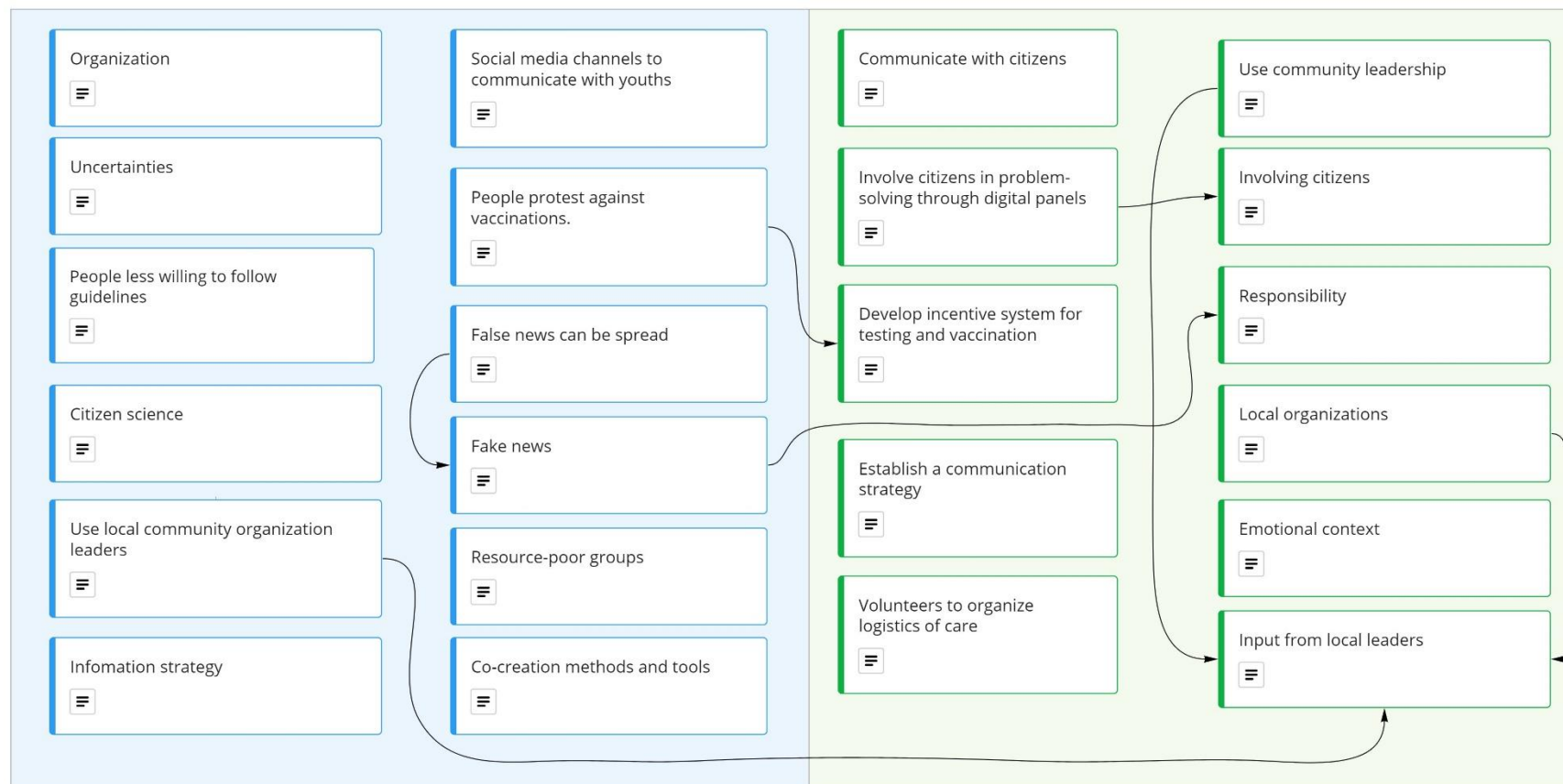


Figure 17 - Solutions presented by Group 3

In the next pages, we present the solutions for each question. Some contributions for the discussion are more detailed than others. In some cases, we did some edition to make the text clearer, for example, by moving long titles to the contents. In no case, we deleted any part of the contribution.

GROUP 1 - QUESTION 1

What would be the problems you expect to occur from the citizen's behavior and how would you react to them in this new scenario?	
Proposed Problems/Solutions	Descriptions/comments of the Problem/Solution
New way to communicate and engage with people	It is getting hard to reach people with social media, there is a need of a new way to communicate with people and engage with them
Emotional reactions	Emotional reactions from the citizens like anger, frustration
People don't feel like being part of the solutions	People don't feel like being part of the solutions anymore
People are hesitant	People are hesitant due to the poor quality of information
Polarization in the opinions, fake news	
Lack of confidence and trust	
Bad information handling	
People's attitude against institutions	People are tired and become reluctant against institutions and containment measures
People are tired of new solutions	People are trying to follow the rules but there is a big gap due to the economic differences. Poorest areas have less awareness
Criminality changed, new criminal activities are occurring	People are taking advantages on new problems
Hard to understand how to support weak people	Hard to understand how to support weak people, e.g. financially hurt people
Riots	

**GROUP 1 -
QUESTION 2**

How to communicate with the public about the new procedures, dealing at the same time with the feelings of hope and anxiety, and keeping the need of protective measures?	
Proposed Problems/Solutions	Description/comments of the Problem/Solution
Unify communication efforts	Unify communication efforts, make people realize that first responders, governments are all on the same line
Using volunteers to engage people	Using volunteers to engage people more through a different communication
Targeting the people	Targeting the people, dividing them in subgroups and work on their specific needs
Change Communication Strategy	People know that there is covid, the message has now to be softened. reminder can be daily and not big alerts. Adapt the communication to the tiredness of people, for example with small reminders and no big campaign or they loose trust in the government
App to show tested positive, or app to track vaccine	App to show tested positive, or app to track vaccine
Test new solutions to track the population	Test new solutions to track the actual status of the population and see how it is possible to open some part of the economy (e.g. cinemas, theaters)
Self Testing	People can test themselves by buying it in the supermarket
Involve Stakeholders	Start from the stakeholders since they are the ones in interest. They should stimulate population more than the government
Use App for variants	Use the App for genomic surveillance and track the variants
Find solutions to new criminality	
Create tools to control the fake news like NewsBrief	Provide the correct tools to survive in the pandemic, no campaign, not a lot of noise but start from the tool. See https://emm.newsbrief.eu/NewsBrief/clusteredition/en/latest.html
Educate people on communication	Educate people on how to handle communication, how to do remote work

GROUP 2 - QUESTION 2

How to communicate with the public about the new procedures, dealing at the same time with the feelings of hope and anxiety, and keeping the need of protective measures?	
Proposed Problems/Solutions	Description/comments of the Problem/Solution
Risk on their assets	
Focus on persevering	Focus on persevering for a small amount of time. Focus on the liberty afterwards.
Return to work	Communicating on measures, guidelines Means to monitor and share situation, e.g., how many people are in the floor plan / density threshold automation for triggering contact tracing, based on badge scanning Updating on public health advice Empowering recipient of information Example (bad): for people that don't adhere, fines are implemented. Fines are increased all the time. Most people don't pay them more and more lawyers are involved to dispute the fines. Giving positive incentives seems to work better.
Return to campus app (Everbridge)	App description will be shared
Focus on inclusion	Need to address vulnerable groups, different means to reach them
Digital contact tracing	Supports peace of mind beyond immediate beneficiaries (e.g. family)
Communication not only focused on health	Example: Red Cross COVID information, addressing also mental health, social life, etc.
Incentives to maintain social distancing	Focus on upcoming holidays, later benefits, to accept restrictions during first holidays
Green passport	Immunity passport will allow you to participate in social activities (theater, malls, study on campus) Associated (in Belgium) with other constraints - e.g., negative tests
Stakeholders view of risks	Ensure stakeholders have a complete and timely view of risks impacting their assets, including changing conditions from COVID-19 other threats such as civil unrest and natural disasters.

GROUP 2 - QUESTION 3

In this new scenario, there is still a high degree of uncertainty. How would you involve citizens to adopt a responsible attitude according to the evolution of the situation, for the better or the worse?

Proposed Problems/Solutions	Description/comments of the Problem/Solution
Enhancing education	Enhancing education about health aspects: infection, vaccination
Explaining measures	It starts with explaining why certain measures have to be taken. This will improve your support base
Keeping the population informed	When population is given information, their behavior is improving, they respect sanitary measures
Issue: cacophony of information	
Communication from official source	Communication from official source to avoid misinformation
Certification of information	Certification of information: coming from official source
Enhanced cooperation with civil society	At national or local level Difficulties at local level
Mass alerting	Mass alerting to improve last minute availability of vaccines

GROUP 3 - QUESTION 1

What would be the problems you expect to occur from the citizen's behavior and how would you react to them in this new scenario?

Proposed Problems/Solutions	Description/comments of the Problem/Solution
Organization	It is important to assign, analyzing and planning responsibilities in accordance with the participants' skills. For example, in question number 1 there are two different parts. First part is more focused in Social and epidemiologist aspects, so this specialist are the ones who must to analyze what will be the problems. This is important to prevent mutual interference between different disciplines. Any case, it is clear that it would be some problems so communicators should first know the consequences, citizens' feels and uncertainties to develop an action plan.
Social media channels to communicate with youths	Using popular social media channels to communicate with youths Reach out to youths on the channels that they use to accommodate challenges concerning that youths do not use formal and therefore behaving on the contrary to expectations information channels.
Uncertainties	We have to prioritize info how citizens uncertainties and monitor how the perception is changing to evaluate message efficiency and to readapt them if necessary
People less willing to follow guidelines	<p>What we already see in Israel (57% of population vaccinated with at least one dose) is that people less willing to continue to follow guidelines, such as wearing protective masks and observing the social distance.</p> <p>The more complicated and illogical the guidelines the less people are inclined to follow them. Solutions:</p> <ul style="list-style-type: none"> a. Adapting the guidelines make them clearer and more logical. For example - to stop making compulsory to wear a mask at the open - on a street, in a park etc. People using common sense based on information they been provided for last year and disregard if it does not make sense. b. Lead by example - make sure all formal and informal leadership, volunteers, public works people, anyone you can convince or enforce to show an example. Analyze the information consumption patterns of each segment and sub-culture of population and identify the best influencers. c. Instead of putting together health administrators to work out the problem in hand put together a group of best marketing people in the country. Change in behavior or desired behavior is a product that needs to be marketed the best, just as Coca-Cola.

People protest against vaccinations.	Problem: People protest against vaccinations. Solution: Being open about risks, advantages, necessities and uncertainties while maintaining vaccination requirements for social participation.
False news can be spread	There is a certain risk that small groups of the population will react negatively to all forms of information. It is important that the population receive information from someone they trust, preferably via text message from their private doctor or local authorities.
Citizen science	Use participatory elements for detecting infection risks - citizen science. A building, a neighborhood could identify zones where infections are likely to occur as an example.
Fake news	Best way to prevent Fake news is share the information available and to avoid informative silence. This doesn't eliminate the problem but limit the consequences. Once Fake news appear we must evaluate if are or not critical in this case we have to use, for example, verification agencies, Media and Social Media.
Use local community organization leaders	Use local community organization leaders as role models and mediators for raising awareness Local authorities identify e.g. religious leaders, minority representatives, different NGOs and establish information strategies that they will integrate/communicate with their members.
Resource-poor groups	Elderly people, pregnant women and other vulnerable groups need to be reassured by people close to them. One must avoid that any riots create unnecessary fear among resource-poor groups.
Information strategy	Most of the essential information and communication should take place locally, via local authorities.
Co-creation methods and tools	Use co-creation methods and tools to facilitate meaningful activities with the citizen. To accommodate the problem that the extracurricular activities of youths are banned. The authorities could use modern digital tools to create alternative activities together with citizens

GROUP 3 - QUESTION 3

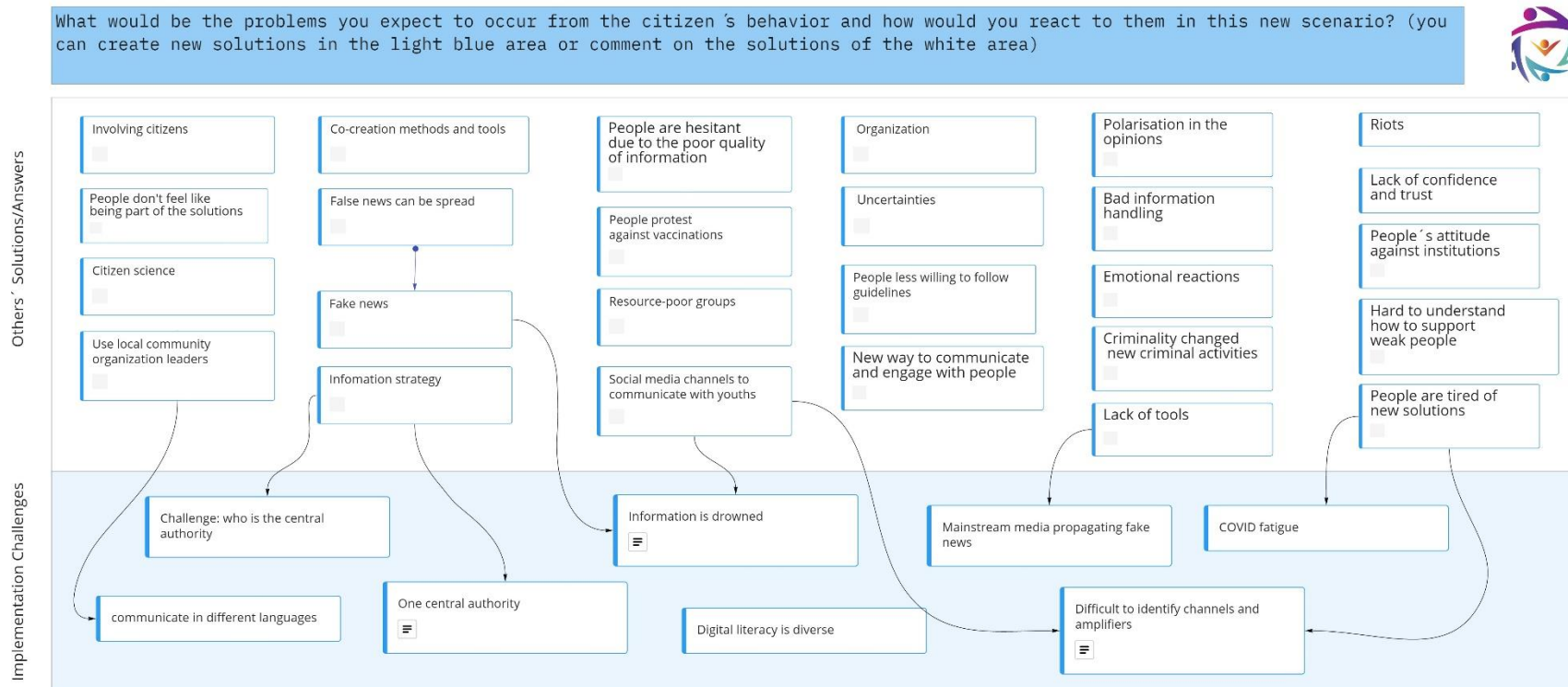
In this new scenario, there is still a high degree of uncertainty. How would you involve citizens to adopt a responsible attitude according to the evolution of the situation, for the better or the worse?

Proposed Problems/Solutions	Description/comments of the Problem/Solution
Communicate with citizens	Communicate uncertainties to citizens and highlight worst and best possible consequences when different infection scenarios are chosen.
Use community leadership	Each of us is part of community or meta-community (for example I am part of parents to high-school kids community, also part of retired military community, also Russian-speaking community etc.). Not necessary physical such as city I live in. We need to identify who would influence best the meta-communities and who would motivate them to take responsible action. Use not only appropriate person that has an impact in this community not only the appropriate language and terms but also the right channels of information delivery for each sub-group or virtual community.
Involve citizens in problem-solving through digital panels	Giving the citizens a sense of participation and a possibility to influence decisions might increase the compliance of the needed behavior and actions. For example: What is the most important thing for you to continue doing despite corona restrictions? What is the most difficult to comply with? -> Foundation for making risk-based prioritization
Involving citizens	If we want to involve citizens we must treat them not just as a victim but an active action and make they know we trust on them. Authorities trust is important but we should have got it in advance, now is time to keep this trust but also to trust the citizens.
Responsibility	One must locate those who spread false news and incorrect information, and make them aware of their responsibilities.
Develop incentive system for testing and vaccination	Develop incentive system for testing and vaccination. Incentive citizens for testing for corona virus, so that authorities could detect cases despite lower risk awareness and compliance with test regimes. Similar could be done for vaccination.
Local organizations	Local organizations of many kinds (football teams, chess clubs, scouts, etc.) have responsible management and members with great confidence. Communication through such groups can strengthen trust in the information provided.

<p>Establish a communication strategy</p>	<p>Establish a communication strategy and the necessary channels between authorities and citizens. The public should be able to easily access information about the authorities plan, how it is being implemented and the progress, also making clear the benefits of the plan and understanding the consequences of putting it at risk by not following it. Several communication channels should be available to suit the varying information needs of citizens. In many previous cases, also when COVID started in Europe, emergency services receive an increased load of emergency calls (putting at risk other citizens who need urgent access to emergency services). Previous practice shows that having already established and well known non-emergency numbers help reduce the emergency call load.</p>
<p>Emotional context</p>	<p>Large emergencies have a significant emotional impact on the population that can affect how the facts are perceived and even their critical thought surrounding the circumstances. In this emotional context, regular communication techniques are no longer effective. In times with turbulent emotions, some specific characteristics of communication must be born in mind in order to be more effective taking into account, considering citizen’s sensibilities. Large emergencies require immediate reaction transparency, understandable, precise, relevant, suitable timeline information.</p>
<p>Volunteers to organize logistics of care</p>	<p>Support medical services with volunteers to organize logistics of care (vaccination, waiting lines, enforcing hygiene measures).</p>
<p>Input from local leaders</p>	<p>Develop solutions based on input from local leaders of communities and organizations. Being sensitive to the context and trends, use actual knowledge from various organizations in the communities and their leaders, to provide specifically tailored measures.</p>

In what follows, we present the maps of implementation challenges added by the subgroup, which did not work on the problem. The map was constructed by joining the solutions of the two other subgroups into a single Panel. Observe that we created a link between the challenge and the solution(s) it refers to. A total of 34 (8, 16 and 10, respectively) implementation challenges were created, but not all with a description and only some linked to the problem.

Group 2 - Question 1



Group 3 - Question 2

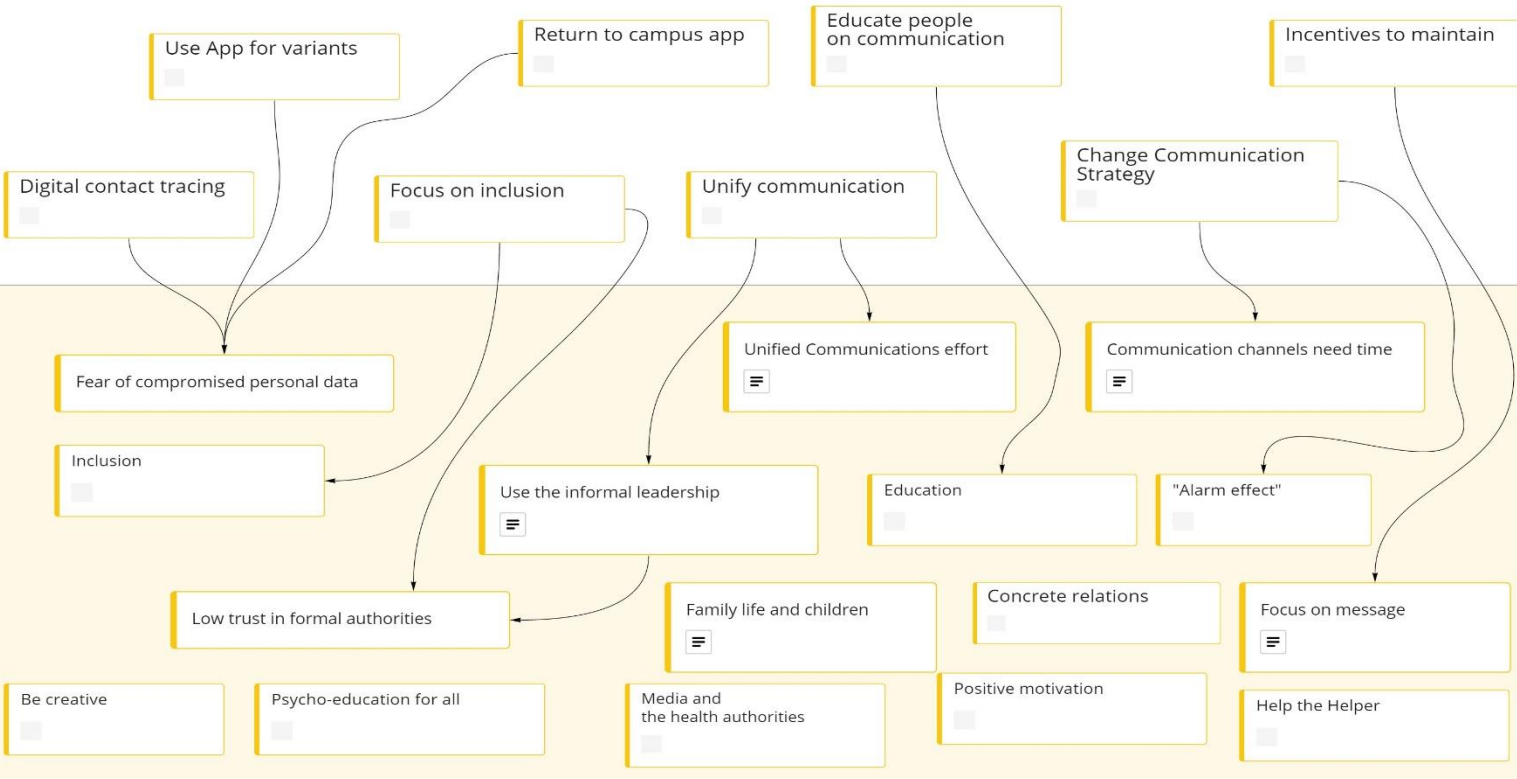
How to communicate with the public about the new procedures, dealing at the same time with the feelings of hope and anxiety, and keeping the need of protective measures? (you can create new solutions in the light yellow area or comment on the solutions of the white area)



Others' Solutions/Answers

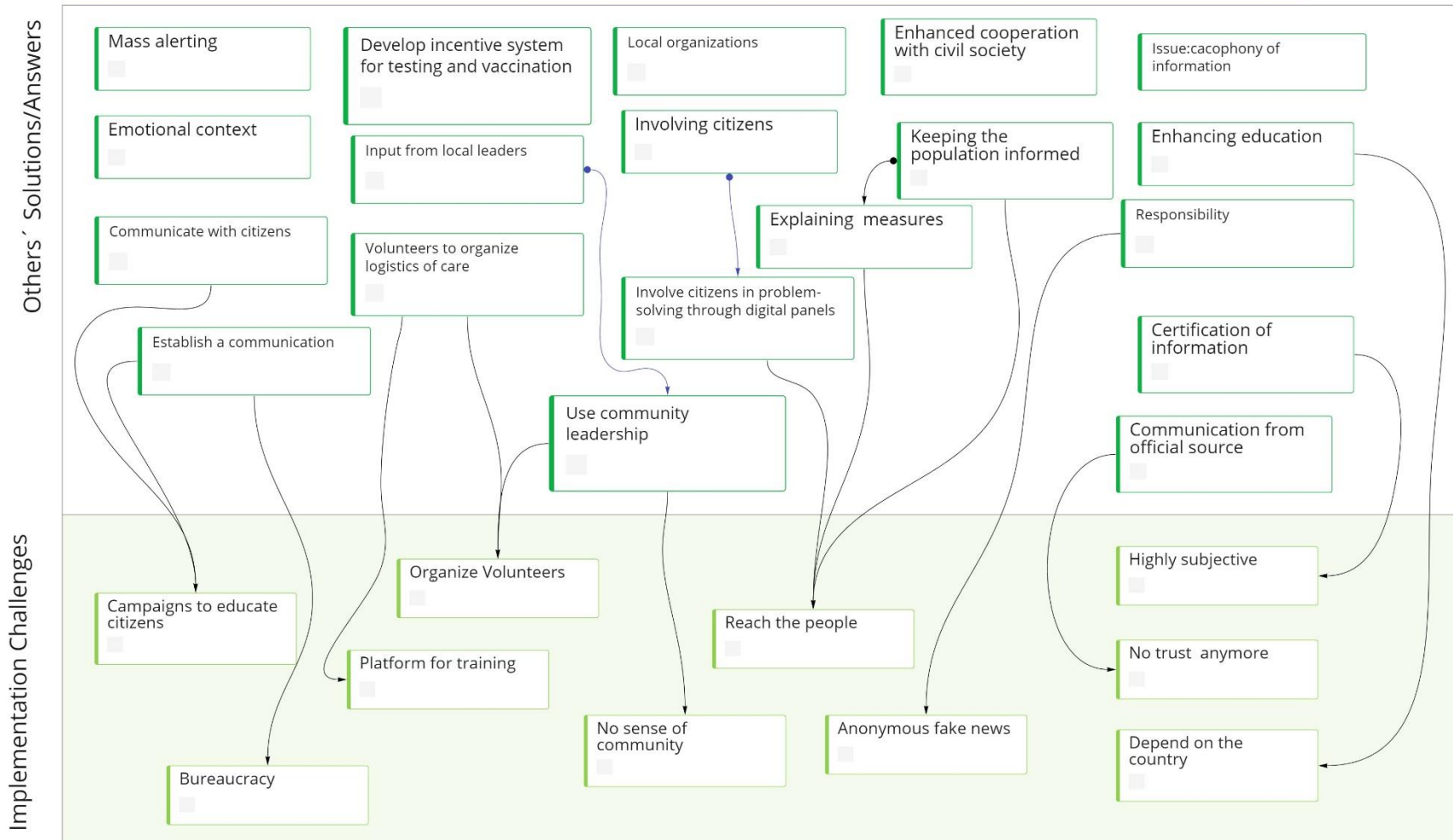


Implementation Challenges



Group 1 - Question 3

In this new scenario, there is still a high degree of uncertainty. How would you involve citizens to adopt a responsible attitude according to the evolution of the situation, for the better or the worse? (you can create new solutions in the light green area or comment on the solutions of the white area)



We now present the contents of each solution and the corresponding implementation challenges.

GROUP 2 - QUESTION 1

What would be the problems you expect to occur from the citizen's behavior and how would you react to them in this new scenario?	
Problems/Solutions Group 1 and 3	Description/comments of the Problem/Solution
Involving citizens	If we want to involve citizens we must treat them not just as a victim but an active action and make they know we trust on them. Authorities trust is important but we should have got it in advance, now is time to keep this trust but also to trust the citizens.
Co-creation methods and tools	Use co-creation methods and tools to facilitate meaningful activities with the citizen. To accommodate the problem that the extracurricular activities of youths are banned. The authorities could use modern digital tools to create alternative activities together with citizens
People are hesitant due to the poor quality of information	People are hesitant due to the poor quality of information
Organization	It is important to assign, analyze and plan responsibilities to the participants' skills. For example, in question # 1 there are two different parts. First part focus in Social and epidemiologist aspects, so this specialist are the ones who must to analyze what will be the problems. This is important to prevent mutual interference between different disciplines. Any case, it is clear that it would be some problems so communicators should first know the consequences, citizens' feels and uncertainties to develop an action plan.
Polarization in the opinions	Polarization in the opinions: fake news
Riots	
People don't feel like being part of the solutions	People don't feel like being part of the solutions anymore
False news can be spread	There is a certain risk that small groups of the population will react negatively to all forms of information. It is important that the population receive information from someone they trust, preferably via text message from their private doctor or local authorities.
People protest against vaccinations	People protest against vaccinations. Solution: Being open about risks, advantages, necessities and uncertainties while maintaining vaccination requirements for social participation.
Uncertainties	We have to prioritize info how citizens uncertainties and monitor how the perception is changing to evaluate message efficiency and to readapt them if necessary
Bad information handling	Bad information handling

Lack of confidence and trust	
Citizen science	Use participatory elements for detecting infection risks - citizen science. A building, a neighbourhood could identify zones where infections are likely to occur as an example.
Fake news	Best way to prevent Fake news is share the information available and to avoid informative silence. This does not eliminate the problem but limit the consequences. One Fake news appear, we must evaluate if are or not critical, in this case we have to use, for example, verifications agencies, Media and Social Media.
Resource-poor groups	Elderly people, pregnant women and other vulnerable groups need to be reassured by people close to them. One must avoid that any riots create unnecessary fear among resource-poor groups.
People less willing to follow guidelines	What we already see in Israel (57% of population vaccinated with at least one dose) is that people less willing to continue to follow guidelines, such as wearing protective masks and observing the social distance. The more complicated and illogical the guidelines the less people are inclined to follow them. Solutions: a. Adapting the guidelines, make them clearer and more logical. For example - to stop making compulsory to wear a mask at the open - on a street, in a park etc. People using common sense based on information they've been provided for last year and disregard if it does not make sense. b. Lead by example - make sure all formal and informal leadership, volunteers, public works people, anyone you can convince or enforce to show an example. Analyze the information consumption patterns of each segment and sub-culture of population and identify the best "influencers". c. Instead of putting together health administrators to work out the problem in hand put together a group of best marketing people in the country. Change in behavior or desired behavior is a product that needs to be marketed the best, just as Coca-Cola.
Emotional reactions	Emotional reactions from the citizens like anger, frustration
People's attitude against institutions	people are tired and become reluctant against institutions and containment measures
Use local community organization leaders	Use local community organization leaders as role models and mediators for raising awareness Local authorities identify e.g. religious leaders, minority representatives, different NGOs and establish information strategies that they will integrate/communicate with their members
Information strategy	Most of the essential information and communication should take place locally, via local authorities.

Social media channels to communicate with youths	Using popular social media channels to communicate with youths Reach out to youths on the channels that they use, to accommodate challenges concerning that youths do not use formal information channels, and therefore behaving on the contrary to expectations
New way to communicate and engage with people	It is getting hard to reach people with social media, there is a need of a new way to communicate with people and engage with them
Criminality changed new criminal activities are occurring	Criminality changed new criminal activities are occurring People are taking advantages on new problems
Hard to understand how to support weak people	Hard to understand how to support weak people, e.g. financially hurt people
Lack of tools	Lack of tools to examine the sources of information like NewsBrief
People are tired of new solutions	People are trying to follow the rules but there is a big gap due to the economic differences. Poorest areas have less awareness
Implementation Challenges	Descriptions of Challenges
Challenge: who is the central authority	
Communicate in different languages	
One central authority	Potentially value of one central authority, homogeneous information - less confusion
Information is drowned	Information is drowned in social media in the middle of many other voices (including fake news)
Digital literacy is diverse	
Mainstream media propagating fake news	
Difficult to identify channels and amplifiers	Channels and amplifiers might not be known outside of the target group
COVID fatigue	

GROUP 3 - QUESTION 2

How to communicate with the public about the new procedures, dealing at the same time with the feelings of hope and anxiety, and keeping the need of protective measures?	
Problems/Solutions Group 1 and 2	Description/comments of the Problem/Solution
Communication not only focused on health	Example: Red Cross COVID information, addressing also mental health, social life, etc.
Focus on persevering	Focus on persevering for a small amount of time. Focus on the liberty afterwards.
App to show tested positive	App to show tested positive, or app to track vaccine
Involve Stakeholders	Start from the stakeholders since they are the ones in interest. They should stimulate population more than the government
Using volunteers to engage people	Using volunteers to engage people more through a different communication
Green passport	Immunity passport will allow you to participate in social activities (theatre, malls, study on campus) Associated (in Belgium) with other constraints - e.g. negative tests
Return to work	Communicating on measures, guidelines Means to monitor and share situation e.g., how many people are in the floor plan / density threshold automation for triggering contact tracing based on badge scanning Updating on public health advice Empowering recipient of information Example (bad): for people that don't adhere fines are implemented. Fines are increased all the time. Most people don't pay them more and more lawyers are involved to dispute the fines. Giving positive incentives seems to work better.
Targeting the people	Targeting the people, dividing them in subgroups and work on their specific needs Comment: Use marketing methods just as you would advertise a product. In this case the product is desired behavior
Test new solutions to track the population	Test new solutions to track the actual status of the population and see how it is possible to open some part of the economy (e.g. cinemas, theatres)
Create tools to control the fake news	Provide the correct tools to survive in the pandemic, no campaign, not a lot of noise but start from the tool
Stakeholders view of risks	Ensure stakeholders have a complete and timely view of risks, impacting their assets, including changing conditions from COVID-19 other threats such as civil unrest and natural disasters.
Self Testing	People can test themselves by buying it in the supermarket Comment: Need to be organized

Risks on assets	Ensure stakeholders have a complete and timely view of risks impacting their assets, including changing conditions from COVID-19 other threats such as civil unrest and natural disasters.
Find solutions to new criminality	
Use App for variants	Use the App for genomic surveillance and track the variants
Return to campus app (Everbridge)	Return to campus app (Everbridge). App description will be shared
Educate people on communication	Educate people on how to handle communication, how to do remote work
Incentives to maintain social distancing	Focus on upcoming holidays, later benefits, to accept restrictions during first holidays
Digital contact tracing	Supports peace of mind beyond immediate beneficiaries (e.g. family)
Focus on inclusion	Need to address vulnerable groups, different means to reach them
Unify communication efforts	Unify communication efforts, make people realize that first responders, governments are all on the same line
Change Communication Strategy	People now that there is covid, the message has now to be softened, reminder can be daily and not big alerts. Adapt the communication to the tiredness of people, for example with small reminders and no big campaign or they lose trust in the government

Implementation Challenges G 3	Descriptions of Challenges
Fear of compromised personal data	
Unified Communications effort	Coordination policy communications is specially critical in the case of a Health emergency such as COVID 19. There are several institutions involved (health, civil protection, defence, education, etc.) at different level (national, regional, municipal, etc.) So, it is important to establish an inter-ministerial committee at two levels, political and technical to coordinate communication policy.
Communication channels need time	Communication channels need time to be well known A lot of solutions include some kind of communication aspect between authorities and citizens. In addition, to reach a wide audience, different communication channels are needed. However, these communication channels need time to be well known and used by the public. Communication should be established in the context of preparedness actions, before the need to use becomes important.

Inclusion	<p>Communication plans addressed to people with disabilities requires a comprehensive accessibility and universal design incorporated to make sure the message is fully accessible for all in accordance with Universal design principles. In this regard, technological advances provide tools and applications that can be extremely useful for assisting institutions with this task.</p> <p>The different disability associations have shown their firm determination to attain complete integration into society; we have to work in close contact with these associations.</p>
Use the informal leadership	<p>Identify informal leadership for different communities make sure they deliver the message of hope and resilience</p>
Education	<p>The education in the schools, at the early stage and further, is part of Risk Communication but a difficult challenge to arrive to all students. So we can use as many resources as possible as civil protection volunteers to help officials in this challenge once coordinated.</p>
"Alarm effect"	<p>Balancing against the "alarm effect" that increases instrumental fear or risk awareness</p>
Low trust in formal authorities	
Family life and children	<p>If kindergartens and schools are closed, parents must be stimulated to take their children on outdoor activities. Places must be established where such activity can take place in a safe manner. Keeping children active is good for the family's psychosocial situation.</p>
Concrete relations	<p>Show the concrete relations with regions complying with vaccination and the opening up of societies to encourage compliance</p>
Focus on message	<p>Focus on message of hope and resilience</p>
Be creative	<p>Be creative - unique mask as fashion statement</p>
Psycho-education for all	<p>Educate people on coping skills - how to identify stress reaction and how to self-support or to help others. How to identify stress among children and which methods to use to decrease.</p>
Media and the health authorities	<p>Local media must be stimulated to show examples of optimism and hope. It is important that the media do this with high editorial integrity, but the individual editor must be invited to a sensible dialogue with the health authorities.</p>
Positive motivation	<p>Positive motivation - vaccinated get to go back to normal life (almost)</p>
Help the Helper	<p>Help the Helper - Self-care for first responders, medical and psychosocial personnel Be aware of extreme burn-out and in many cases compassion fatigue among the helpers. Teach them to self-diagnose and coping tools.</p>

GROUP 1 - QUESTION 3

In this new scenario, there is still a high degree of uncertainty. How would you involve citizens to adopt a responsible attitude according to the evolution of the situation, for the better or the worse?

Problems/Solutions Group 2 and 3	Description/comments of the Problem/Solution
Mass alerting	Mass alerting to improve last minute availability of vaccines
Develop incentive system for testing and vaccination	Incentivize citizens for testing for corona virus, so that authorities could detect cases despite lower risk awareness and compliance with test regimes. Similar could be done for vaccination.
Local organizations	Local organizations of many kinds (football teams, chess clubs, scouts, etc.) have responsible management and members with great confidence. Communication through such groups can strengthen trust in the information provided.
Enhanced cooperation with civil society	At national or local level Difficulties at local level
Issue: cacophony of information	
Emotional context	Large emergencies have a significant emotional impact on the population that can affect how the facts are perceived and even their critical thought surrounding the circumstances. In this emotional context, regular communication techniques are no longer effective. In times with turbulent emotions, some specific characteristics of communication must be born in mind in order to be more effective taking into account, considering citizen's sensibilities. Large emergencies require immediate reaction transparency, understandable, precise, relevant, suitable timeline information.
Input from local leaders	Develop solutions based on input from local leaders of communities and organizations. Being sensitive to the context and trends, use actual knowledge from various organizations in the communities and their leaders to provide specifically tailored measures.
Involving citizens	If we want to involve citizens we must treat them not just as a victim but an active action and make they know we trust on them. Authorities trust is important but we should have got it in advance, now is time to keep this trust but also to trust the citizens.
Keeping the population informed	When population is given information, their behavior is improving, they respect sanitary measures
Enhancing education	Enhancing education about health aspects: infection, vaccination
Responsibility	One must locate those who spread false news and incorrect information, and make them aware of their responsibilities.
Explaining measures	It starts with explaining why certain measures have to be taken. This will improve your support base

Communicate with citizens	Communicate uncertainties to citizens and highlight worst and best possible consequences when different infection scenarios are chosen.
Volunteers to organize logistics of care	Volunteers to organize logistics of care Support medical services with volunteers to organize logistics of care (vaccination, waiting lines, and enforcing hygiene measures).
Involve citizens in problem-solving through digital panels	Giving the citizens a sense of participation and a possibility to influence decisions might increase the compliance of the needed behavior and actions. For example: What is the most important thing for you to continue doing despite corona restrictions? What is the most difficult to comply with? -> Foundation for making risk-based prioritization
Certification of information	Certification of information: coming from official source
Establish a communication strategy	Establish a communication strategy and the necessary channels between authorities and citizens. The public should be able to easily access information about the authorities plan, how it is being implemented and the progress, also making clear the benefits of the plan and understanding the consequences of putting it at risk by not following it. Several communication channels should be available to suit the varying information needs of citizens. In many previous cases, also when COVID started in Europe, emergency services receive an increased load of emergency calls (putting at risk other citizens who need urgent access to emergency services). Previous practice shows that having already established and well known non-emergency numbers help reduce the emergency call load.
Use community leadership	Each of us is part of community or meta-community (for example I am part of parents to high-school kids community, also part of retired military community, also Russian-speaking community etc.). Not necessary physical, such as city I live in. We need to identify who would influence best the meta-communities and who would motivate them to take responsible action. Use not only appropriate person that has an impact in this community, not only the appropriate language and terms but also the right channels of information delivery for each sub-group or virtual community.
Communication from official source	Communication from official source to avoid misinformation
Implementation Challenges	Description/comments of the Problem/Solution
Campaigns to educate citizens	Campaigns to educate citizens in to the new normal Deep Blue Team Solution: Start from the New Normal, SWOT analysis
Organize Volunteers	Platforms to organize Volunteers in a more sufficient way

Reach the people	Communication doesn't reach the people anymore, they are tired and lost trust
Highly subjective	It is highly subjective, think of internet, think of USA where Trump was the one creating fake news.
Platform for training	Provide training is hard and there is a lack of platform to handle them
No trust anymore	People do not trust official sources anymore
Bureaucracy	In some countries bureaucracy is a big obstacle
No sense of community	There is no sense of community, people are tired
Anonymous fake news	Freedom of speech and anonymous fake news
Depend on the country	May be very different from country to country

9.2.4 OBSERVATIONS FROM THE EXERCISE DYNAMICS

We now list the issues we observed during the KI-CoP Workshop.

- **Division into sub-groups**

This seems to work better than a single group in the preparation workshop¹. However, it is important to balance the distribution of participants according to their profile. During the first part, the subgroups generated the same approximate number of solutions. With less people in the subgroups, the interaction worked smoothly.

- **One single scenario and two questions.**

The use of single scenario with only three questions worked better than in the first workshop. Each subgroup initially worked on two of these questions and in the second part, the subgroup worked on the other question, which was filled with the contributions of the first interaction.

- **Expand the analysis and commenting session**

The division into two sessions worked better than in the first workshop.

- **Complement the contribution in Miro with live discussion using Zoom**

That worked better than the first workshop. However, we noticed that some participants only used the Zoom during the session, abandoning Miro and creating some noise to those who wanted to concentrate in the Miro environment. To be discussed if another workshop is planned.

- **Planning and Timing**

The schedule worked better in this Workshop.

- **Plenary sessions**

Although we allowed more time for the general discussion and brainstorming, we noticed the interaction during the plenary sessions was not that intense. Perhaps, we still need to work on the language barriers. We need to find ways to promote interaction beyond the MIRO environment.

- **Discussion about the implementation challenges**

This worked in part. One subgroup was more active than the others, generating more challenges. In any case, it worked better than the barriers, used in the first workshop.

¹ See the Report of the Preparation Workshop in the same folder.

9.2.5 CONCLUSIONS

Despite of the problems, which we considered minor, the KI-CoP workshop went well and produced the results we expected. The use of the MIRO environment as a supporting tool was not unanimous. Most people prefer talking which creates barriers to participation and additional work in transcribing. Besides, we lose the parallel effect. This is an open problem in the area of collaboration support that will need to be addressed as a solution to the workshops, as well as a solution to engage the society. Some supporters of the writing approach say this problem may disappear in future generations.

Report prepared on March 23, 2021.

Marcos Borges, Leire Labaka, Sahar Elkady and Josune Hernantes

ANNEX 1 – POTENTIAL LIST OF PARTICIPANTS

Those were the people who were indicated to participate in the Workshop. Some confirmed, others not.

PARTNER	Profile	Country
NGO	First Responder	Italy
ERTZ	End-user	
	First Responder	
DEEP BLUE	Project Member	Italy
Everbridge		Netherlands
SINTEF	academic	
SINTEF	Project Member	Norway
	First Responder	Israel
TAU	Project Member	Israel
NGO		
	End-user	
	First Responder	Netherlands
ENS	Project Member	
DSU	Authority	Romania
	Authority	
	First Responder	Spain
NGO		Norway
TECNUN	Project Member	Spain
TECNUN	Project Member	Spain
TECNUN	Project Member	Spain
TECNUN	Project Member	Spain