



CRISPRO: Security and Protection through Knowledge

Synergies

Title: Assessment Tool

D 2-1

Version Draft/Final	Date dd/mm/yyyy	Author(s) and/or Unit	Confidentiality level Public/Confidential*	Comments:
Draft v. 1.0	September 2021	Galya Terzieva	Confidential*	Development of the questionnaire
First version of the products	02.10.2021	Galya Terzieva Lenka Brumarova Contribution Davide Niozzo	To be published on a short description on the website and online app by end of April 2022	Analysing methods and input data from the other deliverables
Final Version	05.12.2021	Galya Terzieva	Public – restricted to outreached persons, to be public by may 2022 <a href="https://docs.google.com/spreadsheets/d/1ZHVTYHfhLRz66K9zYKTRZ3N0Y0CR8nJ3/edit?usp=sharing&amp;oid=115366458220224449038&amp;rtpof=true&amp;sd=true">https://docs.google.com/spreadsheets/d/1ZHVTYHfhLRz66K9zYKTRZ3N0Y0CR8nJ3/edit?usp=sharing&amp;oid=115366458220224449038&amp;rtpof=true&amp;sd=true</a>	Submission to DG ECHO

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**CRISPRO: Security and Protection through Knowledge Synergies.**

**No: 101017877**

UCPM-2020-KN-AG – Networking Partnership.



**SECURITY  
AND  
PROTECTION  
THROUGH  
KNOWLEDGE  
SYNERGIES**



Funded by  
European Union  
Civil Protection and  
Humanitarian Aid

*"This document has been produced with the assistance of the European Union. However, the contents of this document are the sole responsibility of implementing partner and can in no way be taken to reflect the views of the European Union."*

## 1. PROJECT CONTEXT

### 1.1. Project overview

CRISPRO gathers partners, networks, past/ongoing project initiatives, integrates knowledge with any widespread and borderless disasters and emergencies, and faces the most significant risks:

- The climate emergency
- Safety and security of societies
- Disaster resilience of the communities

CRISPRO is a diverse consortium of public and private actors, scientists, security, health, civic awareness and educational associations from Slovakia, France, the Czech Republic, Portugal, Finland and Italy. We also involve associated stakeholders from Bulgaria, Finland, Italy, Spain, Turkey and East and Central Europe Associations of Municipalities and Regions.

### 1.2. Specific objectives

Integration of methods, systems and tools from various sectors and countries will strengthen and build a resilient environment and communities in response to combined emergencies of threats, hazards, pandemics and societal shocks. We believe that achieving more practical planning and assessment of all societal, health, and natural disasters will enable more excellent emergency response and interaction of experts from multiple sectors. The overall Call objective 1 is to support disaster risk management actors promoting and facilitating the development, dissemination and exchange of knowledge, good practices. We will achieve that level of quality expertise by promoting the new technologies and innovative approaches in prevention, preparedness and response are developed, tested and disseminated. In addition, our network seeks to integrate good practices, recommendations, and lessons learned in prevention, preparedness and response. We are working on various communication and participatory formats of actions to collect, review, share and apply lessons learned and benchmark good practices in real-time emergencies and mitigation interventions. Further, the communication model in working groups and a thematic expertise committee enables the development of a sustainable network of civil protection and risk management professionals.

The impact of the project intervention will be a stepping-stone to achieve a greater multi-sectoral approach and demonstrate the advantages of networking through practical demonstration of the cooperation framework. Pro-active consideration of relevant horizontal issues includes gender, age, people with disabilities, ethnic minorities,

environmental sustainability, green economic practices, resilience in infrastructure, and the protection of cultural heritage.

### 1.3. Target groups

- Self-governing authorities are interested in gaining more knowledge and building proper communication with the rest actors as emergencies happen in their regional territories. The towns and municipalities need to be better prepared and mainstream/invest in mitigating risks and effective response.

- Decision-makers and ministries are critical actors for developing related policies, increasing investments in technologies and risk assessment of combined and all-hazards emergencies.

Crisis managers and civil protection actors need to increase their coordination activities with scientists and local self-governments, and local actors work with vulnerable groups. First responders can favour technology development and specialists' involvement in emergency response actions and risk analyses.

- Universities and research institutions bring more knowledge about natural and social resilient factors heavily impacting emergencies, all-hazards, and health situations.

- Scientists can bring knowledge about climate changes, chemical and physical data relevant for the modelling of emergency assessment planning and assessment (environment, chemical, hydrology, climatology, geology)

- Technology related experts and IT developers bring information and advanced technologies for mitigating gaps in emergency assessment and all-hazards and public health pandemic management.

- Health sector actors are gaining access to rest actors and enable medics to better coordinate emergencies related to public health and knowledge for epidemic and pandemic diseases.

- The human and social science sectors bring information about behavioural trends and community habits. Moreover, it also facilitates communication with vulnerable groups of homeless, elderly persons, ethnic minorities, migrants, asylum seekers, etc.

- Educational and social services actors facilitate contact with the general public and schools and introduce public awareness activities to strengthen knowledge.

- Strategic infrastructure actors are essential partners in assessment, planning and response activities. For example, in an emergency, cause those actors to ensure critical water and electricity supply services, transport infrastructure, etc.

- Research and think-tank organisations bring knowledge on building better understanding, processes, and policies supporting resilient societies.

## 2. Assessment tool

**Explanation:** CrisPro project aims to develop a practical tool for assessment of the threats to gaining adequate knowledge on how to mitigate risks by investing in capital infrastructure, soft regulation changes, amendments of community habits, changing the economic profile, raising more quality assurance requirements to industries transport and chemical industry, farmers and managers of critical, strategic and soft infrastructure. The tool shall guide the policymaker, decision-makers and crisis managers, private companies, scientists and NGOs on working together to make societies resilient to global trends such as climate change, urbanisation, industrialisation, and smartening of the infrastructure and utilities, trading and health issues.

The tool shall support the design of local planning by proposing good practices, such as those collected by the case study deliverable. The Flexi risk check shall lead to adapting and building resilience to disasters, threats, and hazards by assessing, planning, preparing, and learning from mistakes and the scientific resilient-driven approaches. The aim is to reduce the vulnerability of the community, area and society and build the capacity for reaction by adopting scientific advances and technological opportunities combined with strategic management.

The tool focuses on the hazards, drivers of disasters and incidents, models of cascading effects, vulnerability and exposure indexes, scenarios, and tools to understand social and economic constraints and opportunities facing households, businesses, and governments that make use of planning for disaster risk management. In addition, experiences from past events are important to manage, organise, and invest in the current events to mitigate the risk in the future.

The aim is to bridge the gap between first responders, municipalities, public service providers and first responders and to foster collaboration through the development of more integrated and coordinated approaches improving the safety and security of soft targets, to prevent or mitigate the impact of natural, biological and technological threats/hazards, and to learn from past events effectively.

## 2.1. Perspectives to risk assessment matrix

CRISPRO consortium has studied and explored various available online tools, just like the one QRE promoted by the UNDRR<sup>1</sup> about assessment of the level of risk and the SMR Project<sup>2</sup> tool, which focuses on the relative likelihood of a broad range of risks in cities.

We know some main types of risk assessment methods :

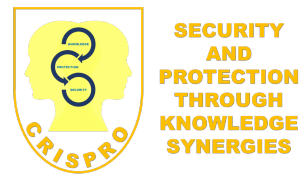
- **Deterministic methods** measure the impact of defined risk events to prove that consequences are either manageable or capable of being managed. The model is heavily dependent on data and providing real values whilst a more robust framework is constructed. The process of developing deterministic stress and scenario sets can also be a means to engage a range of experts and stakeholders in the risk analysis process, gaining buy-in to the process.
- **Semi-quantitative risk analysis** categorises risks by comparative scores rather than by explicit probability and financial or other measurable consequences. It requires inserting a reality check. We can use Semi-quantitative methods to illustrate comparative risk and consequences in the form of risk matrices and traffic light rating systems (for example, red is a severe risk, orange is medium risk, yellow is low risk, and green is very low risk).
- **Probabilistic risk analysis** is an academic method that attempts to associate probability distributions to frequency and severity elements of hazards and then run thousands of simulated events or years to assess the likelihood of loss at different levels.

We also examine the risk assessment approaches developed in each partner country. For example, Slovakia is promoting a new GIS-based crisis management approach aggregating and analysing data to provide a complete profile of all affected objects, processes, etc., in a particular territory (exposure). It is combined with embedded functionalities to calculate the area of impact, persons, damages, etc., by using scientific acknowledged mathematical models and official chemical libraries or other indices concerning economic, social and other aspects. The Czech Republic uses a rigorous method for calculating the level of the risk using a combination of risk matrices (1-3) and scenario-based hazards attributes/profile. The model of the Finnish government is rather focussed on the analyses of the threat scenarios leading to any form of societal disruption.

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<sup>1</sup> <https://www.unisdr.org/campaign/resilientcities/toolkit/article/quick-risk-estimation-qre.html> or list of tools on <https://climatescreeningtools.worldbank.org/useful-resources#othe-tool-ini-res>

<sup>2</sup> <https://smr-project.eu/home/>



Considering that a multi-national assessment tool could not rely on critical values, a numerical model is considered impossible and more complicated to achieve the ultimate goal of resilience. By capitalising on best practices and promoting trends along with the global factors of societies interconnectivity, we propose a model of risk mitigation assessment for the policymakers, stakeholders and civil protection. They can use it to properly understand or explain how to make sound investment and contingency planning and communicate public spending for security and safety with the individuals.

We devise an appropriate form of risk analysis that follows the purpose of gaining knowledge through Flexi check and vulnerability-driven simple scenarios to full probabilistic analysis, but all shall lead to better decision-making.

CRISPRO aims to facilitate the local, city, and regional actors with greater knowledge and skill on how to analyse and mainstream disaster risk reduction issues in planning and capacity building as societal shocks and stresses caused by disasters are critical and essential for the well-being of the citizens.

Damages and losses of disasters and crises easily impact the political and economic stability on the regional and local levels. Unpreparedness and lack of experience of political leaders to challenge extraordinary events badly impact their positive ambitions because they have to challenge extra costs and unexpected problems concerning citizens, economic actors and public facilities or open spaces.

On a decentralised level, decision-makers and private actors shall cooperate to prepare and mitigate disasters' potential risks jointly. These critical and extraordinary events can y impact any societies' strategic plans and socio-economic soundness.

The local leaders need to carefully devise a strategy to challenge vulnerabilities for sustaining society's resilience against multiple sources of threats, multiple shortages of capacities, knowledge, technologies and contingency planning for every type of incident, extraordinary event. However, the tool concept is on resilience against vulnerability and multiple aspects. We aim to communicate resilience as a centralised new philosophy of the security threats strategies and civil protection plans on any level and to demonstrate how benchmarked experience from D3.2.

We can unwrap the potentials of the new technologies, better evaluate the lessons learned from historical events (also traditional prognostics), and promote active citizens' participation in the reaction process. Also, we can promote the need for a societal change of habits, regulations, processes, etc., that are usually a subject of public curbing.





The vulnerability framework presents the interconnection between decision-makers and multi-hazard societal exposure leading to vulnerability.

ROOT CAUSES	⇒ DYNAMIC PRESSURE ⇒	UNSAFE CONDITIONS ⇒	DISASTERS	← HAZARDS
Limited access to Resources	Lack of Institutions	Fragile physical environment Dangerous locations	RISK	Earthquake
Structures	Training	Unprotected structures	=	Wind storm
Power	Skills			
Early warning system	Investment	Fragile local economy		Flooding
crisis management	Markets	Livelihoods at risk	HAZARD	
Interoperability + SOP	media engagement	Low income		Volcano
Specific technologies and equipment	civil society	People living at very low hygienic standards	+	
Ideologies	local construction and other regulations	Vulnerable society		Landslide
Politicise system	Macro-forces	Groups at risk	VULNERABILITY	Drought
Economic system	Population growth	Little capacity to cope		
Social system	Urbanisation			Virus and pest
Cultural habits	Arms expenditure	Public actions		
Family traditions	Debt repayment	Lack of preparedness q interoperability + local decision makers lack of response		Heat wave
	Deforestation	Endemic disease		
	Soil degradation			
	Smart economy			

## 2.2. Tool aims to assess

The tool is designed as an intervention matrix split into four groups:

- (1) type of event and cascading or multi-hazards,
- (2) vulnerability issues - exposure,
- (3) capacity in terms of people, resources and knowledge, technologies, and finally
- (4) measures, planning, investments.

All these four parts of the tool are to support the target groups in better managing their community or area of interest by considering multiple factors and effects.

(1) **type of hazards**, their effects, reasons for triggering the hazards, events and drivers of the events, what causes the extraordinary event, identification of threats and trends in disasters

(2) **exposure**: affected area, people, minority groups, vulnerable groups, affected critical, strategic and soft infrastructure or natural protected area and cultural objects or tangible cultural assets

(3) forms of **reaction and capacities**, knowledge and sources used based on historical and practical experience, how the community is involved, what type of intervention units are used and practical experiences in your organisation, sources of and vulnerability of communities to natural, technological and biological threats/hazards.

(4) threat **General threats**: the amount of danger in a given circumstance; and specific threats: a specific object, situation, behaviour, etc., that corresponds to a rising level of danger within a given context.

## 2.3. Implementation method

The tool is the main product of the project CRISPRO. However, it capitalises on partners' knowledge presented at the thematic webinar meetings focused on new technologies and processes for assessing the multi-hazard profile of crises and disasters today. It also integrates results from a survey mapping the ongoing disruptions and disaster trends in various EU MS. In addition, the tool is structured as a framework based on the case studies exercise that outlined some critical issues concerning the model of ongoing and expected crisis and disasters in Europe.



Last but not least, the tool will be tested via tabletop exercises (TTX) and respectively amended following results of the work of participants of the activity. The tabletop exercises will be held in March-May next year in 2022. By that time, we will consult the tool's content by organising working group sessions online with partners.

By the end of the project, the tool will be placed on the network's website and promoted via instruction seminars to multiple actors.

The tool introduces hazard indicators and other indicators for regulating risks, vulnerability, exposure, capacity, and planning (mitigation and investment measures). Indexes and attributes of each category are grouped (presented in colours).

The assessment tool is focused on profiling the disruption of the community and economic life and basic living and working conditions of a community and/or society in any size of a city or smaller municipality. It enables decision-makers and crisis managers, and politicians to profile the disaster from four major aspects: what happens, how it develops, what triggers and amplifies the disaster, how it affects the territory, the public and private assets, human life and health and in particular vulnerable groups and minorities. Further, the tool examines the sources, knowledge and capacities needed or in place for reacting and coping with the disaster.

Finally, we get to the conclusions and lessons learned concerning the development of capacities, measures, change of behaviour, regulations, and delivery of investments and actions that minimise the risk of the return of the crisis or extraordinary event or reduce the negative impact of shocking and lesser anticipated situations.

The most difficult part of the assessment tool is defining the level of damage for a specific community. While in small villages, a small brook flood can destroy almost more than half of the households, it can be considered a small incident in a city. In some cases, the return period of a natural disaster is the most critical element of risk assessment, for example, floods. We expect regular floods even twice a year in small municipalities with devastating damages for such a small community. Like earthquakes, it is the magnitude of the phenomenon in other cases. In the case of the pandemic public health crisis, a significant indicator for the worsened and critical situation is the number of affected people out of one hundred, number of positive persons out of 10.000.

The tool is a type of intervention matrix for better analysing and thinking over the political and human factors. For example, the same flood in a city or a rural area can have completely different cascading effects and implications. In the city, it may affect public transport and

interrupt regular work life and require very quick response and involvement of a lot of technical equipment and a lot of people to return fast the life to its normal. Contrary, in a smaller rural municipality, a flood can be a disaster for the agricultural community. We will break priorities into topics. We will run scenarios via focus group work and tabletop exercises to prove the main priority and define the main priorities for increasing coping capacities.

We will build scenarios on the diverse environment proposed by all consortium partners. We gather over 11 European countries and partners with a greater knowledge of the needs of rural areas, coastal, mountain or agriculture field geomorphological areas. By testing the same type of threats/hazards and events in different scenarios (for example, country/region A, B, C, etc.), we will identify the weaknesses of different areas/municipalities. Furthermore, we will use our assessment tools to observe the hazard and mitigation measures' profiling and plan per affected area, population and economy.

During the tabletop exercises, we will ask students from Genoa University to be mentoring the work and become observers who will compare the results of the tabletop exercises with the interactive intervention matrix of the e-tool. As a result, we will produce data to analyse the contingency measures and provide data to improve the assessment tool.

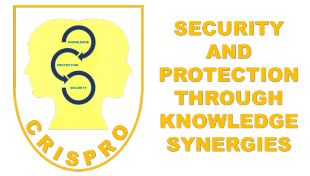
## 2.4. Next steps

- Present the draft of the tool for the launching of the working groups
- Make a plan for working groups/experts events (min. four meetings)
- Discuss each part of the tool
- Prepare a questionnaire for the stakeholders who will participate in the TTX
- Develop a list of partners
- Set a programme
- Distribute the programme to TTX by the end of February to partners
- Identify the place for the TTX
- topics:
  - (critical infrastructure)ports and combined threats (chemical and cyber)
  - (natural disasters sources by human activities and natural phenomenon amplified by the climate change) landslides, fires and floods in a combination follow the A Coruna example
  - Anthropogenic and sociogenic stress of the society due to migration and/or any economic determinant change for the local community

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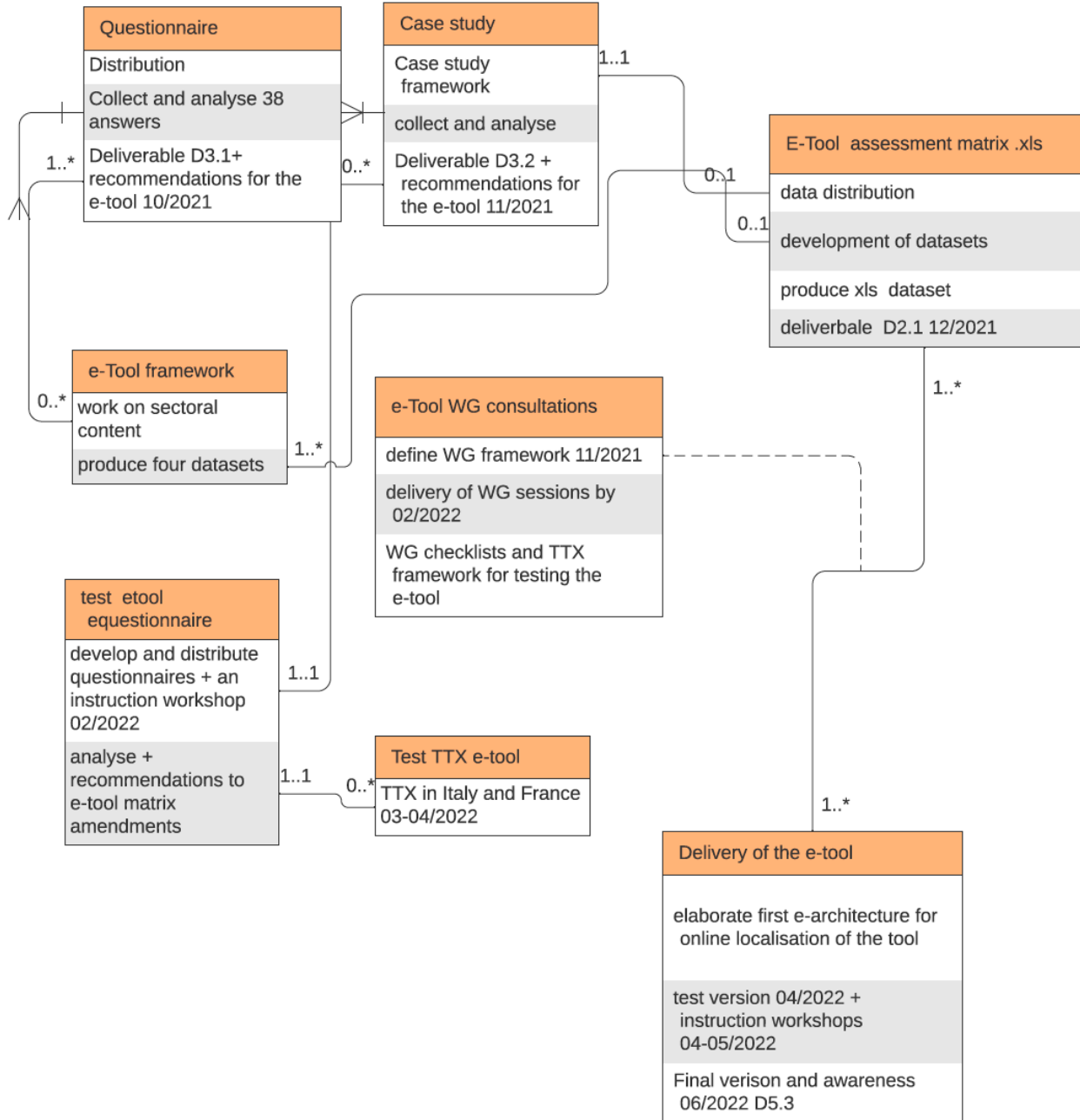
- (social impact, culture-change and traits vs economic and social systems stability of the EU and environment and societal degradation in the poorest countries)migration, climate change, refugees and support to Schengen border countries
- (low return, large exposure, unable to introduce structural measures)earthquakes and tourism
- climate change and mass exploitation of natural sources)draught and farming in big cities.



### 2.4.1. Roadmap

#### ROADMAP Production, testing and dissemination of the CRISPRO e-tool risk assessment matrix

galya | December 3, 2021





### 3. e-tool Matrix description

The e-tool Matrix is composed of two parts. It will be tested offline in the upcoming months with selected numbers of crisis leaders.

A) First part is an interactive model of breakdown of activities and indexed events, sources, capacities, technologies and processes are broken down per categories (hazards/events, capacities, reaction, mitigation and planning measures) as below demonstrated in the table, colouring distinguished,

B) Second, a **scenario-based assessment** of the potentials and opportunities for strengthening the resilience of the communities

#### 3.1. Flexi check of provisions vs planning

##### How will it work?

The user will select attributes to form the cascading lists to each subcategory in the first three thematic categories. The selection of indexes will form the repository of the scenario.

In the final section, the user will select from introduced/mapped scenarios. Also, the user will be able to add his/her scenario description, and the system will add it automatically to the list of preformatted scenarios. It will be functioning as a self-learning platform.

The final 4 subcategories provide a list of measures, etc., as preformatted ones. The user can select from the preformatted measures and add his/her provision proposal.

During tabletop exercises, we will consult the measures with the mentors. The system shall provide preformatted measures to scenarios based on the nature of the extraordinary event/disaster.

hazard	→	01_What type of disaster/extraordinary event
	→	02_Catalogue of hazards
	→	03_Caused by/drivers
	→	04_What combination of threats cascading effect
	→	05_frequency_return



	→	06_affected supply of medicines
	→	07_affected supply of goods
	→	08_loss
	→	09_Identified affected population
exposure	→	10_Affected area
	→	11_Affected natural environment
	→	12_Affected critical or strategic infrastructure
	→	13_Affected minorities
	→	14_Affected soft infrastructure
	→	15_Affected vulnerable groups
	→	16_Loss of life/ injury
	→	17_Identified critical assets to be protected
	→	18_Major damage (not only structural damage, but also non-structural )
	capacity	→
→		20_Access to intervention teams amidst disaster
→		21_Involment of media, NGO, Mayors
→		22_Access to technologies, tools amidst disaster
→		23_Response efforts immediately after the hazard, strategic planning, awareness, community activities, intervention, training, analysis, planning, and policy development.
→		24_Recovery efforts after the hazard (what recovery plan)
mitigation and planning	→	25_Scenarios
	→	26_Soft measures improvement in disaster risk management: regulations
	→	27_Major preparedness/ DRR measures prior to the hazard investment capital
	→	28_Catalogue of measures

Each of the above 30 categories comprise a list of attributes assigned to events, measures, capacities, hazards, etc.). These 30 categories are grouped in four sections a above mentioned.

### Hazards related categories

In this part the user will select attributes to each subcategory

<p><b>01_What type of disaster/extraordinary event</b></p> <p>Natural phenomenon                      Disruption of supply                      Chemical incident                      Transport incident                      Technical failure                      Human, animal or plant diseases                      Public disorder                      Cyber-attack/hacks/fishing</p>
<p><b>02_Catalogue of hazards</b></p>





Categories	Subcategories	Abbreviation
Geophysical	Earthquake	EQ
	Landslide(land degradational)	LS
	Volcano	VO
	Tsunami	TS
Hydrological	Flash flood	FL
	River floods	RF
	Coastal floods	CF
Meteorological	Avalanche	AV
	Flood	FL
	Cold wave	CW
	Heat wave	HW
	Thunderstorm	TH
	Strong wind	SW
	Marine phenomenon	MP
	Atmospheric phenomenon	AP
	Cyclone	CL
	Drought	DH
Climatological	Wildfire	WF
	Subsidence	SD
	Air pollution	AP
Biological	Environmental degradation	ED
	Infection diseases	ID
	Bacterial diseases	BD
	Virus	VI
	Fevers	FE
	Plant diseases	PD
	Animal diseases	AD
Technological	natech environmental damage	NT
	CBRN	CBRN
	Construction failure	CF
	Technological failure	TF
	data-related failure	CC
	Industrial	IN
social transport	Contamination	NA
	Transport accidents	TA
	Civil disturbance	CD
	Economic	EC
	Extra terrestrial	ET
<b>03_Caused by</b>		
chemical accident		
climate change		
cold draught		



earthquake  
extreme high temperature  
extreme low temperature  
hail  
human failure  
ice  
intruded smart systems  
landslide  
rainfall  
strong wind  
technological failure  
tornado  
viruses  
Strong breeze 45-50 km/h  
Strong gale 76-86 km/h  
Whole gale 87-102 km/h  
Storm 104-117 km/h  
Hurricane 119-196  
Strong breeze 45-50 km/h  
Strong gale 76-86 km/h  
Whole gale 87-102 km/h  
Storm 104-117 km/h  
Hurricane 119-196  
Richter minor 2.0-3,9  
Richter light 4.0-4.9  
Richter moderate 5.0-5.9  
Richter Strong 6.0-6.9  
Richer Major 7.0-7.9  
Richter Great 8.0 and more  
Ionising  
Chemical  
Toxic  
Lengthy exposure to cold weather  
Lengthy exposure to hot weather



#### 04\_What combination of threats cascading effect

Natural disasters and critical infrastructure + Natural disaster (fire) causing biological threat and social and economic disorder  
Health threats and natural disasters + Natural disaster (fire) causing biological threat and social / economic disorder  
The natural event causing biological and health emergency  
Public disorder(terrorism, extremism actions) amid a pandemic situation  
Hybrid threat on critical/financial, data and physical infrastructure amid natural disasters  
Chemical incident causing public disorder and health problem  
Chemical incident affects public health  
Floods causing public health problems  
Na-tech technological failure causing fires and life loss  
Na-tech smart systems failure cause supply shortage and diseases  
Na-tech floods, fires, wind destroys the supply system cascading effect health problem and social and economic disruption  
Na-tech extreme weather triggers fires, floods, landslides, coastal degradation, contamination of farms, leading to employment and income-generation instability  
Health threats and natural disasters, Natural disasters and critical infrastructure, The natural event causing biological and health emergency  
Public disorder(terrorism, extremism actions) amid a pandemic situation  
Espionage (organisational or individual), Cyberattack, Information control and overtake, Fake news on social media  
Health threats and natural disasters, Natural disasters and critical infrastructure, Social disorder (public evacuation) and biological threats,

#### 05\_frequency\_return

Once á year  
Twice á year  
Once per 3 years  
Once per 5 years  
Once per 7 years  
Once per 10 years  
Once per 15 years  
Once per 25 years  
Once per 50 years  
Once per 100 years

### Vulnerability categories

In this part the user will select attributes to each category information about the vulnerability of supplies, people, areas, objects and strategic, critical and soft infrastructure

#### 06\_affected supply of medicines

affected 10% of supply  
affected 20% of supply  
affected 30% of supply  
affected 50% of supply



<p>Affected more than 51% of supply</p> <p><b>07_affected supply of goods</b></p> <p>affected 10% of supply of goods</p> <p>affected 20% of supply of goods</p> <p>affected 30% of supply of goods</p> <p>affected 50% of supply of goods</p> <p>Affected more than 51% of supply of goods</p>
<p><b>08_loss</b></p> <p>affected 10% of the VAT contributors in region</p> <p>affected 20% of the VAT contributors in region</p> <p>affected 30% of the VAT contributors in region</p> <p>affected 50% of the VAT contributors in region</p> <p>property loss</p> <p>crop loss</p> <p>environmental loss</p> <p>insured loss</p> <p>aggregated economic loss</p> <p>infrastructure damage</p>
<p><b>09_Identified affected population</b></p> <p>affected 10% of population</p> <p>affected 20% of population</p> <p>affected 30% of population</p> <p>affected 50% of population</p> <p>Affected more than 51% of population</p>
<p><b>10_Affected area</b></p> <p>type of affected area</p> <p>up to 10% of the urbanised place</p> <p>11-25% of the urbanised place</p> <p>26-35% of the urbanised place</p> <p>36-69% of the urbanised places</p> <p>over 70%</p> <p>10% of the urbanised area(also natural area)</p> <p>20% of the urbanised area(also natural area)</p> <p>30% of the urbanised area(also natural area)</p> <p>40% of the urbanised area(also natural area)</p> <p>50% and more of the urbanised area(also natural area)</p>
<p><b>11_Affected natural environment</b></p> <p>affected 10% of nature</p> <p>affected 20% of nature</p> <p>affected 30% of nature</p> <p>affected 50% of nature</p>



Affected more than 51% of nature
<p><b>12_Affected critical or strategic infrastructure</b></p> <p>affected supply of gas, electricity, water for less than 6 hours          affected supply of gas, electricity, water for less than 12 hours          affected supply of gas, electricity, water for more than 12 hours          affected supply of gas, electricity, water for more than 24 hours          affected supply of gas, electricity, water for 24-72 hours          affected supply of gas, electricity, water for more than 72 hours</p>
<p><b>13_Affected minorities</b></p> <p>migrants          refugees          Roma population          disabled persons          ethnic minorities          LGBTI          IDPs</p>
<p><b>14_Affected soft infrastructure</b></p> <p>concert halls          cultural centres          hospitals          kindergartens          monuments          museums          postal offices          schools          shopping malls          social houses          stadiums          theatres</p>
<p><b>15_Affected vulnerable groups</b></p> <p>children          disabled persons          elder persons          homeless          ill persons          impaired persons          people with developmental difficulties          persons in hospitals, social care centres          persons living alone in remote regions          persons with physical disabilities          single mothers</p>



**16\_Loss of life/ injury**

children  
disabled persons  
elder persons  
homeless  
ill persons  
impaired persons  
people with impairing and developmental difficulties  
persons in hospitals, social care centres  
persons living alone in remote regions  
persons with physical disabilities  
single mothers  
elder persons  
children  
foreign tourists

**17\_ Identified critical assets to be protected**

bridges  
dining premises  
factories  
farms  
groceries  
markets  
museums  
offices  
petrol stations  
production lines  
public open spaces  
restaurants and coffee shops  
shops  
storage facilities

**18\_Major damage (not only structural damage, but also non-structural )**

industrial losses  
lack of supply materials in industry  
rise in mortality  
shock in the NHS and social care systems  
boarder closures  
trade restrictions and confinement measures  
rise of people at risk to falling into extreme poverty or to be undernourished  
Health vulnerability  
School system interrupted  
families shocked and suffering from long-term mental consequences  
infrastructure in surrounding areas



affected national supply networks  
jobless people  
power outage  
water outage  
gas outage  
central heating outage  
communication outage  
road traffic restrictions  
severely damaged bridge  
Public lighting out of service  
jobless persons  
pollution  
environmental damage (loss of wildlife, destruction of coastline, water world)  
facility destruction  
services affected for several hours  
drinking water contamination  
agriculture land degradation  
forest degradation

#### Capacity categories

In this part the user will select sources, capacities, recovery and intervention measures, tools, equipment, technologies and capacity available to be used in the course of ongoing disaster.

#### 19\_Access to sources/knowledge, experience, tools amidst disaster

awareness campaigns  
contingency plans  
crisis plan of region  
donations and public collections  
early detection of contamination  
early warning system  
engagement of climatologists  
epidemic plan  
evacuation plans  
food bank - citizens initiatives  
knowledge, and experience  
material  
media coverage  
municipal hubs (third sector organizations whose venues have been used to supply and deliver the food packages to people)  
Operations Centre to manage and coordinate the activities  
pandemic plan  
process management  
public sources  
situational awareness



temporary information centre in communities  
Traumatological plan of Hospital  
traumatological plan of the emergency health unit  
virtual coordination centre  
weather index and forecasts

#### 20\_Access to intervention teams amidst disaster

air helicopter rescue teams  
anti-terrorists unit  
chemical labs  
crisis managers in place  
doctors  
emergency call coordinator  
fire brigades  
firefighters - volunteers  
first aid teams  
health rescue services  
investigators  
lifesaving teams  
mountain rescue teams  
MUSAR  
nurses and paramedics  
police  
pyrotechnicians  
rescue teams  
search and found  
specialised technicians  
USAR  
volunteers

#### 21\_Involment of media, NGO, Mayors

academia  
civil society  
emergency management  
first responders  
general public  
hazard mitigation planning units  
humanitarian community  
insurance companies  
intervention units  
LEA  
loss database operator  
mayors





media  
middle management decision-makers  
operational staff  
policy makers  
security experts  
strategic crisis management experts  
volunteers

**22\_Access to technologies, tools amidst disaster**

an online reporting system for mapping hazards and threats (environmental damages, burdens, environmental health issues (air and water quality)  
atmospheric measurements  
chemical intervention  
control of chemicals use of technologies  
crowdsourcing data and help requests  
detecting flammable liquid equipment/tools  
digitalisation of health services  
equipment and staff  
IT technologies GIS  
management of volunteers app  
media  
monitoring systems  
observation and numerical models run automatically  
Online and other media campaigns  
online tools for early warning  
operational and medical support  
public information and communication  
rescue and health services coordination  
sampling detection vehicle (VDIP)  
sampling technologies  
sensing systems  
situational awareness  
SMS services  
social networks  
surveys and analyses on pollution  
telecommunication systems  
virtual emergency centre management  
water pumping technologies  
water quality measurements  
work with multipliers (regional and municipal offices, first responders)

**23\_Response efforts immediately after the hazard, strategic planning, awareness, community activities, intervention, training, analysis, planning, and policy development.**

analyses and prognosis  
awareness and information for the general public and endangered objects  
community involvement  
contagious diseases surveillance and monitoring of affected area  
cooperation with all activities in a participatory manner



cooperation with owners of hazard objects or endangered community owner of infrastructure/objects/service providers

cooperation with third sector

coordinated response of all types of first responders

emergency units

evacuation

food delivery service

healthcare and social services support

help service for the elderly and disabled

humanitarian aid

hygienic measures strengthened

integrated rescue system

interaction between different departments of the City

mapping and identifying affected persons

monitor epidemiological situation

post traumatic care

prevention measures in the course of disaster development

proper mapping of all area and potential endangered objects and population

provide free food and primary goods to the most disadvantaged people.

psychological support helpline for single people

public collection

regional public health offices campaign intervention

reinstallation of the operating system

risk mitigation measures, including seconded legislation

starting the RT-PCR laboratory tests

temporary shelters

training and table-top-exercises

triage and reconnaissance

useful and relevant information on time

volunteering activities

work with media and information multipliers

#### 24\_Recovery efforts after the hazard (what recovery plan)

army

cleaning debris

compliance analyses by the regional and national authorities, policy and decision-making improved

credit support schemes

decontamination of soil

decontamination of waters

disposed burned wood

economic measures



emergency planning  
forest, coastal and town recovery plans  
government makes a recovery plan  
funding for jobless persons  
fundraising and public collections by NGOs  
humanitarian aid for affected population (public spending)  
malware removal and traffic recovery  
measures concerning the proximity of industrial areas/warehouses to the inhabited catchment area  
municipal level  
removal of debris  
satellite Copernicus system for monitoring and mapping damages of the affected area  
social distancing  
strengthen the preparedness at private company facilities  
vaccination

### Mitigation and planning categories

#### 25\_Scenarios

a strong cold wind > calamity > complete devastation of vegetation in the mountain  
> affected tourism and wood industry  
Burning of a hangar > pollution > evacuated persons > destroyed SME production lines  
cyber-attack/ fishing > hospital > endangered life of persons  
driving under the influence of drugs > car accident with dangerous chemical substances  
> Highway closed > Several retirement home and kindergarten endangered > detour  
route increasing pollution in settlements > environment damages  
extreme weather > tornado > devastated several municipalities > people left without  
home > evacuate > casualties > food and material supply interrupted  
fire > seafood contamination > flooding > affected main fish industry > impacted families  
fires > air pollutions > casualties > environmental damage from waste disposals > wood  
sector disruption  
flash flood > endangered nuclear power plant > blackouts > devastated public spaces  
hazardous material leak in town > confined persons > evacuation > International and road  
railway line interruption  
heavy rains > flash floods > destroyed residential houses > damaged road infrastructure  
> blackout  
individual extremism behaviour > school shootings > social stress > trauma  
Local fire at a squat in a highway bridge pile > confined and evacuated persons  
> disruption of telecommunication lines > destruction of the bridge deck > a gas  
explosion due to damage to the pipe crossing the bridge



measles > minority population > regional epidemics  
rainfall > floods > landslides > community infrastructure damaged > disruption of critical utility systems  
snow scarcity > degradation of the soil > plentiful dry biomass on abandoned slopes easily flammable > combination extreme heats > strong Fohn wind > wildfires > vegetation stress > affected all population  
storm in the sea > Oil spill > Thousands of kilometres of coastline destroyed > environmental disaster > economic activities affected > fishing industry dependant population > tourism dependant population  
strong wind > destroyed electricity infrastructure > utilities shortage for population > affected tourism season  
technological failure > explosion at an explosives disposal in the decommissioning depot of the Military Repair Company > dead > injured > evacuated persons > environmental pollution  
technological failure > contaminated sewage water flowed into the drinking water network for three days > severe health symptoms for thousands of people

### 26\_Major changes / improvement in disaster risk management: regulations

account on new measures concerning vulnerability  
account on new measures concerning vulnerability  
account on new measures concerning vulnerability  
action plans strengthened concerning the control and monitoring  
Awareness of the communities  
better monitoring of the areas  
Capacity building  
centralised monitoring and situational awareness in case of disasters with cascading effect spreading fast and enhancing greater areas  
centralised monitoring and situational awareness in case of disasters with cascading effect spreading fast and enhancing greater areas  
contingency plan for effective crisis management in case of events with a lesser probability  
contingency plan for effective crisis management in case of events with a lesser probability  
health care services  
impose legal framework on surveillance, reconnaissance and observation  
Improve equipment and technologies  
Interoperability and joint training of all rescue teams  
monitoring of endangered areas  
multi-hazards approach to risk assessment and preparedness, prevention, introduced robust monitoring systems  
reconnaissance and observation, monitoring of endangered areas  
reconnaissance and observation, monitoring of endangered areas  
social behaviour



supply chain schemes

### 27\_Major preparedness/ DRR measures prior to the hazard investment capital

account on new measures concerning vulnerability

account on new measures concerning vulnerability

account on new measures concerning vulnerability

action plans strengthened concerning the control and monitoring

Active classroom learning

Active learning online

Awareness of the communities

better monitoring of the areas

Capacity building

centralised monitoring and situational awareness in case of disasters with cascading effect spreading fast and enhancing greater areas

centralised monitoring and situational awareness in case of disasters with cascading effect spreading fast and enhancing greater areas

contingency plan for effective crisis management in case of events with a lesser probability

contingency plan for effective crisis management in case of events with a lesser probability

impose legal framework on surveillance, reconnaissance and observation

Improve equipment and technologies

Interoperability and join training of all rescue teams

monitoring of endangered areas

multi-hazards approach to risk assessment and preparedness, prevention, introduced robust monitoring systems

Preparedness activities aimed at technological development(use IoT, smart systems, AI, simulations, VR, online communication, integrated emergency response systems, digital or traditional early warning systems, etc. define)

prevention measures of structural and non-structural investments

reconnaissance and observation, monitoring of endangered areas

reconnaissance and observation, monitoring of endangered areas

Simulations

### 28\_Catalogue of measures

**Agriculture** (course seedbed preparation to reduce risk of erosion in farmland, crop rotation, decommissioning of farmland

**Assessment measures** (sources of pollution, climate change, hazards monitoring, monitoring of infrastructure bridges, road exposed to landslides, coastal lines exposed to deformations,



**Awareness** (Risk communication activities in education can help to increase awareness and knowledge of risk in the future, etc.)

**Buffer zones** (vegetation-covered systems investments - varying degrees saturated with water to pre-treat rainwater and extend the retention time, grassland/deciduous forests or short rotation plantations, living walls, permanent grassing and plantation, etc.)

**Construction solutions** (baulks oriented in the direction of a contour can slowdown surface runoff and support infiltration, floodplains by terrain modifications like lowering of banks, linear protection measures, small ditches, etc.)

Enforcement property protection systems

**Green and blue infrastructure** in the settlement areas (rivers, river valleys, water reservoirs, natural and artificial wetlands, parks, squares, orchards, gardens, allotments, etc.)

**Improve emergency and crisis management processes** (Careful and standardised documentation of events, Organisational precautions as well as emergency measures, harmonisation of technical standards; cross-border cooperation on emergency planning and consideration, etc.)

**Interactive communication** and participatory formats on community level

Natural-hazards insurance contracts

**Regulations** (exclude new developments that would increase the damage, Zoning plans, refusal of building permissions in hazard zones, Land use and land cover changes, resettlement, etc.)

**Retention solutions** (absorbent pans, basins, filters other to sustain structure, function, productivity and complexity of downstream ecosystems, afforestation of hillslope, surfaces cross drain solutions, design of roads crossing forests, cleaning waterflow basins after flooding, Natural or artificially created detention basins and depressions with a specific retention capacity)

**Technical checks** (Valves needs to be cleaned regularly, regular checks of pipelines, gas pressure stations, installing monitoring and surveillance systems, satellite systems monitoring of bridges concerning their usability, etc.)

**Technological solutions** (to strengthen monitoring, and risk awareness and crisis management system, monitoring systems and forecasts models, etc.)



### 3.2. Scenario-based assessment

Hazards (B)	Driver (C)	Impact (D)	exposure (E)	vulnerability (F)	Capacities (G)	leadership crisis communication (H)	A_D scale of risks (I)	mitigation measures/ assessment (J)
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Where

- **Hazards** are defined as a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. The hazards of concern to disaster risk reduction are of natural origin and related environmental and technological hazards and risks. Such hazards arise from geological, meteorological, hydrological, oceanic, biological, and technological sources. Sometimes acting in combination. In technical settings, hazards are described quantitatively by the likely frequency of different intensities for different areas, as determined from historical data or scientific analysis.
- **Drivers** are processes or conditions, often development-related, that influence the level of disaster risk by increasing exposure and vulnerability or reducing capacity. Disaster risk drivers include poverty and inequality, climate change and variability, unplanned and rapid urbanization and the lack of disaster risk considerations in land management and environmental and natural resource management, as well as compounding factors such as demographic change, non-disaster risk-informed policies, the lack of regulations and incentives for private disaster risk reduction investment, complex supply chains, the limited availability of technology, unsustainable uses of natural resources, declining ecosystems, pandemics and epidemics.
- **Impact** refers to affected economic, social and community activities, habits, functionalities and performance.

ID	Type of impact
I1	agriculture
I2	food supply
I3	famine
I4	migration
I5	economy
I6	biodiversity



I7	inequalities
I8	political stress
I9	water scarcity
I10	health impact on most ill, elder and disabled persons - economic and psychological and health impact
I11	social inequalities and have a disproportionately severe impact on poor and marginalized populations
I12	landscape impact
I13	cascading effect - slides
I14	cascading effect - wild fires
I15	cascading effect - loss of biodiversity
I16	life at risk
I17	living standards humiliation/migration/poverty/famine
I18	environment degradation/health/social disruption
I19	living standards humiliation/migration/poverty/famine
I20	environment degradation/health/social disruption
I21	food safety and food supply disruption
I22	social disruption/famine/migration
I23	social disruption/famine/migration

- **Exposure** (possibility of being exposed to vulnerability) refers to people, property, systems, or other elements present in hazard zones that are thereby subject to potential losses. Exposure is a necessary but not sufficient determinant of risk. It is possible to be exposed but not vulnerable. However, to be vulnerable to an extreme event, it is necessary to also be exposed.
- **Vulnerability** (the likelihood that the asset will be damaged) refers to the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. We can explore various aspects of vulnerability arising from physical, social, economic, and environmental factors. Examples may include:
  - Poor design and construction.
  - Inadequate protection of assets.
  - Lack of public information and awareness.
  - Limited official recognition of risks and preparedness measures.
  - Disregard wise environmental management.
  - Vulnerability varies significantly within a community and over time.

air ambient quality
civil society and war/civil conflicts
e-waste and surplus of production
economic disturbances
environmental degradation
food security and food safety





health deterioration
IoT and IT disturbances
lack of resources vulnerability
link to MDGs
proposal: base vulnerability on the megatrends and societal changes
social inequalities
urbanisation and land use
water scarcity and water stress

- **Capacities of stakeholders (19-24 above tables) – technology, human resources, equipment, material, rescue staff, coordination, processes, stakeholders**
- **Leadership crisis communication** focuses on emergency managers as pivotal to understanding crisis communication strategies. Crisis and strategic managers are responsible for most preparation, mitigation, response and recovery activities and are considered the experts of their communities. They have decision-making authority in local-level communities. Their expertise is critical to understanding the use of crisis communication strategies and integrating knowledge of local community needs and adaption based on crisis types. Crisis managers and decision-makers are encouraged to operate, so that information collection, organisation, and dissemination lead to open, honest, accurate, tailored, two-way, and knowledgeable information. They are expected to provide guidance and assist with instructing, sharing and adjusting.
  - Empathy and caring. Empathy and caring should be expressed within the first 30 seconds. Acknowledge fear, pain, suffering, and uncertainty.
  - Competence and expertise. Education, position title, or organizational roles and missions are quick ways to indicate expertise, establish a relationship with the audiences in advance of the emergency. If that is not possible, have a third party, who has the confidence of the audience, express his or her confidence in you or your organization.
  - Honesty and openness by facing the realities of the situation and responding accordingly. Not being paternalistic but, instead, participatory—giving people choices and enough information to make appropriate decisions.
  - Commitment to reaction and show dedication by sharing in the sacrifices and discomforts of the emergency. Fake hardship for the cameras is not advisable.
  - Accountability is the form of being transparent as possible. If government or non-profit money is being spent in the response to a disaster, sooner or later the public and media will demand to know to whom that money or resources are being distributed.
- **Scale risk.** The risk severity classification is expressed in grades A to D according to the following meanings:
  - A - it is an **extremely serious** risk immediately endangering the security of the system, performance of key processes, further operation of the system is conditioned by the adoption of immediate security measures to mitigate the risk,



- B - **serious risk**, not acceptable, further security measures to mitigate it should be taken, but the performance of key processes of the organisation and the operation of the system are not acutely endangered by it,
- C - **the risk is acceptable** but must be monitored on an ongoing basis; in some cases, a precautionary measure may be proposed for this risk,
- D - **the risk is acceptable; no further action is required.**
  
- **Mitigation and planning measures are:**
  - Mitigation of Natural Hazards: Data Collection and Analysis, Vulnerability Reduction
  - Preparation for Natural Disasters: Prediction, Emergency preparedness (including monitoring, alert, evacuation), Education and Training
  - Mitigation mechanisms are most cost-effective in reducing loss of life and property and most compatible with the development planning process. The data collection effort refers to the hazards themselves, vulnerability, and risk.

## 4. Conclusions

Following the internal logic of the CRISPRO network, we would like to promote a transnational risk assessment and risk mitigation assessment tool to bridge the gap between historical knowledge and practical experience, between prognostic methods and availability of capacities and prevention mechanisms. Furthermore, we aim to provide an online tool that navigates the end-users into the multiple factors and aspects evoked by multi-hazard risks and emergencies.

We would like to outline developmental trends in disaster and community/environment stress, yet, to navigate the target audience how to optimise its sources and processes for achieving greater community resilience in the urbanised and rural natural environment and protected areas. Following the concept of the anthropological theory concerning the interaction of the social, political, and economic elements that comprise a culture to primitive and modern industrial cultures, we would like to communicate the disaster risk reduction within the dichotomy of resilience and vulnerability for the communities. CRISPRO understands resilience as the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of disaster in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

### **Dissemination of the document**

**This deliverable will be disseminated to min. 40 organisations and individuals for preliminary test of the tool. It will be disseminated along with the online xls document available on following link**



<https://docs.google.com/spreadsheets/d/1ZHVTYHfhLRz66K9zYKTRZ3N0Y0CR8nJ3/edit?usp=sharing&oid=115366458220224449038&rtpof=true&sd=true>

## 5. Annex I

### PROTOCOL ON THE RESULT OF THE CONTROL OF THE TERRITORY / MUNICIPALITY

Before testing the tool, each end-user will fill the following questionnaire.

1.	Village/Town/City/Metropolitan mayor	
1.1	Does it have a crisis staff?	YES/NO
1.2	Is the composition of the crisis staff adequate?	YES/NO
1.3	Has an exercise or training of the crisis staff been carried out?	YES/NO
1.4	Is the equipment of the room for the crisis staff adequate and are the necessary tools available?	YES/NO
1.5	Does it have any information system, communication tools and tools to solve the crisis situation?	YES/NO
1.6	Does it have the opportunity to warn and inform persons located in the municipality?	YES/NO
1.7	Does the municipality have a chosen area for evacuation?	YES/NO
1.8	Does the municipality have measures in place to ensure the emergency survival of the population?	YES/NO