

# A governance model methodology for reconstruction after a natural disaster

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## 1. Introduction

**Disaster risk assessment** is a qualitative and quantitative approach aimed at determining the nature and extent of disaster risk analysing potential hazards, and evaluating existing conditions of exposure and vulnerability that could harm people, property, services, livelihoods, and the environment.

Also, in view to contribute to the elaboration of the Green Paper on Emergency Services Regulation Development, the Emilia-Romagna Agency for Reconstruction (PP10), in close coordination with the Lead Partner RERA SD and the Regions Abruzzo (PP1, WP 3 leader) and Puglia (PP9), elaborated a questionnaire (see annex 1), intended to collect information concerning disaster management per each partner involved in the FIRESPILL Interreg project, including the phases of emergency management and the role of civil protection services, reconstruction and the promotion post-disaster social and economic recovery and future territorial development.

The questions, built according to the disaster management cycle developed by UNDP, ask about the main action taken before, during and after a disaster. Out of the 21 questions, the first set (from 1 to 15) targets a **Survey Risk Management (Mitigation, Preparedness, Response, and Recovery actions)**; the second set (from 16 to 21) specifically addresses the role of the **knowledge of the Civil Protection system**. By completing this survey, you will help to build a common approach in the form of disaster governance methodology and further territorial development, as well as in focusing on the key topics about civil protection and the formulation of recommendations for more harmonised regulations on emergency services.

The scope of the questionnaire - and of this report – is to verify if there exists, considering the specific experiences of each partner, a possible common framework of approach and actions towards a shared methodological model of governance for post-disaster reconstruction, including the social and economic relaunch of the territory hit.

There are a total of 9 responses received, and they were provided by

1. PP10 - Agency for Reconstruction - earthquake 2012 - Emilia-Romagna Region;
2. PP13 - Split - Dalmatia County
3. PP4 – ATRAC (Adriatic Training and Research Center for Accidental Marine Pollution Preparedness and Response)
4. PP9 - Civil Protection Department of Puglia Region
5. PP11- ARPA Friuli Venezia Giulia (Environmental Protection Agency)
6. PP5 - Zadar County
7. PP3 - Dubrovnik-Neretva Region
8. PP8 - Development Agency of Šibenik - Knin County
9. PP6 - Civil Protection Service of Marche region

The criteria considered in the analysis for each answer include a shared strategy's general objectives at the local level and consolidated best practices at the local level. The idea is to formulate preliminary guidelines to be shared among the project partners in terms of the characteristics of the governance approach and the adoption of strategies and tools calibrated to the specific aspects of the local context and related risks.

The report shows the questionnaire's outputs, concerning the procedures and measures adopted by some of the Italian and Croatian partners of the Firespill project before, during and/or after a disaster (earthquakes, fires, floods, oil spills and other types of risk).

Over this basis, a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) addresses the aspects emerging from the systematisation of the answers, which can set a basis for a debate on the possible points of convergence between the Italian and Croatian approach to disaster and post-disaster management. These are addressed within a final section of this report, synthesising the critical topics for the ongoing debate about establishing and strengthening a standard governance methodology.

## 2. Analysis of the responses to the questionnaire

### Question n° 1. What are the main risks faced by your country?

The answers show that most partners during their experience, covering the 30 years from 1993 to 2023, were confronted with predominantly natural hazards on their territory (question n° 1, one or more options possible).

In particular, the significant risk factors are linked to floods, fires and earthquakes, followed by industrial risk management and maritime transport. A common fact, historically circumscribed, is represented by the involvement of the institutional subjects present in Firespill in the local administration of the Covid Sars-19 health emergency. (Fig.1)

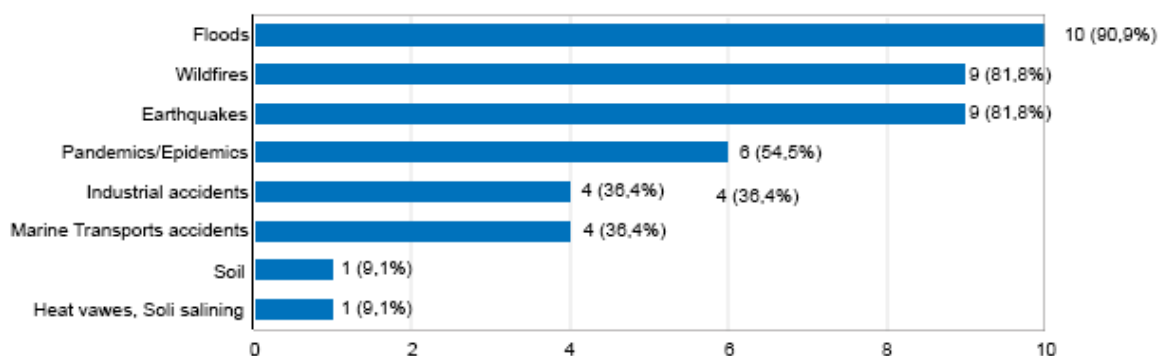


Figure 1. The graph shows the main risks present in the areas involved in the Firespill project

This last figure will be addressed tangentially in this report as the governance actions of the health emergency have been centrally coordinated at the European and national levels

**Question n° 2. What level of exposure does the population have to these hazards/threats? (Is it better/worst handled in the countryside or populated areas?)**

Considering the type of risk factors most present in the territories of the Firespill partnership, in question n°. 2, attention is paid to the population's exposure to the threats indicated above. The standard premise was to mark the geographical areas of the two countries as subject to a medium-high risk of floods, fires and earthquakes. Based on this, there is a need to distinguish the danger emerged depending on the type and density of the settlement.

In both countries, the level of exposure is high, especially to the risks of earthquakes and floods in both inhabited and rural centres. Considering the indicated dangers, the geology and the demographic distribution, the population's exposure is the same both in the countryside and in the inhabited centres. However, the people of cities are more exposed to seismic risks, while rural areas are more exposed to fires. The cross-border partners generally confirm this figure.

In particular, in the Italian context's plain, Apennine and Alpine regions, a medium-high risk relating to avalanches is marked. In addition, there is a significant industrial risk in the specific context of Friuli Venezia Giulia. Of the 28 industries present, 14 establishments are classified in the upper tier and 14 in the lower level. Furthermore, the territory is exposed to danger from shipping accidents and oil spills at sea in the Gulf of Trieste and the upper Adriatic.

These first two considerations provide a general picture of the threats present on the territories.

**Question n° 3. Does your regulation require a mandatory risk assessment plan before the construction of buildings or infrastructures?**

Below, starting from question n°3, information on the management of these threats is collected. The standard premise of all the partners who replied to the questionnaire was the presence in their respective

national plans of the adoption and application of a mandatory risk assessment plan before the construction of buildings or infrastructures.

The valuation is subject to the applicable legal standards and is foreseen for each type of risk, except for the Dubrovnik-Neretva Region. In this case, there is no obligation, even if each building permit requires calculations regarding the static stability of buildings and the method of water drainage or preservation of the natural environment.

**Question n. 4. Can you describe the most calamitous event occurred in your country in the last ten years?**

The question describes the risks the organisations and institutions involved in Firespill faced with specific governance actions on their territories. The results relate to the national scale, tracing back thirty years to consider the peculiarities presented by the single partners.

For the Italian context, the main episodes that have affected the national territory are considered the twenty years from 2003 to the present. The episodes are shown below in their timeline:

2003\_Valcanale and Canal del Ferro flood;

2009\_Aquila earthquake;

2011\_Flood in Liguria;

2012\_Emilια Romagna/Veneto/Lombardy regions earthquake;

2013\_Flood in the Puglia Region (Ginosa area);

2014\_Flood in central Emilia-Romagna;

2016-2017\_Central Italy earthquake;

2017\_Rigopiano Avalanche 2017;

2020\_Sicily flood;

2021\_Flood in Liguria;

2022\_Flood in the Marches (September 15-16, 2022), Ischia flood (November 26, 2022).

On the Croatian front, however, the following episodes should be mentioned:

2004\_Flood in Gunja (eastern Croatia);

2009\_Railway transport accident in 2009 in Split - Dalmatia county;

2015\_Fire on Pelješac peninsula and Korčula island;

2017\_Fire near Split;

2020-2021\_Zagreb and Petrinja earthquake (mainland part of Croatia).

2021\_Trilj earthquake;

2022\_Zaton-Raslina fire.

Common to all countries is managing the COVID\_SARS health emergency of 2020 - 2021.

**Question n. 5. Based on the essential emergency response action listed here, what are the leading recovery post-disaster actions implemented by your local/national government after the disaster described?**

The question is divided into several risk management sessions regarding six parameters: 1) Evacuation and return of the population, 2) Removal of debris and waste, 3) Medical treatment, 4) Damage assessment, 5) Restoration of the habitat, 6) Reconstruction of infrastructures.

For the specific cases reported of catastrophic events involving the Italian regions, evacuation activities and debris removal were coordinated and managed primarily by Civil Protection in concert with the Fire Brigade and local authorities. In particular, Civil Protection has prepared evacuation actions and provided temporary housing.

For Croatian countries, these actions are coordinated at the central national level. For example, during the 2018 fire, Civil Protection, the Interior Ministry, and the Defense Ministry carried out the activities. Generally, these actions are supported by the work of volunteers.

In the Dubrovnik-Neretva Region, the provision of primary and emergency health care was managed by the institutions of the regional administration. Medical teams have been deployed in different areas of the region.

Regarding assessment management, the Emilia-Romagna region describes the specialised government bodies and agencies in the sector task. Instead, in the Marche region, the Fire Brigade carries out the first damage assessment in the event of an earthquake with the utmost urgency. Furthermore, the National Department of Civil Protection has set up a specialist training course for damage assessment in the Marche region. There are currently 131 qualified internal technicians and another 60 employees are undergoing training.

In Šibenik-Knin County, a commission is appointed for the assessment, reports and list of damages reported by the population. In addition, an essay is drawn up containing all the evaluations of the determined injuries to the fifth parameter, and habitat restoration is managed by specialised national bodies and agencies decentralised on the territory.

Management is generally entrusted to the relevant government bodies on the last parameter relating to restoring infrastructures. Rebuilding is the owner's responsibility.

**Question n. 6. Has the disastrous event described in Question 4 been fully restored?**

The question analyses the reconstruction processes. To date, the reconstruction actions are still in progress for the Emilia-Romagna Region regarding the 2012 earthquake, limited to the reconstruction of the historical-architectural heritage.

Compared to the 2016 – 2027 earthquake, the construction process is still ongoing for the Marche Region (as well as for the other regions hit, Lazio and Umbria).

On the Croatian side, reconstruction actions are still ongoing in the Zagreb area following the 2020 earthquake. The same assessment applies to the county of Sibenik and Knin following the Zaton-Raslina fire on July 13, 2022. Actions are underway for recovery, such as felling trees, planting new plants, habitat restoration, and building reconstruction.

**Question 7. Do the existing regulations concerning natural and man-made disasters of your region have been subject to "extraordinary" modifications in order to deal with the disaster?**

The following results were recorded for question n°. 7 relating to the "extraordinary" changes to the current legislation on disasters to deal with the catastrophe.

For the Italian partners, specifically in the Emilia-Romagna and Friuli Venezia Giulia regions, special legislative powers for managing the local emergency have been conferred on the Extraordinary Delegated Commissioner by the Italian Presidency of the Council of Ministers.

For the county of Split, following the earthquake, changes were made to the regulations relating to post-earthquake actions. Instead, a specific law was approved in the Zadar County and Croatian areas where floods occurred in 2019, and the related rules were linked to it.

Regarding the COVID-SARS 2020 health emergency, the changes to the legislation have been made by the central national government bodies in concert with the European provisions.

**Question n°8. In your opinion, what are the main strengths of your governance model concerning disaster management? In particular, did the instruments available (regulations, organisation of your structure, means and equipment available, etc.) ease the job to be done?**

The results illustrate the strengths of the individual governance models. In the Italian context, the model prepared by the Emilia-Romagna Region for the 2012 earthquake emerges: the Emilian governance model is characterised by its multi-level governance solid vocation, which has allowed for synergistic cooperation between institutional subjects and civil society.

In this context, the creation of the Agency for reconstruction was significant, coordinating the reconstruction process of housing, schools, and enterprises. At the same time, it is still engaged in rebuilding its cultural heritage. The Emilian multi-level governance approach represents an exemplary practice at the local level, in particular for institutional coordination. A positive interaction can be observed between the administrations and social and economic actors. They are involved in developing the territory and its redevelopment and enhancement. Furthermore, the system promotes training and awareness at the regional level.

For the regions of Marche and Friuli, the action carried out by Civil Protection in both the prevention and management phases is significant.

On the Croatian scale, the strengths of the governance model can be found in the immediacy of response to threat management and the presence of competent human resources. On the other hand, the lack of specific equipment to handle major disasters is commonly highlighted as a weakness.

**Question n. 9. In your opinion, what are the main weaknesses of your governance model concerning disaster management? Please, focus in particular on the difficulties encountered in carrying out the disaster management and the solutions adopted.**

In question n. 9, the partners were asked to explain the weaknesses of their governance model. For example, the Emilia-Romagna region for the 2012 earthquake invested locally in technical training, which was scarce in the aftermath. In addition, the difficulties of a rapid response in reconstructing historical-architectural assets damaged by the earthquake to about 80 per cent must be considered.

Finally, most of the partners highlight the need to improve the communication and coordination between the various subjects delegated to risk management between the Civil Protection, which operates in the imminence, and the national and local administrative bodies.

**Question n. 10. What recovery actions are planned for the private sector (businesses and industries) by your government after a disaster?**

Concerning the private sector (question No. 10), almost all of the answers from the Italian partners indicated the disbursement of economic contributions to support businesses and workers, a practice that is common also for the Dubrovnik-Neretva and Šibenik-Knin Counties. In Italy, funding is paid in concert with European and national institutions, trade associations and trade unions.

However, the Marche region's experience underlines that the process of disbursing contributions does not have streamlined procedures as far as its own experience is concerned. On the other hand, Zadar County highlights the absence of tools to help legal entities in the specific case of flooding.

**Question 11. What support actions targeting vulnerable groups were introduced after a disaster (women, children, people with disabilities, the elderly, indigenous, and minority communities) from your state/institutions of provenience?**

As regards the actions envisaged for the fragile civilian population (question 11), the results obtained illustrate the involvement of policies, where foreseen, at a centralised level with decentralised aid in the territories affected by the disaster. In particular, the Italian state provides for economic and health support, tax suspensions and the preparation of temporary accommodation in the face of the level of damage. In Split County, such actions are taken care of by the Red Cross. In the case of the Emilia-Romagna Region, the strategic lines of post-earthquake governance have identified the reconstruction of schools as a priority, the reconstruction of homes and businesses, and the premises used to provide public services.

**Question 12. Do your institutions implement special communication channels connecting all the key players (referring to the first responders in hospitals, the Civil Protection department, Red Cross, etc..) involved in emergency first action?**

Question 12 requires you to clarify whether implementing communication channels between the subjects involved in the first emergency has been envisaged in the governance models developed.

Overall, the answer was affirmative and in detail it concerned the greater effectiveness of the system in charge of Italian Civil Protection.

During the emergencies, special channels were activated for the regions of Puglia and Friuli, and those of Civil Protection were strengthened, especially in the Friulian context, creating a connection between ReteRadio 118 and the Civil Protection coordinated by the prefecture.

ARPA FVG instead implements a comparison between the regional management and the volunteers of the municipal groups and associations for shared social communication: the #socialmediacommunityFVG. It includes more than 135 municipal groups out of a total of 215 municipalities, which represent 63% coverage



of the regional territory. It also uses Facebook, Instagram, Twitter, Telegram and Youtube channels, all of which are Civil Protection channels.

Split County and Dubrovnik-Neretva Region took advantage of the TRETRA network while Zadar County has established its autonomous communication system for 14 days without recharging.

**Question n. 13. After the disaster, to your knowledge, do you/your institutions implement effective disaster awareness campaigns?**

The question is focused on the awareness-raising actions adopted in risk management governance models. Overall, FireSpill partners, for all responses, have planned and implemented actions in this sense. In particular, awareness-raising was carried out within the public administration, primary and secondary schools and universities.

The Civil Protection of the Puglia Region acted to raise awareness at trade fairs and public events.

The Emilia-Romagna Region has created actions envisaged to build the perception of the "city as a common good" and, of creating multiple opportunities for meeting and institutional acceptance of collaboration proposals at all levels (work groups, training courses, workshops), also through the support of dedicated financial resources.

The detailed results are visible in the graph below.

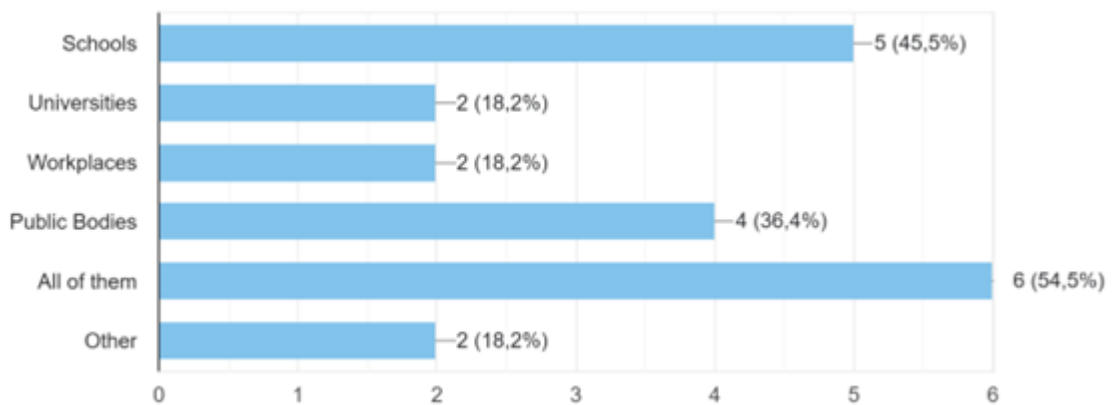


Figure 2 The graph illustrates the main bodies in which risk awareness campaigns have been activated.

**Question n. 14. If any, after a disaster, do your institutions have promoted recovery actions and/or new development policies, addressing in particular the social and economic sectors and/or the territories mostly hit by the event?**

As regards the promotion of recovery actions or new development policies, specifically addressed to the social and economic sectors most affected by catastrophic events (question n°14). Only ATRAC, Dubrovnik-Neretva Region, and the Public Institution Development Agency of Šibenik-Knin County have not promoted any actions in this sense.

**Question n. 15. Which type of effects have produced/are producing such types of measures?**

The effects produced by the new policies are summarised as follows:

For the Emilia-Romagna Region, the conceptualisation of new development paths, according to the reconstruction principle, "where it was, how it will be". In particular, businesses were not relocated, and there were no significant job losses. On the contrary, there was an increase in GDP, added value and the commercial strength of specific sectors/districts: biomedical and mechanical engineering. Agricultural

enterprises and the agri-food sector have been the focus of particular attention, generating successful supply chains for regional PDO products<sup>1</sup>.

After the flooding events affecting the area from 1990 to the first decade of 2000, under the ordinances of the Extraordinary Commissioners, the Friuli Region provided funds to repair the damage.

Furthermore, the regions of Puglia and Marche have also made use of specific policies, the first to support the restart of the agricultural sector, and the second has invested in the enhancement of tourism.

While for the County of Split, special laws have been issued to support the activities.

**Question n. 16. What civil protection activities are carried out by the organisation?**

In response to question n°. 16 (one or more options possible), it should be noted that the actions were concentrated on overcoming the emergency; Rescue, Prevention, and Forecast, as shown in the graph below.

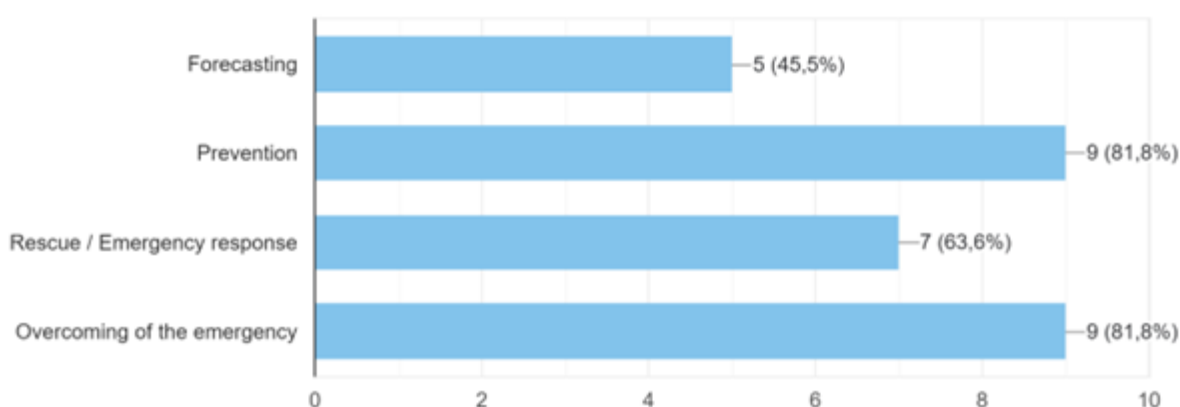


Figure 3. The diagram outlines the most important activities performed during the first post-disaster operations by each organisation.

**Question n. 17. Tell us about your experience in managing an emergency event and/or your activities in managing one of the risks covered by the project (Forest Fires, Seismic, OilSpill).**

Within question n° 17, the risk management experiences about the purpose of the FireSpill project are collected. First of all, it can be stated that some of the common denominators of individual approaches to risk management have been cooperation between different levels of government, from the superordinate national to the intermediate region to the local scale. The regional civil defence played a central role in the early stages of emergency coordination. Finally, training and dissemination activities were practical and valuable in terms of knowledge and awareness.

The Emilia-Romagna Region has developed governance skills concerning managing the 2012 Earthquake: cooperation between institution and civil society level, supporting policy implementation. Split County, in its experience of managing the catastrophic events that occurred, believes that it needs to improve the coordination between civil protection units and could, at the same time, optimise communication networks and implement the use of more modern equipment. The activities carried out by ATRAC in oil spill situations are mainly advisory.

The aim above is pursued through civil protection planning, daily forecasting of fire criticality levels, AIB training, information to the population, land protection and active measures to fight forest fires. The follow-up will focus on the latter two actions contributing to real-time risk management.

Land protection allows for the early detection of forest fires by field and room personnel, thanks to the views provided by the detection cameras. The latter, equipped with appropriate sensors, have been installed in strategic points of the territory, characterised by high naturalistic value and broad panoramic areas. In addition, special patrol services are also activated for territorial protection, whose intensity is linked to the

level of fire-fighting criticality defined daily in special bulletins issued by the Puglia Region's Decentralised Functional Centre.

On the other hand, active action can reduce the spread of fires and limit the areas affected by the fire: these actions are coordinated by the Puglia Region Permanent Unified Operations Room (SOUP), including the National Fire Brigade, the Carabinieri Forestry Corps, the Regional Agency for Irrigation and Forestry Activities (ARIF), the Regional and National Air Fleet Authorities, the Organised Civil Protection Voluntary Organisations registered in the Regional List, and other Local or Functional Bodies support these activities. The SOUP, incardinated in the Regional Operations Centre (COR) of the Civil Protection Section, ensures H24 operations during the maximum danger of forest fires defined each year by the Decree of the President of the Regional Council.

ARPA FVG within FIRESPELL addresses hydrocarbon spills at sea. In particular, it is preparing tools to improve the prediction of the fate of the oil spill to provide the proposed bodies with the necessary information to secure the affected areas and intervene promptly.

For the Dubrovnik-Neretva Region, the regional level of government acts through the Civil Protection Command. This body cooperated with the national bodies and was responsible for gathering information on the situation at the site and proposing solutions.

The Marche region's experience in managing earthquake emergencies in 2022 saw the involvement of all the system components: the national Civil Protection department cooperated with our regional structure. The National Institute of Geology and Volcanology contributed to monitoring the event (still in progress) with its instruments. The regional network distributed digital and hard copy videos, books and brochures on seismic risk and how to behave. Meetings were convened with municipal administrations and prefectures. The voluntary sector was involved, which carried out campaigns with citizens.

**Question n.18. Do the instruments available to you (regulations, organisation of the structure, means, equipment, etc.) allow you to carry out the activity in an easy way?**

A clear division is observed in Question 18 concerning the adequacy of tools and regulations available to manage emergencies. While the Italian partnership is optimistic, Split-Dalmatia County, Zadar County and Dubrovnik-Neretva Region point out the need for more and better equipment to improve emergency management. They also emphasise the need to improve and streamline the legislative framework.

**Question n. 19. Have you encountered any difficulties in carrying out the activities? If so, what were they?**

Question 19 collects information on particular difficulties encountered. They are considering the specifications in the previous questions (6, 8, 17). Setting aside the specific aspect reported by the Emilia-Romagna Region on the reconstruction of cultural heritage, the significant difficulties are, on the one hand, related to the availability of means and equipment and, on the other hand, depend on the lack of interoperability or the critical conflict between laws and regulations. The latter aspect makes it difficult but possible to have and act according to a standard methodology on a national or even international scale.

**Question n. 20. What solutions have been adopted to overcome these difficulties?**

In this case, the Puglia Region has launched several initiatives to cope with these difficulties (outcome of question 20).

- development of an IT platform for civil protection risk management (integrated analysis, forecasting, monitoring and information system - S.IN.A.P.S.I.), which also allows the collection of the contents of civil protection plans and the data that compose them;
- implementation, under the INTERREG project "Ofidia 2 - Operational fire Danger prevention plAtform2", of a highly innovative and cutting-edge system consisting of a wireless sensor network; high-resolution cameras and drones for fire detection in or near wooded areas;
- establishment of Regional Territorial Operating Rooms (SOT) on an experimental basis in two provinces (Foggia and Lecce) for the management of events involving vegetation types in the vicinity of wooded areas, leaving the Unified Operations Room Permanent (SOUP) forest fire management;

- financing under the 2014-2020 ROP for Apulia for No. 140 municipalities in Puglia for the implementation of municipal civil protection plans;
- funding, from the ROP Puglia 2014-2020, for the Regional Activity Agency Irrigue and Forest (ARIF Puglia) for the implementation and activation of the presidio territorial civil protection;
- funding, from the ROP Puglia 2014-2020, for the University of Bari for the development of fuel models and the identification of forest roads;
- provision, under the INTERREG project "TO BE READY – The Flood and Big fire forest, prediction, forecast and emergency management", of training courses for personnel involved in various capacities in forest fire-fighting activities (Director of Shutdown Operations, Operations Room Manager, Room Attendants, Safety and AIB team coordination, etc. );
- agreements with the Regional Fire Department and the Regional Fire Department, Carabinieri Forestali to support the management of the AIB campaign during the danger period through the presence of their personnel in SOUP and additional teams in the area;
- identification of a firm for the service of extinguishing forest and non-forest fires by launching water and/or extinguishing/retardant products, or other compatible additives, using two fixed-wing aeroplanes;
- approval of the territorial contexts identified as a result of the activities of the PON Governance for the subsequent perimeter of the optimal territorial and organisational areas, beneficial for the organisation of the same.

While improving the performance of modelling tools and verifying results using drifter tests is invested in ARPA for Friuli Venezia Giulia

Furthermore, tools were developed to optimise response times to have the input information immediately available to the models. Regarding communication with other agencies, the exercises made it possible to learn the technical terms used by other agencies, better focus the requests and define the resources (time and personnel) needed.

**Question n. 21. What do you suggest to improve the tools available (legislation, plans, means and equipment, etc.) in order to optimise risk management, according to your state of the art (strengths/weaknesses)?**

Question 21 contains suggestions for legislative and operational improvements to emergency management models. Generally speaking, responses have focused on increasing public awareness and knowledge through awareness-raising actions.

They are implementing information and communication systems (digital platforms) to collect, in a systematic and easily accessible manner, any valuable information for risk management. At the Italian national level, in particular, the Puglia Region emphasises the knowledgeable framework improvement for planning and the start-up of the available resources in terms of men and means.

To constantly adapt the regulations and the structure, it is proposed to update the AIB operational programme annually. In this sense, the Puglia Region is responsible for drafting and approving this programme annually, within which fire management procedures are updated. These updates allow the current knowledge of the territory and any changes in the organisation of the regional civil protection system to be taken into account.

Furthermore, for constantly updating the geographical information layers and planning tools, it is proposed to use a common platform accessible by all the bodies involved in managing civil protection risks, both in deferred time and in the event phase.

In this sense, the Puglia Region has activated the S.IN.A.P.S.I. platform, currently under development and continuous adaptation, to collect, in a systematic and easily accessible manner, all valuable information for risk management.

Given the critical issues identified by the Croatian partnership, it is suggested that existing laws be harmonised to consider the capacities of individual levels of government.

### **3. Towards a common governance approach**

### 3.1 Strategies and tools adopted by partners: a SWOT analysis

This section (Tab. 1) provides an analysis of the strategies and instruments adopted by partners for disaster management, according to the SWOT (strengths/Weaknesses/Opportunities/Threats). Strengths and weaknesses are analysed according to a "country approach", in view to give evidence to the main aspects identified by partners as core topics to be addressed in view to develop a shared and progressively convergent governance scheme. On the other hand, the external factors corresponding to opportunities and threats that may positively or negatively affect the achievement of the stated objective (e.g. the different approaches, forms of organisation, capacities available in the different contexts), are addressed jointly.

**Tab. 1 SWOT analysis of strategies and tools for risk and disaster management adopted by Firespill partners**

Strengths	Weaknesses
<b>On the Italian side</b>	
<ul style="list-style-type: none"> <li>• General capacity for multi-level governance, esp. in coordination with all the agencies holding specific functions (emergency management; social protection; economic relaunch);</li> <li>• In Emilia-Romagna (ER), also:               <ul style="list-style-type: none"> <li>• strong capacity to cooperate with civil society;</li> <li>• accurate Territorial Planning facilitates immediate emergency infrastructure decision making;</li> </ul> </li> <li>• robust public policy (particularly in ER and Marche Region) to promote post disaster economic relaunch;</li> <li>• Multilevel governance mode ensures avoiding risks of economic/demographic desertification post-disaster;</li> <li>• Training of volunteers and the financing in favour of the municipalities for the planning;</li> <li>• Strong role of ICT tools in supporting decentralized management of applications for financial support to private/enterprise reconstruction (regional);</li> <li>• Regional authorities support vulnerable groups in case of disaster;</li> <li>• Centrality of the risk prediction networks in case of disaster;</li> <li>• Centrality of risk awareness campaigns.</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of a widespread and capillary specialised media network;</li> <li>• Regional differences in institutional organization, may lead to overlapping of actors and functions in the decision-making process;</li> <li>• Preservation of several cultural assets on Italian territory;</li> <li>• Regional lack of regulated intervention procedures for specific risks. (e. g. Puglia region)</li> <li>• Frequent undersized staff and equipment for managing emergencies.</li> </ul>

**On the Croatian side**

<ul style="list-style-type: none"> <li>• Quick response capacity and highly skilled human resources;</li> <li>• Equipment and training of central civil protection units, such as firefighters, protection and rescue services, and Red Cross units;</li> <li>• Centrality of effective risk prediction / communication networks in case of disaster;</li> <li>• Centralized management of applications for financial support to private/enterprise reconstruction (national);</li> <li>• National authorities/Civil Protection support vulnerable groups in case of disaster;</li> <li>• Centrality of risk awareness campaigns.</li> </ul>	<ul style="list-style-type: none"> <li>• Complex coordination of civil protection units</li> <li>• Frquent lack of specialised equipment;</li> <li>• Infrastructures non seismic-resistant;</li> <li>• Need for harmonization between different legislative levels, avoiding “over-planning” due to bad legislative coordination.</li> </ul>
<b>Opportunities and threats, on both Italian and Croatian sides</b>	
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• Implementing risk monitoring procedures;</li> <li>• Invest in awareness and prevention.</li> </ul>	<ul style="list-style-type: none"> <li>• Cultural heritage preservation and management at the national scale can become a bottleneck, due to the stricter restoration rules;</li> <li>• The delay in legislative harmonisation across different levels of government may affect the timely management of risk;</li> <li>• At the legislative level, specific procedures on risk assessment often aren't mandatory while for issuing building permits, the opinion of Civil Protection representatives should be binding, at least for critical infrastructure.</li> </ul>

Some observations and considerations

Over the basis of the results provided by the survey, we can stress some relevant elements:

- a. both countries show the presence of a widespread risk management planning, regulating and reducing hazards
- b. the organizational form (and subsequent process governance) depends upon different factors, locally relevant:
  - the level of centralization/decentralization of powers and functions, that influence the grade of autonomy both in risk management planning (although according to common norms, that maybe established also at EU level, as in the case of floods<sup>2</sup>);
  - the capacity in self-organization and coordination of Public Administrations, in particular at interregional, regional and local level (regions, counties/provinces, municipalities);
  - the level of training of Civil Protection and in general of the professionals involved in risk management activities;
  - the level of equipment (including autonomous, effective and long-range communication tools);

- the grade of sensitization and awareness of citizens, their capacity to safely behave in case of an emergency and to collaborate in its management.
- c. apart of the immediate relief intervention, an “effective” response to the disaster implies the capacity to ensure as short as possible the maintenance or restoration of services to citizens and the support to economic activities, avoiding migrations, urban centres desertification, job losses;
- d. damage assessment is still slow and rather “handmade”, in particular about historic and cultural heritage; this calls for technological innovation to speed up processes and standardize assessment results;
- e. the more powers and functions are clearly allocated, the higher the potential effectiveness of governance schemes based upon a centre-periphery coordination and integration;
- f. the Italian experience of the Regional Presidents appointed as Government Deputy Commissioners, with the power to operate by ordnances proved very effective in providing a timely decision making vs. ordinary legislative processes that are mostly very time consuming;
- g. the best performances in post disaster management are observed in the territories in which public-private and institution-civil society cooperation has become the recognition code of territorial networks relationships;
- h. updated territorial planning can be a highly important resource when a rapid decision making is required (e.g. where to locate refugee camps and/or provisional service infrastructures); on the contrary, over-planning and/or non coordinated and integrated multi-level planning may become an obstacle for effective decisions;
- i. in general terms, in case of a disaster citizens remains primarily “victims”, as communication and sensitization campaign, although growing in scale, are still not experience and practice-based (safety drills are still few and non continuous).

### 3.2 From disaster experiences, can we outline a possible “common model”?

With regard to the factors conditioning the implementation of effective responses to emergencies, the cases and experiences of different types of disasters, as emerging from the questionnaire, leads us to consider “local conditions” as the variable that most of all conditions the ability to respond to a disaster of any origin. And it is also the main factor in what makes true “modelling” difficult.

Paraphrasing the scholars Okuyama and Sahin<sup>3</sup>, we can affirm that, although at different levels according to the scale of the event, “a natural disaster throws the entire society against the wall. How much the territorial system economy manages to bounce back depends on the elasticity of the ball, i.e. the resilience of same territory. In this metaphor, the assessment of the impact of a disaster is to measure how hard the ball is smashed against the wall”<sup>4</sup>.

In this sense, the “crushing of the ball” concerns the territorial system in all its aspects: it is also what makes “governance” indispensable as the capacity to implement decision-making processes that involve all stakeholders, ensuring a transparent response to their needs and respect for everyone’s rights.

According to this conceptualisation, summarised in the diagram in figure 4, all levels of governance must work together, coordinating their actions so that the management of an emergency is successful.

Fig.xx: Emergency and reconstruction management<sup>5</sup>

			National level	Regional level	Local level	Other actors
Phases: from the disaster to the	Before	Prevention / mitigation	Attribution of roles and responsibilities			

management of the emergency and reconstruction		Preparation / planning / early warning	Coordination of actions
	After	Response	
		Reconstruction	

According to the UNDP (United Nations Development Programme)<sup>6</sup>, generally speaking, good governance is characterised by a series of criteria that distinguish effectiveness and sustainability, and can be traced back to the following aspects:

1. subsidiarity in the allocation of functions and responsibilities;
2. equity, both in preparedness policies and in access to reconstruction resources;
3. accountability and transparency in decision-making processes;
4. civil commitment of citizens, with much emphasis on democratic participatory processes, as creators of consensus around choices,

to which, according to partners' experience, we may add two more criteria:

5. efficiency of the administrative apparatus, avoiding the creation of new institutions<sup>7</sup>;
6. capacity for leadership.

We can thus affirm that, on the whole, this "package" of criteria, if well balanced within the local/regional institutional setting, can lead to a good degree of efficiency and effectiveness in managing emergency and reconstruction/reclamation processes, by organising cooperation among the existing institutions, from the central to the local level, and with the actors in the affected communities.

Apparently, the most effective operational framework corresponds to the form of a network, rather than strictly hierarchical relations, in which the decision-maker first of all listens, gathers information from all the relevant actors and together with the local communities, creates the synthesis that can best convey information on the damage suffered and on the needs upon which to base adequate decisions<sup>8</sup>.

Therefore and as an example, all things being equal, the disaster stories – e.g the earthquakes and floods hitting Emilia-Romagna, Marche, Friuli Venezia-Giulia and Zadar or the fires in the Dubrovnik – Neretva region or in Split – Dalmatja county<sup>9</sup> - can actually be considered, rather than governance "models", as a proposals for a method. This comes about as a need to create a path capable of providing answers even to the most complex aspects of the emergency and the reconstruction or reclamation management, with an open approach. In other terms, a concrete approach based upon a "learning by doing" attitude, accumulating experience that will be valuable from the point of view of future prevention.

In particular in Italy, if we consider the problems of religious and monumental buildings so hardly hit by the earthquakes of L'Aquila (2009), Emilia-Lombardy-Veneto (2012) and Central Italy (2016 – 2017), this approach and model of intervention on such delicate structures may be probably replicable in the rest of the country and in Croatia as well.

In this regard, however, if we focus in particular the earthquake experiences, it should always be remembered that on one hand, as in the case of Emilia-Romagna (2012), a regional community's "discovery of its vulnerability"<sup>10</sup> may be linked to the under-consideration of the actual extent of the seismic risk, in relation to its history; on the other, the huge endowment in cultural and historical heritage, although bringing a very relevant contribution to the so-called "territorial capital", is also hardly exposed to risk of collapsing, in the case of an earthquake. Indeed, in terms of prevention this claims for opportune seismic re-classification and for better seismic engineering of the buildings.

In the same way, today, common experience suggests that we should also work on significantly increasing citizens' awareness, so that when a risk turns into a real event, their "role" is less and less that of "victims" and more and more that of proactive actors, making the principle of damage minimisation more concrete. From this point of view, Firespill project is providing relevant examples.

Ultimately, the analysis of more than a decade of disastrous events hitting the two countries and in particular the Firespill project area, tells us how complex it can be to have a prepared emergency management



structure in place before an emergency occurs, as disasters are mostly unpredictable in terms of probability of occurrence and actual magnitude.

This is for the many reasons mentioned and also because preparing for the worst is expensive, as it necessarily requires adopting a multi-risk approach. However, we know from experience that this is an approach that “pays off”, as good management capacity on the part of a functioning institutional and social context reduces the scale of impact, including in terms of costs. This is even more the case in a context in which the capacities for both monitoring and forecasting, and emergency management in the strict sense, are improving considerably.

Securing the territory, once again, must be considered a political priority, an investment made in the present with an eye to the future of a country and its community. In this sense, the human capital and the legacy of knowledge and skills accumulated in the reconstruction processes must be put to good use, precisely because of the opportunity to structure a stable form of governance from this, reducing fragmentation, maximising resources and public investment, and guaranteeing community participation.

It is therefore good to remember that *even “models”, if any, need to learn from experience*, especially at a time when, once the emergency has been resolved, services restored, homes and factories rebuilt, it becomes necessary to think in the future in an innovative way, seizing the opportunity to change what is useful to change, e. g. abandoning obsolete spatial planning choices and preparing for the new weaknesses and criticalities that the territory poses by today, especially those linked to local effects of global warming, on energy, water, food production, civil protection, public health, which has proved more vulnerable than expected.

This is the real field of the new challenge of how to concretely decline the mission of increasing what presently we use to call “territorial resilience”.

### 3.3 What resilience and for whom: new governance challenges for territorial sustainability

In general, post-disaster reconstructions can be seen as opportunities for urban and territorial regeneration, in the broadest sense of the term: in this regard, we can consider the famous example of the reconstruction of south-eastern Sicily following the violent earthquake of 1693, which gave rise to the splendid “*Sicilian Baroque*”. Today, in the territories hit by some kind of disaster this opportunity finds the ideal grounds for experimentation and innovation, giving concrete form to the principle of a reconstruction/restoration process that, while safeguarding its historical-cultural, economic and social heritage and identity, looks ahead, trying to outline progressively what and how the “*future territory*” will be.

The historical centres, the productive settlement systems, the open spaces of agricultural production in the setting of the reclaimed land, represent not only the history of the communities that created them, but each piece of territory to be returned to the productive and reproductive processes of local systems and their actors. In this sense, the role of communities in the processes of rebuilding their own spaces emphasises

the importance of *social capital*, of the role of networks of cooperation, reciprocity and trust which enable individuals and groups to carry out actions that would not be possible on their own<sup>11</sup>.

It is a “property” of any territorial context that also constitutes the cornerstone of the “*identity*” of places and communities, which has allowed them to become what they are today. It is not, however, a property with univocal characteristics: it can produce positive effects when used as a basis for innovation and building a territory of better quality, but also negative effects, when it results in a localist defence of assets and interests pre-existing pre-existing to the disaster and in some cases obsolete.

This makes the discussion on the choice between “*adaptation*” (as the capacity to absorb a shock, getting back the the previous state) and “*adaptability*” (as the capacity to “use” the shock to re-engineer the system) - and thus on the concept of “*resilience*” - anything but academic.

Large disasters often represent an epochal rupture, including the potential triggering of important migrations<sup>12</sup>, for the mending of which in several situations important participation processes were carried

out, centred on the direction and objectives of local reconstructions. In these, the needs for immediate physical restoration were superimposed on the objectives of regenerating wounded identity and social cohesion.

But today's framework more and more speaks of other challenges, which in themselves transcend the choices of reconstruction and re-functionalisation of structures damaged by a flood, an earthquake or a large fire, pointing out new risks, linked to the issues of territorial "sustainability" (although this term appears to be largely worn out). For example, the quality of the landscape as a paradigm of a territory's attractiveness, the energy mix and models to support communities, and - last but certainly not least - how to manage water, hitherto treated in the purely emergency-based terms of its seasonal scarcity in relation to a growing demand or of its excess, due to highly concentrated and alluvial rainfalls, and not as the structural problem that – exactly like energy - characterises the present and for most of the year, rather than a more or less far future. In all contexts in which there is a scarcity of strategic resources, whether of a quantitative nature or more linked to cost factors (maximally in contexts hit by relevant disasters, e.g. a long lasting drought), there is a significant risk of the emergence of competition over access to the resources themselves (e.g. water, energy, woods, a clean sea, etc.) both among the actors in a specific territorial community (e.g. agriculture vs. industry and/or vs. standard civil uses), and between distinct and sometimes distant territories. And it goes without saying that patterns of use considered as "sustainable" within a given territory can produce unsustainable externalities in others, even not nearby. An example is the summer 2022 water crisis in the Po River, linked not only to a rainfall deficit, but also to excessive water use in the whole basin in relation to supply, by the production systems located upstream: a negative dynamic determining the rising of the so-called "salt wedge" in the entire delta area.

Even if potentially, the practices of multi-level governance put in place for the management of an emergency and a post-disaster reconstructions or reclamation, represents an important legacy and experience to support new collective actions for the so-called "ecological transition" of territories. By enhancing the capacity for interaction between social and economic actors and the different levels of government, it may also be possible to design new solutions for the strategic problems linked to today's interlinked risks – social, ecologic, economic - which are more than ever characterised by unpredictability and uncertainty, also because of their possible synergic effects.

Faced with the onset of a crisis, communities often demand speed in decision-making, but just as often, the improvement of environmental sustainability conditions requires more knowledge and thus more time; this is, policies pretending to support social and economic "resilience" claim a much shorter time than ecosystems', being also, at least potentially, conflictive (e.g. the recent energy policies to support demand vs. the negative effects of the Ukrainian war, that in fact re-stimulated the use of fossil fuels).

Crisis process governance is thus the right terrain for more robust horizontal and vertical coordination and integration of the different sectors and levels of public policies - including research - and the of actors that contribute to their design, which ensures territorial equity in the distribution of the effects of mitigation and adaptation policies.

For instance, in the case of the climate crisis, unlike an earthquake or flood or other on-the-spot shocks, its effects represent a "slow burn" that, tends to corrode slowly but constantly territorial cohesion, exacerbating divisions when, it is perceived that the allocation of resources creates winners and losers, especially when availability and supply does not keep pace with demand. This is the case e.g. of over-utilization of the water (for civil and other purposes) upstreams in a water basin, penalising all the other users (civil and productive) located downstream This brings with it the risk of flight for those missing sufficient resources to keep up in the competition for resources (e.g. weaker companies, with less funds to invest in water saving technologies), tensions in the fabric of institutions and organisations, between generations and social and political factions , and between different geographical areas.

Therefore, addressing the question of *what kind of resilience and for whom* highlights the importance of understanding what kind of territorial system adaptability a community wants actually to pursue, according

to what time perspective and with what externalities. Pursuing a higher level of resilience encourages consideration of both short-term, reactive responses to shocks, and long-term, proactive strategies. The short-term necessarily addresses the quantitative aspects of immediate emergencies, such as post-disaster reconstruction or the crisis of production systems with possible job losses, caused by cost overruns related to energy and/or water shortages, with “fire-fighting” measures aimed at mitigating their negative effects.

A longer-term vision can instead better address the qualitative aspects, drawing possible structural exit routes from the immediate crisis situations, with more suitable paths to respond appropriately to the recurrence of the manifestations of the crisis itself and minimising externalities. Following our example, promoting an ecological transition that secures the territory not only seismically or hydrologically but also, e.g., reducing in absolute terms the demand for energy and water from the entire territorial system.

The pursuit of a more crisis-resilient territory, in the above-mentioned sense, emphasises the need for intelligent institutional leadership, with the sensitivity and preparedness to manage rapid and pervasive changes, capable of contextualising the nature of events and constructing a narrative of strategic adaptation involving regional and local actors. This is a need for which the relative “*institutional memory*” of having managed a disaster<sup>13</sup>, if properly taken advantage of, can be very valuable. Exactly as it is the “*social memory*”, for which continuous sensitization and capacity building can mould citizens from simple potential “victims” to proactive actors in managing emergencies.

“Resilient” and effective disaster management have a lot to do with the *ecological transition*, today largely pursued by EU and international policies; and this paradigm poses a central question to governance: how to ensure that “sustainability” - understood as the capacity to preserve and improve the shaky equilibrium of a territorial (eco)system - does not become a mere “*compensation for the damage*” produced by a disaster, “patching up” local systems with short-term emergency measures and without questioning the structures that stand at the roots of the disaster itself (be it an instant shock or a *slow burn*)<sup>14</sup>.

On the contrary, for any area hit by catastrophic events, a disaster should represent a real testing ground for a new season of development and transformation of the territory, in which the recovery of places of identity and the need to relocate functions, to define new and less risk-vulnerable urban polarities with better quality public spaces and better connections with the rural space, to re-launch and innovate production activities and services, will have to measure themselves not only against the challenges of the digital and technological transition, but also, and perhaps above all, against ecological challenges and the threat they represent to citizens’ safety.

This is a scenario that today also implies greater territorial “*attractiveness*”, for citizens as a place to live and work, for businesses as a place to maintain and multiply their investments, for everyone as a place to discover. Definitely, for a territorial system open to change, although when considered a “model” in risk management, an unforeseen catastrophic event may represent a challenge also in terms of lessons learnt to improve the model itself.

### **D.3.4.3 | Common approaches developed in the form of the governance model methodology for reconstruction after a natural disaster aimed at developing the territory damaged by the natural disaster (physical, social-economic, cultural heritage)**

Disaster risk assessment is a qualitative and quantitative approach aimed at determining the nature and extent of disaster risk analyzing potential hazards and evaluating existing conditions of exposure and vulnerability that could harm people, property, services, livelihoods, and the environment.

This questionnaire is intended to collect information concerning disaster management per each partner involved in the FIRESPELL Interreg project, also in view of the ways to promote post disaster recovery and future territorial development. The questions, built according to the disaster management cycle developed by UNDP, asks the main action taken before, during and after a disaster. The questions target the Mitigation, Preparedness, Response, and Recovery actions.

By completing this survey, you will help to build Common approaches developed in the form of the governance model methodology aimed at defining and developing the territory damaged by natural and man-made disasters.



Università  
degli Studi  
di Ferrara

DA Dipartimento  
Architettura  
Ferrara

Thank you for your cooperation.

**Name and Surname:**

**Mail Adress:**

**Organization:**

**Role in the Firespill project (if any):**

## Section 1 | Risk Management

1. *What are the main risks faced by your country? (one or more options are possible)*

- Floods
- Wildfires
- Earthquakes
- Pandemics/ Epidemics
- Industrial accidents
- Marine Transport accidents
- Other, please state.....

2. *What level of exposure does the population have to these hazards/threats? (Is it better/worst handled in the countryside or populated areas?)*

Please describe...

3. *Does your regulation require a mandatory risk assessment plan before the construction of buildings or infrastructures?*

YES  NO

3.1 *If yes, does the evaluation is made for all kinds of risks? (floods, earthquakes, fires, incidents, etc..)?*

YES  NO

If only few are considered, please name the risks...

4. **Please list the most calamitous event occurred in your country in the last ten years (earthquakes, forest fires and/or oilspills)**  
Please, describe...

5. **Based on the basic emergency response action here listed, what are the main recovery post-disaster actions implemented by your local/national government and/or Civil Protection system after the disaster(s) described?**

**Event #1**

Emergency Response Action	Recovery Post Disaster Actions
Evacuation and Return of Population	
Clearing debris and waste	
Emergency medical attention	
Damage Assessment	
Public security (roles and coordination)	
Restoration of habitat (if applicable, e.g., oils spilling, fires)	
Reconstruction of Infrastructure	

**Event #.. (x)**

Emergency Response Action	Recovery Post Disaster Actions
Evacuation and Return of Population	
Clearing debris and waste	
Emergency medical attention	
Damage Assessment	
Public security (roles and coordination)	
Restoration of habitat (if applicable, e.g., oils spilling, fires)	
Reconstruction of Infrastructure	

6. **Has the disastrous event described been fully restored?**

YES

NO

1. *If no, please describe the current situation*

7. ***Do the existing regulations concerning natural and man-made disasters of your region have been subject to “extraordinary” modifications in order to deal with the disaster?  
Please describe...***
  
8. ***In your opinion, what are the main strengths of your governance model concerning disaster management? In particular, did the instruments available (regulations, organization of your structure, means and equipment available, etc.) ease the job to be done?  
Please state your opinion..***
  
9. ***In your opinion, what are the main weaknesses of your governance model concerning disaster management? Please, focus in particular on the difficulties encountered in carrying out the disaster management and the solutions adopted  
Please state your opinion..***
  
10. ***What recovery actions are planned for the private sector (businesses and industries) by your government after a disaster?  
Please indicate what are the measures provided...***
  
11. ***What support actions targeting vulnerable groups were introduced after a disaster (women, children, people with disabilities, the elderly, indigenous, and minority communities) from your state/ institutions of provenience?  
Please describe...***
  
12. ***Do your institutions implement special communication channels connecting all the key players (referring to the first responders in hospitals, the Civil Protection department, Red Cross, etc..) involved in emergency first action?***

YES

NO

*If yes, please describe..*

13. ***After a disasters, to your knowledge, do you/your institutions implement effective disaster awareness campaigns?***

YES

NO

*13.1 If yes, choose the place or places where the awareness campaign is carried out (more than one option is possible)*

Schools

Universities

Workplaces

Public Bodies

All of them

other...

14. ***If any, after a disaster, do your institutions have promoted recovery actions and/or new development policies, addressing in particular the social and economic sectors and/or the territories mostly hit by the event?***

YES

NO

*If yes, please describe..*

15. ***If yes, which type of effects have produced/are producing such type of measures?***

*Please describe..*



**16. *What do you suggest to improve the tools available (legislation, plans, means and equipment, etc.) in order to optimize risk management, according to your state of art (strengths/weaknesses)?***  
*Please describe.*