



Peer review – report Portugal 2019



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Peer review

Portugal 2019

2018-2019 Programme for peer reviews in the framework of EU cooperation on civil protection and disaster risk management.



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Acknowledgements

The time and expertise dedicated by the peers was essential for the completion of this report. The peer review team was composed of four peers:

- ▶ **Vittorio Bosi**, Training Services, Civil Protection Department of Italy;
- ▶ **Sofía González López**, Expert in Natural Risks and Disaster Risk Management, Spanish Civil Protection;
- ▶ **Oliver Nestler**, Chief of Operations, Fire Department Dortmund, Germany;
- ▶ **Nicholas Paris**, Expert in Risk Management, Cyprus Civil Defence.

Figure 1: Peer review team and representatives of the National Authority for Emergency and Civil Protection (ANEPC)¹



Nacira Boulehouat, Judith Sorensen and João Silva supported and took part in the mission on behalf of the European Commission's Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO). Jack Radisch and Charles Baubion furthermore contributed with their experience and knowledge on conceptualising and implementing peer reviews on behalf of the Organisation for Economic Co-operation and Development (OECD). A consortium led by Ecorys Nederland B.V. assisted the Commission in carrying out the peer review. Willem Bloem from Ecorys Nederland B.V. and Claudia Berchtold from Fraunhofer INT were project managers for Portugal and provided technical and administrative support to the peers throughout the review process.

The peer review would not have been possible without the significant contributions of all the stakeholders consulted in Portugal, which provided the review team with invaluable inputs throughout their stay in the country. The National Authority for Emergency and Civil Protection (ANEPC) volunteered to undergo the peer review on behalf of Portugal and provided onsite support throughout the mission. Particular thanks are due for the full commitment of the Head Office's staff, and for the full-time logistical support provided by Carlos Mendes, Patrícia Pires, Isabel Santana and Isabel Pais.

The peer review was financed by the European Union.

¹ From left to right: Nicholas Paris, Oliver Nestler, Claudia Berchtold, Sofía González López, Isabel Santana, Patrícia Pires, Charles Baubion, Isabel Pais, João Silva, Nacira Boulehouat, Vittorio Bosi, Carlos Mourato Nunes, Willem Bloem, Jack Radisch, Judith Sorensen, Carlos Mendes, José Oliveira

List of abbreviations

| Abbreviation | Definition |
|----------------|---|
| AGIF | Agency for the Integrated Management of Rural Fire |
| APA | Portuguese Environment Agency |
| ANACOM | National Authority for Communications |
| ANEPC | National Authority for Emergency and Civil Protection |
| CEIF | Forest Fire Research Centre |
| COP | Common operational picture |
| DG ECHO | Directorate-General for European Civil Protection and Humanitarian Aid Operations |
| DGS | Directorate-General of Health |
| DGT | Directorate-General for Territorial Development |
| DRM | Disaster risk management |
| EDP-D | EDP Distribuição (Portugal's mainland energy distributor) |
| ENAAC | National Strategy for Climate Change Adaptation |
| ENB | National School of Firefighters |
| EU | European Union |
| GNR | National Guard |
| ICAMAOT | General Inspectorate for Agriculture, Sea, Environment and Spatial Planning |
| INEM | Medical Emergency National Institute |
| IPMA | Portuguese Institute for the Sea and Atmosphere |

| | |
|--------------|---|
| LNEC | National Laboratory for Civil Engineering |
| NATO | North Atlantic Treaty Organisation |
| NRA | National Risk Assessment |
| PNEPC | National Emergency Civil Protection Plan |
| SGIFR | Rural Fire Management System |
| SIOPS | Integrated System for Relief Operations |
| UCPM | Union Civil Protection Mechanism |
| UNDRR | United Nations Office for Disaster Risk Reduction |

Executive summary

The Portuguese civil protection system can be characterised as a multi-level system with responsibilities at national, district and local (municipal) level. Within this system, the municipal level is the principal actor in designing and implementing disaster risk management (DRM) measures. At national level, a set of guidelines was designed to support DRM activities that are also partly overseen by the national government, for example the development of emergency plans. The district level plays an intermediate role in this system, a role based on guidance and coordination. By following the principle of subsidiarity, this set-up is very efficient and allows local specificities to be considered. At the same time, however, the set-up is dependent on the availability of local resources and capabilities and hence the actual status of DRM measures varies according to the local context.

Overall, the Portuguese civil protection system has been and still is undergoing major changes and adaptations with respect to actors, responsibilities and developments, which represent challenges, but also great opportunities. In this context, it is well noted that all actors work jointly and continuously on enhancing the system and are very much aware of and willing to close the remaining gaps.

Existing good practices and recommendations are detailed in the report in three main sections:

1. Comprehensive DRM approach, which includes the political and legal framework, as well as aspects of public awareness or financing;
2. Prevention, which covers the risk assessment and planning process; and
3. Preparedness, encompassing early warning, capability analysis and training, among other areas.

The most important recommendations are summarised below:

Comprehensive DRM approach

- **Further facilitate coordination between governance levels and actors:** coordination among actors and between governance levels is one of the main strengths but also challenges of the Portuguese civil protection system. Since many activities are implemented at municipal level, it could be beneficial to strengthen coordination efforts. For example:
 - ▷ The Agency for the Integrated Management of Rural Fire (AGIF) could serve as a blueprint to establish a more coordinated approach to managing the risk of wildfires and to facilitate better coordination between the multiple levels – national, district and municipal – and multiple actors involved at each level.
 - ▷ The training of mayors is an outstanding procedure. It would be more effective if training were to become mandatory or in some way more disseminated, ensuring good and more uniform knowledge about risks and civil protection responsibilities at municipal level.
 - ▷ Exchange of good practices among the municipalities should be facilitated, for example through a dedicated platform and/or annual fair.

- ▶ **Nominate ‘Competence Centres’:** nominating dedicated Competence Centres, chosen at national level for certain scientific fields, could ensure a more coherent use of information across the country and avoid fragmented or contradictory information.
- ▶ **Develop an integrated communication strategy:** an integrated communication strategy is needed at national level and should be developed in order to provide guidance to the municipalities and establish a single source of information. It should also include:
 - ▷ the diversification of communication measures for different (vulnerable) population sub-groups,
 - ▷ a survey on societal risk perceptions, which will enhance the process of communication.
- ▶ **Even out imbalances in the availability of resources at local level:** a sound funding mechanism should be developed to even out the imbalances in funding and align the resources with the activities required at municipal level, especially for those risks that can have an impact at regional and national level. In addition, a national fund should be developed. This may support the municipal level upon request and based on selection criteria. It may also be used to set priorities in DRM activities.

Prevention

- ▶ **Consider cascading effects:** currently, the National Risk Assessment (NRA: ANEPC, 2019) considers risks very much separately. However, the inclusion of cascading effects, such as failures of infrastructure or Seveso establishments (establishments where dangerous substances are used or stored in large quantities), should be implemented at national level and translated to the district and municipal levels.
- ▶ **Flag mandatory assessment needs at local level:** municipalities that are particularly exposed to certain hazards should be flagged up at national level as requiring more detailed and localised assessments. The integration of a more detailed analysis should be mandatory at municipal level and go beyond risks at Seveso establishments, dam breakage and earthquake/ tsunami risks.
- ▶ **Translate risk assessments into land management effectively:** risk assessments should translate efficiently into land management planning in a consistent manner across the country. While this is already envisaged in the current legislation, it seems that risks are not always reflected in local land-use plans.
- ▶ **Consider earthquake and tsunami risk more prominently in critical infrastructure and Seveso establishments:** earthquake and tsunami events should play a more prominent role in contingency planning of ports, critical infrastructure and Seveso establishments. Currently, they seem to play only a limited role in the planning of these infrastructure and facilities, which could have devastating, cascading impacts in case of an event.

Preparedness

- ▶ **Establish an efficient multi-risk early warning system:** building in the NRA, it is necessary to implement an efficient multi-risk early warning system that allows the exposed population to receive relevant and timely information in a systematic way, so that they can take informed action.
- ▶ **Enhance collaboration between operators, authorities and the public in relation to risks at Seveso establishments:** as technical measures and inspection procedures are very well developed in Portugal, further improvement in implementing the Seveso directives should focus on the links between operators and authorities. It should also focus on enhanced public participation in assessment and planning procedures to ensure harmonisation between the operational procedures of operators and authorities, as well as harmonisation with the behaviour of the affected population.
- ▶ **Facilitate the engagement of volunteers:** volunteer civil protection resources (in fire brigades and other voluntary organisations) should be backed by providing the best possible education, equipment and appreciation, as they are a very good and cost-effective way to ensure a sufficient number of operational assets.

1. Introduction

Peer review is a governance tool whereby the performance in disaster risk management (DRM) and civil protection of one country ('the reviewed country') is examined on an equal basis by experts ('reviewing peers') from countries participating in the Union Civil Protection Mechanism (UCPM) and eligible neighbouring countries. The process is based on exchange of experience, resulting in non-binding recommendations aimed at policy improvements in DRM and civil protection. The peer review process provides an effective way to i) facilitate exchange of good practices, ii) strengthen mutual learning and common understanding, and iii) deliver credible and trusted recommendations.

Under the European Union (EU) civil protection legislation (Decision No 1313/2013/EU), peer reviews can contribute to policy on both prevention and preparedness. The scope of the peer review is defined by the reviewed country, which can opt for either a 'thematic' or a 'comprehensive' peer review. Peer reviews strengthen cooperation between participating states and contribute to an integrated approach to DRM by linking risk prevention, preparedness and response actions. The peer review process consequently has the potential to foster wider policy dialogue in Europe, improve consistency and steer progress in critical areas for EU cooperation on civil protection and DRM. After two pilots (in the United Kingdom and Finland), a first round of peer reviews took place between 2015 and 2016, covering Bulgaria, Estonia, Georgia, Malta, Poland and Turkey. The peer review of Portugal is part of the second round, which also covers Algeria, Cyprus, North Macedonia, Serbia and Tunisia.

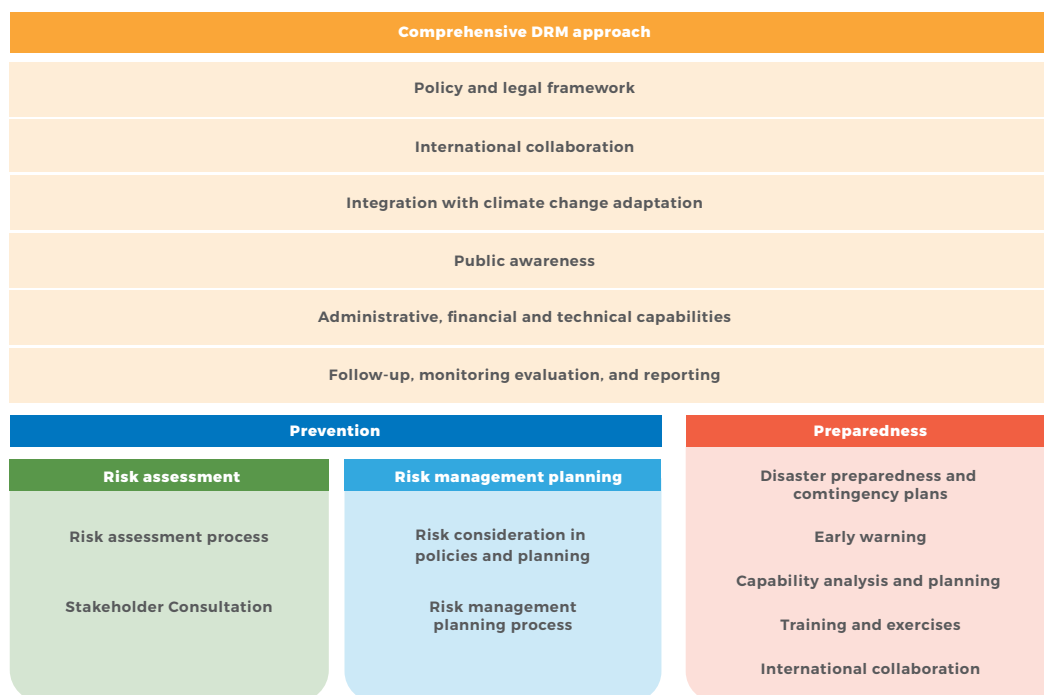
The objectives of the peer review programme are as follows:

- ▶ Contribute to improved policy-making on national DRM and civil protection through mutual learning and external assessment by reviewing experts from other countries acting as peers;
- ▶ Contribute to the development and implementation of relevant EU policies and steer progress in priority actions for EU cooperation on DRM and civil protection, including where relevant a contribution to the implementation at national level of the international framework for disaster risk reduction (the Sendai Framework for Disaster Risk Reduction);
- ▶ Increase the consistency between the different national DRM and civil protection policies and stimulate transferability of good and innovative practices;
- ▶ Foster policy dialogue in Europe and enhance regional cooperation between countries exposed to common or similar hazards and risks;
- ▶ Encourage awareness raising through involvement of all stakeholders in the review process and wide dissemination of the results;
- ▶ Ensure visibility and political commitment at a high level to promote the DRM agenda..

1.1 Scope of the review

As part of its participation in the 2018-2019 peer review programme, Portugal opted to undergo a full review, focussing on risk assessment as part of the disaster risk reduction process. The general 2018-2019 peer review framework incorporates comprehensive principles developed at both the global (namely the Sendai Framework for Disaster Risk Reduction and its predecessor, the Hyogo Framework for Action) and European (namely the UCPM) levels. This general framework was further specified in line with the thematic focus. The resulting review framework also covers the processes of risk assessment and risk management planning. Guiding questions were developed for each of the sub-processes to streamline the peer review process across participating countries. An overview of the sub-processes explored during the Portugal peer review can be found in **Figure 2** below. In terms of hazards, a focus was put on wildfires², earthquakes, tsunamis and chemical, biological, radiological or nuclear (CBRN) risk related to Seveso establishments (establishments where dangerous substances are used or stored in large quantities). In terms of geographic coverage, the review focused on mainland Portugal, with additional input from the autonomous regions of the Azores and Madeira.

Figure 2: Overview of the review framework for Portugal



Based on the reviewed aspects, as detailed in the framework, this report identifies good practices and proposes a series of recommendations. It is for the Government of Portugal to consider and determine whether and how the recommendations should be implemented to contribute to their policy goals.

² In general we refer to the broader concept of wildfires encompassing the unintended burning of landscapes. In certain parts of the report, reference is made for example to forest fires as a result of a more specific focus in these sections and/or particular organisational structures with a respective framing.

1.2 Review process

Once Portugal's participation in the DRM peer review was confirmed, a call for nominations of experts was sent to countries participating in the UCPM and eligible neighbouring countries. Four peers from EU Member States — Cyprus, Germany, Italy and Spain — were chosen to participate. The peers were supported in their tasks by the European Commission, the Organisation for Economic Co-operation and Development (OECD) and a project team contracted by the European Commission.

The peer review mission was conducted over a 12-day period from 16 to 27 September 2019. The review opened with a meeting with representatives engaged in civil protection activities in Portugal. During the mission in the country, the peer review team met with and interviewed stakeholders from many different organisations, government agencies and/or authorities, volunteer organisations and academia (see Annex III). The team was also given access to a number of documents concerning risk assessments and disaster management in Portugal. A list of the most important of these documents can be found in Annex II.

The peer review team presented their initial findings during a stakeholder meeting in Lisbon on 12 December 2019. The review was discussed during a panel discussion, as well as in smaller groups, with representatives of various stakeholders.

This report represents an analysis of the situation in Portugal as of September 2019. Later developments are not taken into account. Furthermore, the report reflects selected good practices and recommendations resulting from the field visits and interviews conducted during the mission, but cannot be viewed as an encompassing overview of the civil protection system with all its specificities.

Figure 3³: The peer review team and European Commission representative



3 From left to right: Sofía González López, Nicholas Paris, Oliver Nestler, Vittorio Bosi, João Silva

1.3 Country profile

1.3.1 Overview

The Portuguese Republic is a country located mostly on the Iberian Peninsula in south-western Europe. Lisbon is the country's capital and largest city. In total, Portugal has around 10.3 million inhabitants. Mainland Portugal is located in the south-western edge of the European continent, with an extensive coastline to the west and south. The country is approximately 560 km long from north to south and it spans around 220 km from west to east at its widest point. The total area of mainland Portugal is 89 089 km². Its territory also includes the Atlantic archipelagos of the Azores and Madeira, which are both autonomous regions with their own regional governments.

Figure 4: Map of Portugal



Mainland Portugal is split by its main river, the Tagus, which flows from Spain and discharges in the Tagus Estuary, in Lisbon, from which it enters the Atlantic Ocean. The northern landscape is largely mountainous inland, with several plateaus indented by river valleys, whereas the southern part of the country, including the Algarve and Alentejo regions, is characterised by rolling plains.

Portugal has a Mediterranean climate and is one of the warmest European countries: the annual average temperature in mainland Portugal varies from 8–12 °C (46.4–53.6 °F) in the mountainous, inland part of the north to 16–20 °C (60.8–68.0 °F) in the south and on the Guadiana river basin.

In administrative terms, the mainland is currently divided into three levels: districts, municipalities and parishes. In this context, continental Portugal is made up of 18 districts (**Table 1**), 278 municipalities and 2 882 parishes.

Table 1: Areas of mainland Portugal⁴

| District | Number of municipalities | Number of parishes | Area | | |
|----------------------------------|--------------------------|--------------------|-----------------|------------------|------------|
| | | | km ² | ha | % |
| Aveiro | 19 | 147 | 2 801 | 280 100 | 3 |
| Beja | 14 | 75 | 10 263 | 1 026 332 | 12 |
| Braga | 14 | 347 | 2 706 | 270 611 | 3 |
| Bragança | 12 | 226 | 6 599 | 659 855 | 7 |
| Castelo Branco | 11 | 120 | 6 627 | 662 747 | 7 |
| Coimbra | 17 | 155 | 3 974 | 397 373 | 4 |
| Évora | 14 | 69 | 7 393 | 739 346 | 8 |
| Faro | 16 | 67 | 4 997 | 499 680 | 6 |
| Guarda | 14 | 242 | 5 535 | 553 531 | 6 |
| Leiria | 16 | 110 | 3 506 | 350 590 | 4 |
| Lisbon | 16 | 134 | 2 803 | 280 282 | 3 |
| Portalegre | 15 | 69 | 6 084 | 608 434 | 7 |
| Porto | 18 | 243 | 2 332 | 233 170 | 3 |
| Santarém | 21 | 141 | 6 718 | 671 823 | 8 |
| Setúbal | 13 | 55 | 5 214 | 521 404 | 6 |
| Viana do Castelo | 10 | 208 | 2 219 | 221 882 | 2 |
| Vila Real | 14 | 197 | 4 307 | 430 747 | 5 |
| Viseu | 24 | 277 | 5 010 | 500 979 | 6 |
| Mainland Portugal (total) | 278 | 2 882 | 89 089 | 8 908 886 | 100 |

⁴ European Commission (2019)

1.3.2 Disaster risk profile

The top five disasters reported in Portugal for the period 1990 to 2019, ordered by number of people killed, number of people affected and economic damage, are detailed below. Information is based on the EM-DAT database⁵, which contains essential core data on the occurrence and effects of over 22 000 mass disasters in the world from the year 1900 to the present day.

Table 2: Overview of natural disasters in Portugal, 1990-2018

| Disaster | Year | No. killed |
|---------------------|------|------------|
| Extreme temperature | 2003 | 2 696 |
| Extreme temperature | 2005 | 462 |
| Flood | 2010 | 43 |
| Wildfire | 2017 | 64 |
| Wildfire | 2017 | 45 |

| Disaster | Year | No. affected |
|----------|------|--------------|
| Flood | 1996 | 2 000 |
| Wildfire | 2003 | 150 000 |
| Storm | 2013 | 3 967 |
| Wildfire | 2016 | 1 161 |
| Wildfire | 2017 | 2 771 |

| Disaster | Year | Damage |
|------------------|------|--------|
| (1 000 000 US\$) | 2003 | 1 730 |
| Drought | 2004 | 1 338 |
| Wildfire | 2005 | 1 650 |
| Flood | 2010 | 1 350 |
| Wildfire | 2017 | 500 |

⁵ EM-DAT (2019), the international disaster database run by the Centre for Research on the Epidemiology of Disasters – CRED.

Table 3: Hazard exposure⁶

| Hazard | National exposure ⁷ | Prevalence | Additional details |
|-----------------------|---------------------------------------|--|---|
| Coastal floods | High | Potentially damaging and life-threatening river floods are expected to occur at least once in the next 10 years. | |
| Cyclone | Very low | There is less than a 1 % chance of potentially damaging cyclone-strength winds in the next 10 years. | |
| Earthquakes | Medium | There is a 10 % chance of potentially damaging earthquake shaking in the next 50 years. | The most critical infrastructure prone to possible earthquakes are airports and seaports to the south to Lisbon, and the main transportation routes, including bridges and railways, in the districts of Lisbon, Santarem, Setubal and Faro. Several hospitals, fire units, National Republican Guard (GNR), Public Security Police, armed forces and the building of ANEPC are located in these districts. Finally, attention must be drawn to several dams, electricity networks and natural gas pipelines. |
| Extreme heat | Medium | There is more than a 25 % chance that at least one period of prolonged exposure to extreme heat, resulting in heat stress, will occur in the next five years. | The intensity with which these waves occur is not identical in all the regions of mainland Portugal, partly due to the softening effect of the Atlantic Ocean. |
| Landslide | Low | The area has rainfall patterns, terrain slope, geology, soil, land cover and (potentially) earthquakes that make localised landslides an uncommon hazard phenomenon. | Major transport routes (motorways and/or main roads) in areas of greatest susceptibility to mass movements are located in the districts of Viana do Castelo, Braga, Vila Real, Porto, Viseu and Lisbon. |

⁶ Information taken from the Think Hazard (2019) database, which is run by the Global Facility for Disaster Reduction and Recovery (GFDRR) with a range of partners such as the World Bank and the UN Office for Disaster Risk Reduction (UNDRR).

⁷ For overview purposes, exposure is defined at national level (naturally, exposure is more varied at regional level).

| Hazard | National exposure | Prevalence | Additional details |
|-----------------------|-------------------|---|---|
| River flood | High | Potentially damaging and life-threatening river floods are expected to occur at least once in the next 10 years. | In mainland Portugal, the main regions with greater susceptibility to occurrence of flooding (high degree of susceptibility) are the areas of the valleys of the Sado, Tagus (Lezíria do Ribatejo) and Mondego rivers, the Vouga estuary (Ria de Aveiro), the mouth of the Douro river and the stretch of the Douro river in Peso da Régua. |
| Tsunami | Medium | There is more than a 10 % chance of a potentially damaging tsunami occurring in the next 50 years. | |
| Urban flood | High | Potentially damaging and life-threatening urban floods are expected to occur at least once in the next 10 years. | Often floods are the result of heavy (above-average) rainfall during winter and in various river basins. |
| Water scarcity | Medium | There is up to a 20 % chance that droughts will occur in the next 10 years. | |
| Wildfire | High | In any given year there is more than a 50 % chance of encountering weather that could lead to a significant wildfire that would be likely to result in both life and property loss. | |

Vulnerability

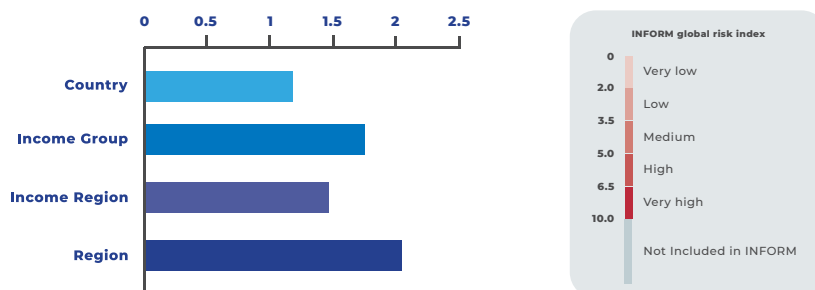
Vulnerability relates to the set of characteristics and circumstances of a community or system that make it susceptible to the damaging effects of a disaster. It can also be understood as the ‘human dimension of disasters’⁸. For the purpose of this country briefing, vulnerability is measured through reference to the vulnerability variable included in the INFORM index.⁹

Table 4: Vulnerability

| Vulnerability | Score ¹⁰ |
|------------------------------|---------------------|
| Socio-economic | 1.3 |
| Development & deprivation | 1.6 |
| Inequality | 2 |
| Aid dependency | 0 |
| Vulnerable groups | 1 |
| Uprooted people | 1.4 |
| Other vulnerable groups | 0.5 |
| Overall vulnerability | 1.2 |

Portugal has a relatively low vulnerability as compared to its income group and region. In the chart pictured, ‘*Income Group*’ relates to the average score of countries in the same income group; ‘*Region*’ relates to average score of countries in the same region; and ‘*Income Region*’ is the average score of countries in the same income group and the same region.¹¹

Figure 5: Vulnerability



⁸ See <https://www.preventionweb.net/risk/vulnerability>.

⁹ The INFORM Index is based on a collaboration of the Inter-Agency Standing Committee Reference Group on Risk, Early Warning and Preparedness and the European Commission. The European Commission's Joint Research Centre is the technical lead of INFORM. INFORM has been developed in response to recommendations by numerous organisations (for example, the Commission's Directorate-General for Humanitarian Aid and Civil Protection, the World Bank and the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA)) to improve the common evidence basis for risk analysis. In order to be comparative, the index makes use of indicators that reflect a simplified view of the reality.

¹⁰ Scale: 0 (best) – 10 (worst)

¹¹ Ibid.

Lack of coping capacity

Lack of coping capacity derives from structural shortcomings (whether institutional or infrastructural) that limit a country's ability to effectively respond to, and prepare for, disasters. For the purpose of this report, this is measured through the lack of coping capacity variable included in the INFORM index¹².

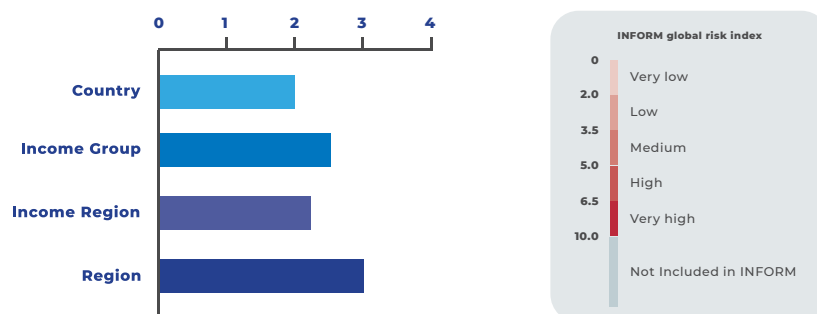
Table 5: Lack of coping capacity

| Lack of coping capacity | Score ¹³ |
|--|---------------------|
| Institutional | 2.9 |
| Disaster risk reduction | 2.6 |
| Governance | 3.2 |
| Infrastructure | 0.9 |
| Communication | 2.2 |
| Access to health care | 0.4 |
| Physical infrastructure | 0 |
| Overall lack of coping capacity | 2 |

Portugal's lack of coping capacity score is slightly below the average of comparable income groups in the region.

As for vulnerability, in the chart pictured, '*Income Group*' relates to the average score of countries in the same income group; '*Region*' relates to average score of countries in the same region; and '*Income/Region*' is the average score of countries in the same income group and the same region.

Figure 6: Lack of coping capacity¹⁴



¹² Ibid

¹³ Scale: 0 (best) – 10 (worst)

¹⁴ Ibid

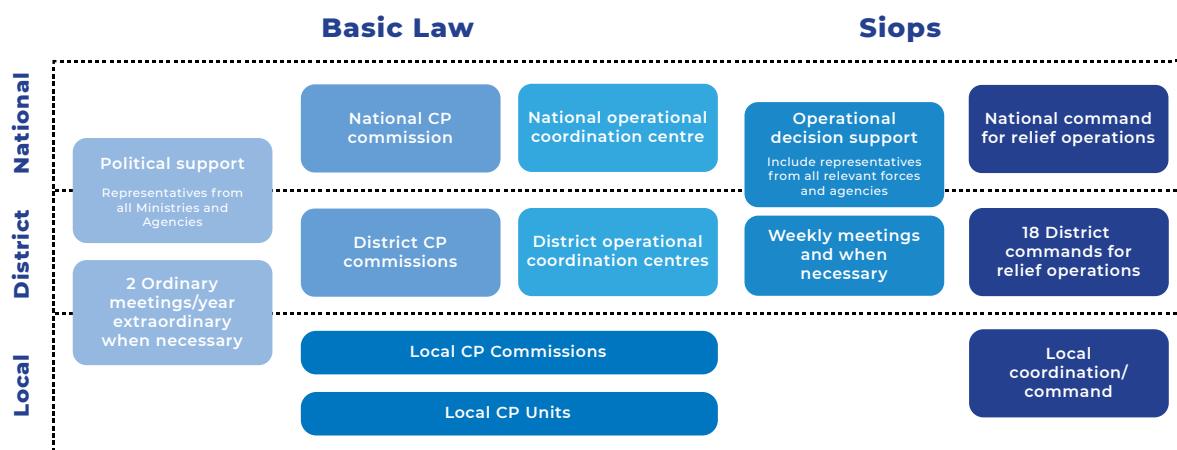
1.3.3 National DRM system

In Portugal, the Law on Civil Protection defines civil protection as the activity carried out by the State, Autonomous Regions and Local authorities, by citizens and by all public and private entities with the aim of preventing collective risks, mitigating their effects and protect and help people and property in danger when disasters happen. It is, by nature, a permanent cross-sectorial and multidisciplinary activity, between all bodies of public administration, that have, on a decentralized way of action, the responsibility to conduct its' execution.

In 2006, the Law on Civil Protection established an Integrated System for Relief Operations (SIOPS), which This system is a set of structures, standards and procedures that ensure that all civil protection agents act, at the operational level, in a coordinated way and under a single command, to respond to emergency situations (already declared or foreseen), without prejudice to their hierarchical and functional dependence.

The national disaster management system is therefore legally established and well organized, with different coordination levels, as illustrated in the figure.

Figure 7: The national disaster management system

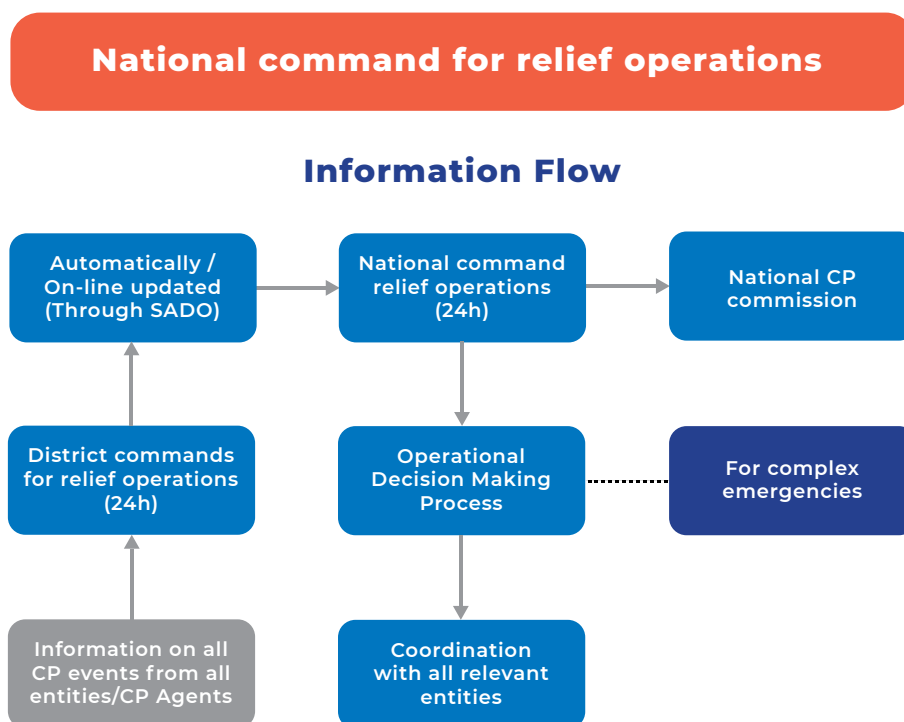


The single command established through the SIOPS system relies on the responsibility of the ANEPC. The ANEPC is responsible for planning, coordinating and executing civil protection policy – namely in the fields of prevention and response to major accidents and disasters, protection and relief and superintendence of fire brigades – as well as for planning and coordinating national needs in the area of civil emergency planning for crisis or war situations. With a national responsibility, the ANEPC performs its mission with an internal organisation that foresees one Director General, 4 Deputy Directors responsible for different areas, and a national command that coordinates all relief operations.

The civil protection system is decentralised, which means that it starts at the local level, then the district, regional and finally national level. Civil protection activities are therefore performed by different actors at different organisational levels, each with a set of competencies and responsibilities established by law.

It is also important to highlight that the information related to any kind of civil protection operation is registered by the fire brigade at local level via a web platform called 'SADO'. It is immediately made available to the higher levels (the SADO platform is visible 24/7 on all ANEPC operational rooms), so that the District Commands and National Authority have all the information they require to decide on and apply appropriate operational measures.

Figure 8: National command for relief operations



SIOPS has a permanent response capacity. The first response comes from firefighters at local level, complemented by two reinforcement capacities: around 1 000 military personnel from the GNR, called the 'Relief and Protection Intervention Group', and around 300 professional firefighters from the ANEPC, known as the 'Civil Protection Special Force'.

The first response capacity is mainly made up of volunteers (around 90 % of firefighters). There are around 30 000 firefighters on active duty. These firefighters make up the most important civil protection agent in Portugal. In order to promote efficient operational responses, there are specific guidelines that detail the operational response measures, in order to ensure that each civil protection agent knows their function, position and responsibilities.¹⁵

1.3.4 Disaster management entities

The Portuguese civil protection structure is organised at the national, regional, district and municipal levels. The responsibility for the country's overall civil protection policy lies with the government, which guides the policy to be adapted or proposed in this field of intervention. Specifically, the Prime Minister and the Ministry of Internal Administration are responsible for directing the civil protection policy at national level. A National Command for Relief Operations operates 24 hours a day within the ANEPC to control and manage operations on an ongoing basis.

At municipal level, the local mayors are responsible for civil protection. In each municipality, there is a Municipal Civil Protection Commission responsible for coordinating civil protection. Each municipality is also equipped with a Municipal Civil Protection Coordinator and a Municipal Civil Protection Service, which reports to the mayor and is in charge of aspects including the prevention and assessment of risks and vulnerabilities, planning and support for operations, logistics and communications and public awareness raising.

At sub-municipal level (parishes), the parish leaders can establish so-called Civil Protection Units to support municipalities in their civil protection activities.

The Law on Civil Protection establishes the following civil protection agents:

1. Firefighters;
2. Security forces;
3. Armed forces;
4. The National Maritime Authority;
5. The National Authority for Civil Aviation;
6. The Medical Emergency Institute and other public health bodies; and
7. So-called 'Forest Sappers'.

¹⁵ ANEPC (2019)

Figure 9: Civil protection agents

The Red Cross is also defined as a cooperative entity, with civil protection functions in the domains of intervention, support, relief, and sanitary and social assistance.

Moreover, there are some entities with a special cooperation duty, namely: private fire brigades; private security forces; forensic and legal public health services; social security; solidarity institutions; private security and rescue services from airports and ports; other institutions from the forest, industry, energy, transport, communications, water, sea and air sectors; and voluntary civil protection organisations.¹⁶

¹⁶ Ibid.

2. Comprehensive DRM¹⁷ approach

2.1 Policy and legal framework

2.1.1 DRM authority and actors: a multi-level system

The Portuguese civil protection system is characterised by a multitude of actors and legal bases and hence a comparatively high level of **complexity**. It involves the national level and the district level, both of which are represented by the ANEPC, as well as the municipal level. Within this system, the actors involved collaborate closely and smoothly, particularly in operational terms.

Legal bases are developed at national level and include responsibilities for the district and municipal level. In many cases – such as the emergency planning process – these responsibilities are also reviewed at national level. Overall, the Portuguese civil protection system follows the **subsidiarity principle**, which enables the close involvement of local communities and stakeholders. Overall, this approach has been identified as a very good practice, as it enables close interaction with the local communities and facilitates the consideration of local specificities. At the same time, the subsidiarity principle, with its current set-up, may lead to differences between municipalities' levels of involvement in the elaboration of civil protection activities and inconsistencies in terms of their alignment with national and district approaches. A rich set of guidelines, plans and general information has been developed by the ANEPC in varying fields of civil protection, such as National Operational Plans, Directives, Technical Notes and risk-related information.¹⁸ Nevertheless, civil protection activities at municipal level depend to a large extent on the individual capabilities, commitment, but also resources of mayors and their administration. Collaboration with other levels and stakeholders also varies.

The review identified a range of very good examples in which municipal engagement, together with strong regional coordination, led to local solutions. For example, in the Algarve region, well-equipped and financed local fire services are closely connected to cross-linked municipal and regional civil protection planning. They are also assisted and overseen by a District Command that provides administrative support. This shows that the system can work well when the framework conditions are ideal. However, the underlying funding mechanism in particular tends to favour municipalities with higher income, as municipal civil protection depends on its own budget. The system is however lacking a funding mechanism that ensures appropriate resources to implement civil protection activities equally across the municipalities, including equal target levels of safety and security. Although all municipalities have a civil protection budget within their overall budget, it does not always appear to be proportionate to the actual tasks they have to fulfil.

¹⁷ DRM is defined as 'the systematic process of using administrative directives, organisations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. [...] It is an extension of the more general term 'risk management' to address the specific issue of disaster risks. Disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.' (UNISDR 2009)

¹⁸ Some of this information is available via the ANEPC website: <http://www.prociv.pt/pt-pt/Paginas/default.aspx> (07.11.2019)

Given the varying civil protection resources between municipalities and the high level of responsibility at municipal level, the national level provides guidance documents to support municipalities in their activities. At the same time, however, **stronger coordination** could be useful in order to facilitate the actual implementation of civil protection measures and their technical aspects, and to ensure harmonisation of objectives relating to comparable risks. For example, it could help to share good practices at district and national level. This may help to provide technical solutions, such as applications, that are currently used by individual municipalities at local level but could be adapted by others. The development of the AGIF as an umbrella for wildfires may serve as a good example of how to streamline related activities at a higher level while maintaining the high level of responsibility at municipal level. By acknowledging that wildfires represent one of the most pressing risks in Portugal, it represents an isolated solution that neglects the range of other risks the country is facing, such as earthquakes, tsunamis and floods. Beside these, common and recognised high impact of natural hazards, there must be taken into account that local fire departments and local civil protection authorities must be able to face also every day risks (e.g. structural fires, accidents, CBRN incidents). Hence, it could be useful to either replicate the AGIF umbrella approach for other predominant risks or ensure in another (to be determined) way how a more integrated and coordinated approach to managing risks can be achieved.

Box 1: Multi-level system

Good practice:

- ▶ **G1:** The Portuguese civil protection system follows the subsidiarity principle, which facilitates the implementation of measures in close collaboration with the local communities and with consideration of local specificities. In many cases, this has led to excellent examples of local solutions to local challenges.
- ▶ **G2:** Despite the complexity of the system, all actors – particularly on the operational level – are well acquainted with each other and collaborate smoothly. At the same time, the development of AGIF as an umbrella to streamline wildfire risk management activities can be a very good example to enhance coordination across scales and between district and municipal actors. It might serve as a good practice example for other risks, too.
- ▶ **G3:** Many high-quality guidelines are available to help the local level implement their responsibilities.

Recommendations:

- ▶ **R1:** A sound funding mechanism should be developed to even out the imbalances in funding and align the resources with the activities required at municipal level. From a technical point of view, it would therefore be necessary to develop technical regulations on the resources a municipality, including its fire department, should have in relation to a certain hazard level and the identified risks. This could also be determined in a regulation or guideline.
- ▶ **R2:** The AGIF example could potentially serve as an example to establish a more integrated and coordinated approach to managing risks and to facilitate better coordination between the multiple levels and actors involved at district and municipal level. In addition, better coordination at district level could provide practical support to the municipalities. A respective body should also facilitate the coordination of the scientific institutions, as well as the communication and public awareness activities. Furthermore, a national risk management policy fair could be useful to showcase good examples and facilitate exchange.

2.1.2 DRM legislation and strategy

A range of legal bases exists determining the set-up of the Portuguese civil protection system and the related responsibilities. As detailed above, they establish a multi-level system with responsibilities at the national, district and municipal levels and a strong focus on bottom-up activities. While these levels collaborate and the national level in many cases reviews practices at the district and municipal levels, the system is characterised by soft guidance measures that are used by the national level. Against this background it is particularly important to develop strong and convincing support and coordination mechanisms and tools to allow the municipalities to fully unleash their potential in developing local solutions to local challenges.

Traditionally, Portuguese civil protection has mainly focused on relief problems and emergency response issues; however, in recent times a big effort is being made to emphasise preventive aspects and, therefore, to move towards DRM. In fact, in 2017, Portugal's National Strategy for a Preventive Civil Protection was approved. This strategy defines five strategic objectives (strengthen governance; improve knowledge of risks; establish strategies for risk reduction; improve preparedness; and involve people in the knowledge of risks), aligned with the priorities of the Sendai Framework. For each strategic objective, a series of priority areas has been defined (10 in total). In turn, each priority area has a set of operational objectives that are specific actions and projects for risk reduction. In total, 101 actions have been defined. Together they make up an Action Plan for Risk Reduction that is to be implemented in the period 2017-2020.

In the overall set-up of the legal bases and strategy, it is important to note that the Portuguese civil protection system is under constant revision. All actors are in close dialogue and continuously strive to identify challenges and to improve civil protection activities, as detailed in the following sub-section. The Portuguese National Platform for Disaster Risk Reduction, with over 50 governmental, non-governmental, private and scientific stakeholders, plays a specific role. It is very active in developing aspects such as increasing resilience at local level, regulating building assessments, building codes on seismic risks, implementing a disaster loss database and protecting cultural heritage.

Finally, requirements stemming from European law, such as the implementation of Risk Assessment and Risk Management Capability Assessments (Art. 6 Decision No 1313/2013/EU on a Union Civil Protection Mechanism), have been fulfilled and the directives on Seveso, flood risk management and critical infrastructure, among others, have been implemented in the Portuguese legislation. In certain cases, activities even go beyond the requirements and provide good examples that could be translated to other countries (see also **section 3.2.1** below).

Box 2: Legislation**Good practice:**

- ▶ **G4:** The high level of responsibility foreseen for municipalities is reflected in the lack of an option to enforce binding requirements that could be formulated in a top-down manner from national level, such as fines. However, a broad range of soft measures, such as guidance materials, reviews and communications, has been developed.
- ▶ **G5:** The Portuguese civil protection system is constantly striving for improvement and all actors collaboratively (re)shape the legal basis and system set-up. The UNDRR national platform plays a very active and central role in this.
- ▶ **G6:** Requirements from EU legislation are fulfilled and in some cases offer very good practice examples in going beyond these requirements.
- ▶ **G7:** The National Strategy for a Preventive Civil Protection, approved in 2017, constitutes a real national action plan for disaster reduction.

Recommendations:

- ▶ **R3:** In the absence of enforcing power relating to binding requirements at national level (such as fines), and recognising the usefulness of allocating a high level of responsibility at municipal level, it is important to further enhance guidance and coordination (see also **section 2.1.1** above).
- ▶ **R4:** The revision and re-shaping of the civil protection-related legislation and system set-up offer great potential to further improve the civil protection system. In particular, the redefinition of district-level responsibilities (see section below) could serve to enhance coordination among municipalities.
- ▶ **R5:** It is necessary to further develop and implement the 101 actions included in the National Strategy for a Preventive Civil Protection.

2.1.3 Integration of lessons learned and recent changes in the Portuguese DRM system

Disasters such as the devastating 2013 and 2017 wildfires led to the revision of actors and responsibilities and the introduction of various changes, many of which are not yet fully implemented. The aforementioned wildfires stressed the need to shift the focus of DRM from response towards prevention. The changes also related to functional aspects, particularly to counter-balance the responsibilities of municipalities and facilitate coordination in a multi-level, multi-stakeholder civil protection system.

One of the most prominent changes has been the creation of the AGIF. The Agency aims to resolve the problems identified in the aftermath of the severe wildfires of 2017 and shift the focus from preparedness and response through well-defined processes and procedures. The AGIF forms an umbrella for all organisations active in the field of forest fires. It is well designed and the idea of integrating temporary regional entities into the forestry service illustrates good practice in ensuring sustainability, synergies and integration into the existing system.

On a more general level, the division of responsibilities between the municipal, district and national levels is currently being revised. This includes the reshaping of the geographic boundaries of the current districts and their reorganisation to intermunicipal communities. The introduction and development of this level could help to better integrate the municipalities and develop coherent support measures. For example, in Coimbra, a platform has been developed that facilitates municipal policy support in several areas, including an assessment of the effects of climate change. At the same time, political commitment seems to be very varied across the intermunicipal communities. Once again, it might therefore add value if the national level were to facilitate the exchange of good practices between the communities, or guide the execution of their responsibilities, to ensure consistency across the country.

On the other hand, civil protection at local level has been reinforced in recent years. To achieve this, several laws have been passed with the main objective to strengthen the powers of the local authorities in the area of civil protection and redefine responsibilities. This is based on the fundamental principle that local authorities are a key element of the Portuguese civil protection system.

Overall, all actors are working hard to enhance the civil protection system in Portugal. They are very much aware of the remaining shortcomings and are working together to overcome them, including through major structural changes in the overall set-up of the system.

Box 3: Integration of lessons learned**Good practice:**

- ▶ **G8:** All actors are constantly striving to enhance the civil protection system. This effort is reflected in a shifting focus from response to prevention.
- ▶ **G9:** The introduction of the intermunicipal communities offers a great opportunity to better integrate, support and coordinate the municipal civil protection activities, as the example of Coimbra has shown.

Recommendations:

- ▶ **R6:** Umbrella organisations for specific clusters of hazards could help to coordinate activities among different DRM phases and actors. In addition, the creation of intermunicipal communities or other coordinating bodies could facilitate coordination among municipalities. However, guidance from the national level – including technical support, such as for platforms – could further facilitate this process and lead to more coherent activities across the country. Finally, it must be ensured that the existing structures (e.g. ANEPC District Commands) are consequently adapted to any form of new administrative structure, in order to avoid any confusion about responsibilities and chain of command.

2.2 International collaboration

Portugal has established a range of bi-lateral and multilateral agreements with the aim of promoting technical and scientific exchange, information sharing and operational assistance. So far, it has bilateral agreements with Spain, France, Morocco, Russia, Cape Verde, Mozambique, Tunisia and Algeria. These agreements not only relate to response activities, but also to the development of resources and aspects of prevention and preparedness, including training activities. A digital platform has been developed to disseminate information among the Portuguese speaking countries (Cape Verde and Mozambique).

Furthermore, Portugal has been developing cooperation through the UCPM. There have also been activities developed at Council of Europe level, through the European and Mediterranean Major Hazards Agreement, and at NATO level (Civil Emergency Planning).

Portugal is an active provider of international assistance. Recent examples include its contributions to emergencies in Mozambique (Cyclone Idai, April/May 2019), Sweden (forest fires, July 2018), Chile (forest fires, January 2017) and Cape Verde (volcanic eruption, November 2014).

Currently, seven Portuguese modules are registered under the UCPM, as detailed below:

Table 6: Portuguese modules registered under the UCPM¹⁹

| | Typology of capacities | Registered as modules | Registered |
|----------------|--|-----------------------|------------|
| Modules | GFFF (Ground forest fire fighting) | 1 | 1 |
| | GFFF-V (Ground forest fire fighting using vehicles) | 1 | 1 |
| | MUSAR (Medium urban search and rescue) | 2 | 1 |
| | CBRNET (CBRN detection and sampling) | 1 | 1 |
| | USARCBRN (Search and rescue in CBRN conditions) | 2 | 1 |

At the same time, Portugal has been receiving international assistance and has requested support through the EU's Civil Protection Mechanism 17 times since 2003, each time relating to forest fires.

Portugal has implemented the EU Host Nation Support Guidelines in its national civil protection system and is therefore prepared to receive international assistance and ensure the effective implementation of international assets in local response operations. Taking into account that the most probable need for international assistance relates to earthquake and tsunami scenarios, there should be a focus on further planning in relation to the possible entry points of international assistance for the autonomous regions. In the Azores in particular, operational airports and ports are essential for fast and effective assistance from mainland Portugal and abroad.

87 Portuguese experts have received training under the UCPM. These experts participate on a regular basis in UCPM courses, trainings and missions.

Portugal organised a UCPM civil protection exercise in May 2019. The 'CASCADE'19' exercise featured teams from Belgium, Croatia, France, Germany and Spain, mobilising more than 6 000 participants from across Europe. It aimed to test and train the national and international response to multiple emergency situations that may occur in succession (earthquake, floods, chemical accidents, dam ruptures and marine pollution, among others) on Portuguese territory.²⁰

The main scientific and technical institutions in the country that are in charge of risk assessment, as stakeholders of the civil protection system, also have international agreements with different countries, especially neighbouring countries, to improve knowledge of risks, threats and hazards.

¹⁹ European Commission (2019)

²⁰ For more information, see official website of CASCADE'19: <https://cascade2019.pt/en/organization/> (11.10.2019).

One example is the Portuguese Institute for the Sea and Atmosphere (IPMA), which is a public institution that is responsible for monitoring the sea, atmosphere and geodynamics, as well as for establishing warnings related to weather, earthquakes and tsunamis. The IPMA has special agreements in place to exchange data and information with international institutions, such as the World Meteorological Organization, and counterpart institutions in neighbouring countries, such as the Spanish National Geographic Institute (IGN) (in the case of earthquake and tsunami risk).

Finally, Portugal is actively engaged in implementing the UNDRR Sendai Framework and is the organiser of the European Forum on Disaster Risk Reduction (EFDRR) in 2021. At European level, Portugal is engaged in several thematic fora, for example on critical infrastructure protection, nuclear and radiological emergencies, aspects relating to Seveso establishments, and floods.

Box 4: International collaboration

Good practice:

- ▶ **G10:** Preventive action is strengthened through several examples of bi-lateral and multilateral collaboration, including a dedicated platform used by Portuguese-speaking countries.
- ▶ **G11:** The country contributes to a range of UCPM modules and is actively involved in the training of experts for missions. The CASCADE'19 exercise demonstrated and further contributed to the high-level of professionalism and embeddedness of operational experts in the international community.
- ▶ **G12:** Portugal has implemented the Host Nation Support Guidelines and is prepared to receive international assistance in case of a major disaster.

Recommendations:

- ▶ **R7:** Host Nation Support plans should be developed for the Azores in particular, in order to receive international assistance, including the breakdown of airports and ports.

2.3 Integration with climate change adaptation

Following the different scenarios envisaged by the Intergovernmental Panel on Climate Change, southern Europe and therefore Portugal is one of the areas that will potentially be most affected by climate change. Indeed, Portugal is among the European countries most vulnerable to the impacts of climate change, as illustrated by a growing trend of more destructive climate disasters (floods, droughts, heat waves, storms, wildfires, etc.).

Portugal adopted its first National Strategy for Adaptation to Climate Change (ENAA) in 2010. Since then it has established a governance framework for climate change adaptation, in which DRM has been integrated through representation by the Civil Protection Authority. The ENAA was later revised in 2015 to make improvements in relation to how sectors communicate and collaborate in the following common thematic areas: research and innovation, financing adaptation, international cooperation, communication and propagation, mainstreaming in spatial planning, and mainstreaming in water resources.

Nevertheless, it is necessary to go one step further and assess DRM, including climate change adaptation, at different territorial levels. In doing so, it is possible to verify how, in several cases, climate change has been considered for the different risk scenarios. Much has evolved in recent years in terms of municipal and intermunicipal planning as part of climate change adaptation. Almost all of Portugal's mainland territory will soon be covered by adaptation plans at NUTS III level. Among other things, the history of impacts of extreme events is systemised and DRM issues are often addressed in these adaptation plans. This is the case in the Intermunicipal Community Region of Coimbra, for example, which has developed a Climate Change Adaptation Plan that takes into account the meteorological risks of forests fires, planned for different time horizons. Another example is the Algarve region, which has also studied the risks of climate change, in particular the projection of a gradual increase in sea level until 2100, in which the worst case scenario involves a sea level rise of more than one metre. The Algarve region is therefore adapting its land planning in anticipation of this worst case scenario.

However, the consideration of climate change in different DRM actions, especially risk assessment, does not seem to be common practice, at least at municipal level. These examples should not be exceptions, so it is necessary to incorporate DRM strategies at local level throughout the country, while also taking into account climate change adaptation.

At national level, the need to improve the integration of climate change into risk assessment, cartography and sectoral policies is also evident. A positive example is the coastal areas programmes that define safeguard areas by taking into consideration the projections for sea level rises. The NRA already includes references to the impacts of climate change in its description of the relevant risks, but still hasn't been properly integrated in the methodologies to produce risk mapping. The mapping of current hazards and its future adaptation to the context of climate change was one of the objectives established in the National Programme for Land Use Policy, published in 2019.

Box 5: Integration with climate change**Good practice:**

- ▶ **G13:** In some districts, the impacts of climate change have been studied and mapped with a high level of detail. They are provided to the related municipalities for information and planning.
- ▶ **G14:** All municipalities have access to climate change adaptation information for their area via an online portal. Every land use plan has to consider the information on this portal.
- ▶ **G15:** Define safeguard areas, taking into consideration sea level rise projections.

Recommendations:

- ▶ **R8:** In future risk assessments, climate change parameters could be introduced into the risks assessed, for example forest fires, sea level rises (although this is already being done in current coastal protection planning) and flooding (the next generation of food risk management plans will consider climate change scenarios), or otherwise be taken into serious consideration when assessing impact and vulnerability. At the local level, climate change strategies should be integrated coherently throughout the country.

2.4 Public awareness

2.4.1 Risk communication

The NRA is publicly available²¹ and has been passed on to the district and municipal levels, where more localised assessments are being developed. In this process, the district builds on the NRA and adds further detail to the risk analyses. At municipal level, the further analytical steps vary between municipalities. Heavily exposed municipalities across the country are further encouraged to develop specific emergency plans. This is not mandatory, however. Consequently, the degree of analysis applied varies (see also **section 3.1** below). In light of this varying depth of assessment and in line with the heterogeneous level of resources among the municipalities (see **section 2.1.1** above), the degree of communication also varies. Some municipalities are very active and have developed great examples of communicating risk at local level, using leaflets, mobile applications and other means of communication. To name just one, the municipality of Loulé has developed a mobile application to inform its citizens. Many municipalities have developed mobile applications, but this has led to a multitude of applications that differ a lot one from one another in terms of graphics, content and architecture. While this may not be a problem for the citizens of a single municipality, it could be more problematic for tourists that need timely risk information when passing from one municipality to another during their stay in Portugal (see Algarve as an example).

21 <http://www.prociv.pt/pt-pt/RISCOSPREV/AVALIACAONACIONALRISCO/Paginas/default.aspx> (07.11.2019).

In some cases, a national mobile application has already solved this problem, for example Fogos.pt, where anyone can find accurate information on wildfire at national level, with a high level of detail. Additionally, the official national mobile application (MAI Mobile) includes information on other topics, and even allows citizens to receive warnings if they are in the vicinity of an emergency.

This application is however combined with information from the police services and hence not very intuitive from a civil protection perspective. In addition, several local mobile applications have been developed. The civil protection system would benefit from streamlining these approaches and potentially developing a dedicated and scalable civil protection solution. In terms of non-digital communication, leaflets have been developed with dedicated versions for tourists and foreigners. For the latter, there is close cooperation with the non-governmental organisation (NGO) 'Safe Communities Portugal'. Bilingual SMS warnings are also disseminated to roamers.

In the context of the implementation of the Seveso directives, operators and municipalities are trying to fulfil the objectives of public participation and active information of the public about Seveso establishments and behaviour in case of an accident. As larger incidents in Seveso establishments can spread beyond the perimeter of the establishment, such incidents often directly affect the surrounding areas. Therefore, it is necessary that the operators of facilities and the municipalities in their area have a coordinated approach to communicating the risk and the appropriate response in case of an incident that affects the public. To raise public awareness, as well as public trust in operators and authorities, communication on risk has to be carried out in close cooperation. In particular, this is because there remains a lack of public awareness of HazMat-related risks, and because information on how to behave in case of an emergency is not noticed by the public.

The lack of public awareness about this topic also manifests in the very few people that take the chance to participate in the consultation process to the public about new or changing Seveso establishments. Public consultation is required by the SEVESO-III-Directive (2012/18/EU) in relation to the planning of new Seveso establishments, changes to existing establishments and developments in the proximity of such establishments. However, just as in most European countries, the respective public consultations are not well attended and the overall interest in the consultation process is low.

Box 6: Risk communication

Good practice:

- **G16:** In the Portuguese multi-level system, municipalities are key actors in communicating risk. Some of them are very proactive and advanced.

Recommendations:

- ▶ **R9:** Municipalities could be better supported in their communication activities by those at the national and district levels sharing their experiences and communications strategies. With respect to mobile applications in particular, a more homogeneous approach among all mobile applications is needed, especially for tourists. While the MAI Mobile application is a national (yet not very intuitive and dedicated) solution, many local solutions have been developed in parallel. If respective developments could be facilitated at a higher level, to then be adapted by the municipalities, a more homogeneous approach in communicating risk could be formed. A respective approach would be particularly beneficial for citizens working, residing and travelling within and between different municipalities, as well as for tourists. Although the national application MAI Mobile already exists, a more dedicated, clear and user-friendly national risk-related mobile application could be very useful and could be easily disseminated through ports, airports, railway stations, buses and tourism websites, as well as on civil protection websites (national and local).
- ▶ **R10:** Overall, there should be an integrated strategy for municipalities on communicating to the public, similar to the strategy for education. Social surveys concerning risk perceptions are expected to make risk communication strategy and planning more focused.
- ▶ **R11:** Risk communication plans could adopt two-way communication, including a bottom-up approach, so that citizens can communicate how they want their information be conveyed.
- ▶ **R12:** Due to the presence of tourists, European and third country nationals, a bilingual approach to key messages of risk communication must continue to be given special attention, at least to the extent it is now, or to an even greater extent. The ongoing cooperation with the NGO Safe Communities Portugal (which provides closer links with foreign citizens) and the dissemination of bilingual SMS warnings to roamers are interesting initiatives, although the challenge now is to further increase efforts in this area.
- ▶ **R13:** In the context of the Seveso directives, municipalities and operators of Seveso establishments should combine their efforts to address HazMat-related risk communication to the public. Especially in the field of risk communication, a proactive, coordinated approach towards the population is necessary to ensure that the endangered population in the surrounding areas of Seveso establishments has a deeper understanding about possible threats and can react properly to danger in case of an emergency.

2.4.2 Education and awareness strategy

Education and awareness strategies in Portugal are outstanding in terms of not only their volume, but also their content and level of specificity.

Risk education is formalised and since 2003, the ANEPC and the Ministry of Education have been collaborating to create a culture of understanding risk at school level. The National Education Strategy for Citizenship has been available since 2017 and a dedicated website has been developed for all education related information: <https://cidadania.dge.mec.pt>.

The strategy integrates risk education in curricula and makes two cycles of basic education compulsory. Guidelines for risk education are available to facilitate implementation. A 'train the teachers' programme has been developed by the ANEPC to implement these guidelines, with the goal of having one teacher responsible for risk education in each school and for triggering engagement of other teachers. Generally, risk education already starts at pre-school and primary school level, with dedicated formats.

An outstanding example of risk education in schools are the so-called 'Civil Protection Clubs', which convey the main principle that 'everybody is civil protection'. Teachers and students organise these clubs in an effort to disseminate civil protection knowledge, activities and experiences to other students and to the wider community. Civil protection clubs are active in more than 250 schools and are a very good example that could be valuable for many other countries.

The 'Tinoni House' project in Lisbon is one fascinating example of educating local children in disaster risks.

Figure 10: Visit to the Tinoni House



In terms of **awareness raising**, a range of campaigns have been developed in recent years, particularly in the context of wildfires. They include for example 'Portugal chama' ('chama' in Portuguese means 'flame' but also 'calls') and 'Safe Village, Safe People'. The latter, which targets rural areas, involved the identification of dedicated safety officers in the villages to communicate with the public and be the contact person in case of an incident. There is, however, no evidence that all mayors support the campaign. Alongside this campaign, the GNR is responsible for interviewing citizens in rural areas to spread the messages of the campaign. The Public Security Police is responsible for raising awareness and for preventive and reactive enforcement of wildfire regulations. It also has the power to punish those who do not comply with the regulations.

In terms of earthquakes, the ‘Shake out’ campaign²² and exercise were developed five years ago. The campaign and exercise make up an annual event implemented together with the Ministry of Education. The exercise on how to behave during an earthquake is just one minute long, but it is accompanied by activities throughout the week-long campaign. One school is chosen each year as a good practice example. In 2018, more than 600 000 individuals, mainly from schools, registered on the campaign website.

Nevertheless, many people in Portugal remain unaware of the risks they face. Civil protection stakeholders still report that risk awareness and risk perception among the general population is low. This has led to conclusions that more effort is required to make people aware of risks, as well as to homogenise the respective communication campaigns.

Box 7: Risk education and awareness

Good practice:

- ▶ **G17:** The integration of risk education into the education system encompasses a very high level of specification and diversification, from pre-school to secondary school, as well as involving teachers. The activities furthermore encompass compulsory as well as voluntary activities, such as school clubs.
- ▶ **G18:** The introduction of Civil Protection Clubs into schools appears to be a very good model for creating a proactive culture of civil protection among young people. Participation and proactivity are the key to success in these environments.
- ▶ **G19:** Several campaigns have been developed and rolled out during recent years. With respect to the wildfire campaigns, a range of municipalities have now a safety officer that guides the local communities, thanks to public information (and other prevention and preparedness measures, as detailed below). Furthermore, it was reported through the programme coordinators that addressing risk is becoming a more common practice and this could help to reduce panic.

Recommendations:

- ▶ **R14:** Currently, all information for the public is dispersed. For example, the education programme has a website, and so do the individual campaigns. It could be useful to group this information under an umbrella page, to be accessed through a central portal. Such a portal can also be useful to inform and invite citizens to activities related to civil protection.
- ▶ **R15:** Although individuals report on the effectiveness of education and campaigns, the programmes should be evaluated and be linked with target indicators and criteria.
- ▶ **R16:** Awareness measures should be diversified to consider different audiences from all age ranges and include vulnerable groups (e.g. disabled persons, foreigners, etc.). The diversification should furthermore include the use of social media, which are an integral part of risk communication. However, different societal groups make use of different channels. Hence, a survey should be conducted to identify the most relevant communication means for each citizen group.

²² The campaign is adapted from the U.S. initiative ‘Shake out’.

2.4.3 Crisis-communication system

Incidents in Portugal are made available to the public in almost real time, via a website run by the ANEPC. This allows citizens, as well as the media, to follow incidents across Portugal. It is an example that should also be followed by other countries. In terms of early warning, several approaches exist, such as those for tsunamis or Seveso accidents, as detailed in **section 4.2** below. For wildfires, safety officers have been nominated in many rural villages to get in touch with their citizens in case of an incident. From a legal perspective, the media are required to collaborate with the civil protection authorities.

Box 8: Crisis-communication system

Good practice:

- **G20:** The availability and geo-location of incident data in almost real time is a good example that can serve as a model to other countries.

Recommendations:

- **R17:** A campaign could be developed to promote the existing early warning and real time arrangements. In touristic areas, this might include the creation of 'totems' with information and perhaps buttons to hear alert sounds (one such example already exists for tsunamis in the Algarve region). Such alert sounds could also be incorporated into the various mobile applications, or maybe in a national phone application. Such an approach can be a very effective way to make people aware of the related risks and to make tourists familiar with the alert sounds.

2.5 Administrative, financial and technical capabilities

2.5.1 Expertise

Risk assessments are the responsibility of the ANEPC at national and district Level, without prejudice to the specific responsibilities legally attributed to specific entities to manage certain risks, such as the IPMA, the Portuguese Environment Agency (APA) and the Institute for Nature Conservation and Forestry (ICNF), among others. To this end, the ANEPC has experts with multidisciplinary experience in risk assessment who have appropriate training in the various areas of knowledge necessary for such processes. Complementary to their academic backgrounds, experts receive additional training by certified public and private entities on a regular basis. The experts also attend national and international seminars in order to improve their knowledge.

Collaboration between academia and those entities managing specific risks generally works well and there are outstanding examples of how such collaboration can look. For example, relevant stakeholders were actively engaged in the National Risk Management Capability Assessment (NCA). At the same time, this collaboration is frequently organised between the municipal level and academic stakeholders and hence differs across the country.

At national level, close cooperation exists between the ANEPC and the scientific partners. Several projects have been funded to provide insights and exchange information between these actors, such as the development of general tsunami inundation maps for Algarve. Nevertheless, in order to produce these inundation maps, which are essential for the development of detailed emergency plans and thus the better protection of citizens, each municipality has to find a contractor and needs to pay to undertake studies to obtain data on their area. This leads to emergency plans having different levels of detail across the different municipalities. Wealthier municipalities can afford the data, but others do not have this possibility.

The Rural Fire Management System (SGIFR), approved by a Resolution of the Council of Ministers (12/2019), enhances the use of collaborative laboratories, research centres and other sources of scientific knowledge. This includes the implementation of protocols, collaboration on research projects and the hosting of trainees, in order to increase predictive capacity to support planning and decision-making in the preparation, pre-detection and extinction phases.

The role of the Technical Independent Observatory for Forest Fires, which was established in August 2018 by the National Assembly, should also be highlighted. It was established with the objective of providing guidance, issuing recommendations on the national plan relating to forest fires, developing assessment reports on forest fires, observing the general forest fires system and advising on legal initiatives. It is made up of experts from different universities, the Polytechnic Council and other experts chosen by the National Assembly.

Also, it is important to highlight the Forest Fires Research Centre (CEIF) of the Association for the Development of Industrial Aerodynamics (ADAI), University of Coimbra, which it is a pioneer centre in forest fire research specialised in fire behaviour. This centre works very closely with the different civil protection agents involved in forest fire risk management, organising training sessions, courses and seminars. It has signed protocols with the IPMA, ANEPC, GNR and ICNF.

Other examples of good practice in collaboration with academic stakeholders are seismic risk studies, in particular for the Metropolitan Area of Lisbon and the Algarve region, in which universities, research laboratories and public institutes have taken part.

Figure 11: Demonstration of the behaviour of fire at the CEIF of the ADAI, University of Coimbra



Box 9: Expertise

Good practice:

- ▶ **G21:** The Technical Independent Observatory for Forest Fires is a new tool and a good way to take advantage of the knowledge of the scientific community in the face of the challenge of wildfires. It is also an example that could be successfully extrapolated to other risks such as tsunamis, earthquakes, accidents with hazardous materials, etc.
- ▶ **G22:** A good example of close cooperation between academic research, governmental institutions and operational organisations is the CEIF of the ADAI, University of Coimbra. With a focus on fire behaviour and fire safety issues, the Research Centre conducts basic research on several wildfire-related topics and distributes the findings through operational training of firefighters and other civil protection agents.

Recommendations:

- ▶ **R18:** The concept of nominating dedicated Competence Centres for certain scientific fields could be a good approach for Portugal, to ensure more coherent use of information across the country and to avoid fragmented or contradictory information. The centres could be managed by the ANEPC, which would coordinate their topics, as well as their financial support.
- ▶ **R19:** The collection of scientific data, which are required to produce detailed emergency plans, can be supported by the National Authority to avoid differences in the levels of protection that different municipalities are able to provide to their citizens. At the same time, research conducted across the country should be made available to other stakeholders via the ANEPC. It should be integrated into a **good practices platform** at national level.
- ▶ **R20:** A national Disaster Reduction Knowledge Network should be established.

2.5.2 Stakeholders

Additional relevant DRM stakeholders include critical infrastructure operators. These operators collaborate very well and have made plans and protocols to reinforce their infrastructure and make the system more resilient. After the devastating wildfires in 2017, the National Authority for Communications (ANACOM) introduced a set of recommendations to improve resilience in the communication sector. Electricity companies are taking on responsibility to reduce wildfire ignitions by undertaking fuel management measures in the surroundings of their facilities and protect their critical infrastructure.

Box 10: DRM stakeholders

Good practice:

- ▶ **G23:** The fuel management programme of the primary electricity grid provider REN is reducing electricity-induced wildfires from high voltage transmission lines. This is an example of good practice in preventing forest fires.
- ▶ **G24:** The special fire brigade of REN is a valuable operational asset to protect critical infrastructure of the electricity grid and avoid cascading effects from wildfires affecting the electricity supply of the population.

Recommendations:

- ▶ **R21:** At the moment, the energy providers are not able to conduct their fuel management programme on private land. Because of the importance of fuel management in the surroundings of high voltage landlines, the legislator should introduce regulations that allow companies to undertake these measures when the landowner is not able to do so.

2.5.3 Financing

In general, all levels and actors have dedicated civil protection resources. At municipal level, however, an alignment or revision of funds and obligations seems to be lacking (see also **section 2.1.1** above).

It also seems that – partly as a result of these limited resources – European funds are accessed in a strategic manner by several actors. While this shows a high level of professionalism and integration with academia, and indeed can deliver good results (for example, a pilot for a tsunami early warning system could be developed), this funding cannot make up for a lack of resources. In addition, pilot projects are individual efforts that lack horizontal coordination and are not embedded in a thematic strategy.

At municipal level, all civil protection issues depend on their own budget, resulting in inequalities among municipalities, because not all municipalities can cope with the risk management tasks that they face. This means the development of DRM activities at municipal level is sometimes dependent on the wealth of the municipality, among other factors. The problem increases at household level, when individuals cannot manage the preventive measures that they are entrusted with by law. This is a problem in relation to the management of dry vegetation in forest areas, where inhabitants are obliged to maintain a clean perimeter around their houses.

In many cases, households cannot clean their land because the cost of cleaning has risen since 2017 due to increased demand. At the same time, some municipalities cannot support their residents either, due to a lack of resources on their part.

In the event of a disaster or major accident, two types of permanent financial mechanisms for recovery issues have been developed. The so-called ‘Emergency Bank Account’ is designed to support individual citizens affected by certain disasters and the ‘Municipal Emergency Fund’ covers infrastructure and equipment loss and damage at municipal level (municipalities, intermunicipal communities, metropolitan areas and parishes).

In the case of individuals, awareness about insurance is very low. For example, only 50 % of households have insurance and only 28 % of these cover seismic risk. It is necessary to promote a disaster insurance policy that establishes a National Insurance System for Disaster Protection.

Box 11: Financing

Good practice:

- ▶ **G25:** In the Algarve region, well-funded municipal fire services, together with funding and supporting resources at the intermunicipal level and a strong connection between municipal and regional planning, is forming a well-equipped regional civil protection system.

Recommendations:

- ▶ **R22:** The availability of national funds should be monitored, in order to ensure their adequacy to support prevention and preparedness activities at municipal level upon request and based on selection criteria. Respective funds could also be used strategically to set priorities in DRM activities. Furthermore, funds or technical support should be available for those households that do not have the resources to clean their own land to remove hazardous fuel.
- ▶ **R23:** A disaster insurance policy should be promoted that establishes a National Insurance System for Disaster Protection.

2.5.4 Information and communication

Information and communication within the Portuguese civil protection system are in general very smooth, from the national to the district and municipal level. A range of guidelines exist to support the lower levels in implementing DRM activities. At the same time, information is passed upwards from the municipal to the district and national levels, for example in the context of emergency planning. Plans are developed at the municipal and district levels and passed on to the ANEPC for review before approval.

At the operational level, the system is characterised by a multitude of actors (see also **sections 1.3.4 and 2.1.1**) which are well aware of their responsibilities and collaborate well. A very good example of this collaboration is the existence of a common operational picture (COP)²³ across the agencies in control rooms at municipal, district and national levels, which even encompasses of a layer available to the public (see **section 2.4.3**).

²³ Provision of an equal picture or situational awareness to all the participants of a situation.

With the SIOPS system, the operational coordination from the national level down to the operational units is standardised and secured.

Several contexts are currently used for cross-actor collaboration, including the UNDRR national platform (see also **section 2.1.2**) and the ‘Resilient Cities’ campaign, which is also linked to UNDRR. For example, under the supervision of the ANEPC, six working groups have been established under the national platform to deal with specific topics such as school safety and post-earthquake damage assessment, but also to address generic aspects such as collaboration with the private sector and the development of a disaster loss database. The Resilient Cities activities involve more than 30 municipalities.

Box 12: Information and communication system

Good practice:

- ▶ **G26:** The UNDRR national platform is very active and used as a forum to coordinate among all stakeholders. Working groups are used strategically to address relevant DRM aspects, such as the development of a disaster loss database. The UNDRR Resilient Cities campaign is used actively to help municipalities manage disaster risk. More than 30 municipalities are participating across Portugal.
- ▶ **G27:** A COP across all actors is available in the control rooms at municipal, district and national level. This adds to the smooth collaboration between all actors. One particular layer of the COP is even available to the public and the media in real time.

Recommendations:

- ▶ **R24:** Communication and information sharing is practiced in a very good way in Portugal. However, the lack of an enforcement mechanism for binding recommendations from the national level to municipalities may lead to the guidelines and soft coordination procedures not being used.
- ▶ **R25:** A central platform that makes the guidelines available and provides a coherent overview of civil protection activities and support materials might facilitate the process. In addition, a cooperation network with academia should be developed.

2.5.5 Equipment

To ensure a strong operational civil protection system in the decentralised administrative structure of Portugal – i.e. with the main responsibility and the main operational assets on the local level – standardised and harmonised specifications on subjects such as common staffing of rescue services and units, roles and responsibilities, training, exercises and equipment are necessary. This holds particularly true since – due to the varying availability of resources – capacities and equipment vary between the municipalities. The decentralised system benefits from local knowledge and the high level of responsibility given to municipalities. It can however only unleash its full potential if proper interoperability between the different civil protection stakeholders can be guaranteed. Standardised equipment and procedures and joint training and exercises are crucial to ensure smooth cooperation and interoperability between the various operational civil protection stakeholders from different municipalities and at different administrative levels.

Box 13: Equipment

Good practice:

- ▶ **G28:** Many municipalities have large quantities of equipment at their disposal, although this does vary between municipalities.

Recommendations:

- ▶ **R26:** A way to assess and counterbalance shortfalls in equipment (in relation to defined capacities per risk level) should be defined.
- ▶ **R27:** Interoperability needs to be ensured by means of standardised equipment and procedures and joint training and exercises.

3. Prevention²⁴

3.1 Risk assessment

3.1.1 Risk assessment process

Risk assessments are the responsibility of the ANEPC at the national and district levels, the Autonomous Regions of the Azores and Madeira at regional levels and the local councils at municipal level, without prejudice to the specific responsibilities legally attributed to specific bodies (e.g. IPMA, APA, ICNF, the National Health Directorate (DGS) and the National Laboratory for Civil Engineering (LNEC), among others).

The NRA was prepared for the first time in 2014 and is prepared in accordance with the 'Risk Assessment and Mapping Guidelines for Disaster Management' issued by the European Commission (SEC (20-0) 1626 final, 21.12.2010). It builds on the previous work of two key instruments: The National Emergency Civil Protection Plan (PNEPC) and the ENAAC. The risks considered in the NRA were selected according to the scenarios defined in the National Emergency Plan, which considers a comprehensive set of natural and man-made risks. These risks were considered in the NRA by the ANEPC, with the support of the Civil Protection Committee. In the 2019 version, wind storms were also considered, due to the fact that in recent years Portugal has been affected by winter storms, as well as by a tropical cyclone (Hurricane Leslie in 2018).

Overall, the 2019 NRA covers 23 risks presented with a short territorial and historical introduction, supplemented by a geographic distribution and synthesis of the risk scenario. For each risk, the relevant actors have been involved in the assessment by providing input data. Stakeholders contributing to the NRA included public bodies such as the APA, IPMA and ICNF, several private companies that manage infrastructure (e.g. operators of dams or high-risk Seveso establishments) and municipal councils. The private companies and municipal councils were mainly involved in providing basic data.

Currently, the involvement of the different stakeholders in the different phases of the disaster cycle is significant. For risk analysis and evaluation, however, a more detailed consideration of vulnerability dimensions, such as susceptibility or coping capacity, would be useful. For example, the vulnerability of buildings is currently under development; for example, the Lisbon area needs to develop a holistic assessment of its earthquake risk. Also, the risk identification and prioritisation process could be more transparent and include as many stakeholders as practicable, also including representatives from academia.

Overall, the assessment methodologies – which are however not described in the NRA itself – seem to be very sound.

²⁴ Prevention is divided into 'Risk assessment' and 'Risk management planning'. Risk assessment means 'the overall cross-sectoral process of risk identification, risk analysis, and risk evaluation undertaken at national or appropriate sub-national level' (UCPM, Decision 1313/2013/EU). Risk management planning, in contrast, is the 'systematic approach and practice of managing uncertainty to minimize potential harm and loss' (UNISDR 2009). Based on risk assessments and their analysis, it comprises the implementation of strategies and specific actions to control, reduce, and transfer risks. It can be complemented or preceded by an assessment of the country's risk management capability.

Risk assessment at local level is generally heterogeneous. Some municipalities, such as Portimão, have conducted fairly accurate risk assessment studies, while others lack them almost completely. It is necessary to take into account that this type of analysis at local level is the key tool not only for knowing risk scenarios, but also for managing land use and allocating sufficient operational resources.

Figure 12: Example of land-use planning in Portugal



The NRA builds the basis for developing further assessment and risk management measures at national, district and municipal level. This is indeed the case at district level, but at municipal level, the situation appears to be varied. Some municipalities align their local assessments with the NRA and add information where necessary. For example, in the Algarve region, some municipalities have analysed tsunami risks in more detail, with the most exposed municipalities including inundation maps that were developed by the ANEPC. However, despite the mandatory analysis of earthquake risks (for the Algarve and Lisbon regions specifically), as well as Seveso-related risks and dam breakage (for the entire country), more detailed analyses are not necessarily implemented. Hence, municipalities that are particularly exposed to certain hazards should be flagged and the integration of a more detailed analysis of these hazards should be mandatory at municipal level. In terms of financing additional assessments for tsunamis, the IPMA as a public body should act as an information provider for municipalities, free of charge. Hence, for all municipalities, less detailed maps should be made available to make the approach affordable.

In addition, the assessment methodologies of the NRA are not detailed in the document itself, and regional and local assessment procedures can deviate from the national level. However, the procedures at municipal level should be aligned with the established methodology. Also, certain planning scenarios should be coherently used across the country. Currently, different municipalities use different kinds of scenarios for their planning, which may lead to inconsistencies and contradictions between the assessments applied at local level.

Box 14: Risk assessment**Good practice:**

- ▶ **G29:** The NRA is implemented in line with existing EU legislation and builds on existing work such as the PNEPC. It considers a range of stakeholders necessary for providing relevant datasets.

Recommendations:

- ▶ **R28:** Risk assessment methodologies are not necessarily clear for all hazards and should be part of the NRA document. This would ensure that procedures at municipal level are aligned with the NRA.
- ▶ **R29:** For the earthquake risk assessment, the grid should be enhanced for the Azores and Madeira. The catalogue should be improved and updated to integrate the IPMA simulations. In addition, all municipalities exposed to a particular hazard (earthquake, tsunami, etc.) should have an accurate risk assessment analysis to be used not only as a risk scenario, but also for the proper management of land use. The district level and perhaps the national level could support the local level when needed.
- ▶ **R30:** At the current stage, the NRA considers risks very much separately. However, a multi-risk approach, also including complex crises and cascading effects, should be implemented at national level and translated to the district and municipal levels. In addition, cultural heritage should be given more weight in the risk assessment.
- ▶ **R31:** Societal risk perception could be included in the assessment. Surveys could be conducted to better understand the diverse societal sub-groups and to eventually support the risk identification and prioritisation process, as well as the establishment of a national communication plan.
- ▶ **R32:** Methodologies to integrate more diversified aspects of exposure and vulnerability into the municipal assessments need to be detailed and implemented in a standardised manner at municipal level. This encompasses, for example, the number of people and buildings affected.

3.1.2 Dissemination of risk assessment results

Following the NRA, risk assessment must be made available to the public by the competent authorities on a summary basis as part of public consultation procedures for civil protection emergency plans. In this context, citizens are called upon to take part, for a period of at least 30 days, in the validation process. This public consultation is a key communication tool, as it means citizens are aware of the plan, including the results of the risk assessment, which are presented as a chapter of the different plans. After approval, the results of the risk assessment (at different territorial levels) are in some cases made fully available to the public by the respective responsible entities in a more detailed version usually online or via specific communication mechanisms (during events, in leaflets, etc.). In other cases, at least a summary is available.

Box 15: Dissemination risk results

Good practice:

- **G30:** The public availability of assessment results, at least on a summary basis, and their use in public consultation procedures for civil protection emergency plans is a very good practice to disseminate information related to risk assessment and raise public awareness.

Recommendations:

- **R33:** Municipalities that are particularly exposed to certain hazards should be flagged up and the integration of a more detailed analysis of these hazards should be mandatory at municipal level, going beyond Seveso, dam breakage and earthquake/tsunami risks.
- **R34:** Developing a risk geoportal for the different territorial levels that collects and displays all risk assessment maps available for that territorial level would make all risk-related information about a specific territory available on the same site.
- **R35:** For some risks, such as Seveso, dam breakage and earthquake/tsunami risk, more detailed assessments should be mandatory at district and municipal level. The more detailed municipal assessments, e.g. in the form of tsunami inundation maps, would be facilitated by the national level.

3.2 Risk management planning

3.2.1 Risk consideration in policies and planning

The risk management planning process, just like the overall civil protection system set-up and risk assessment process, is characterised by its diversity. The process is facilitated by the national level through the NRA, the National Emergency Plan, and guidelines. The main actors remain however the municipalities, many of which follow a linear planning process that builds in the NRA and aligned municipal assessments. Currently – and this is most likely due to the historic focus on response – there is a very clear emphasis on emergency planning and at least one generic plan has to be developed by the municipalities. Specific plans on earthquake/tsunami risk, dam breakage and Seveso-related risks must also be drawn up where relevant. In that case, the Basic Law on Civil Protection is quite generic. Although it says that specific plans for specific risks may cover areas that are likely to be affected by a particular risk, there is no identification of municipalities that have to produce such plans.

With respect to the development of DRM policies and planning, activities differ between hazards. For example, many **wildfire related activities** take place at municipal level, especially since the events of 2017. This is facilitated by the national level, since it has designed a new model – an integrated system for the management of wildfires (the SGIFR) – which seeks greater and more effective safety in relation to wildfires. This has resulted in the adoption of an integrated and specialised model for the management of wildfires, in an attempt to ensure that they do not pose a threat to people and their properties. For example, AGIF facilitated the development of a wildfire risk assessment, including history, fuel models, price of fuel, impact of specific habitats, and impact on the wildland-urban interface (WUI). The assessment translated into plans for forest management, divided into:

- ▶ Ignition reduction;
- ▶ Strategic fuel management;
- ▶ The anticipation of complex events, including risk data;
- ▶ The development of strategy, operations and tactics programmes (link with campaigns, see **section 2.4.1**).

For other risks, the development of policies and planning processes is in its early stages. For example, in the context of tsunami risk, new regulations regarding the use of pictograms and sirens were approved in September 2019. For dam breakage risk however, scenarios have to be assessed for an area at least 5km downstream of the dam and the assessment must be validated by the authorities.

In terms of **Seveso-related aspects** of DRM, the SEVESO-III-Directive (2012/18/EU) is fully implemented in the national law and the related activities in Portugal even go beyond these requirements in some aspects. For example, a simplified emergency plan for lower-tier facilities has been established and the 'high risk' classification from the General Inspectorate for Agriculture, Sea, Environment and Spatial Planning (IGAMAOT) considers not only substances and amount, but also the reliability of operators and findings of former inspections. Furthermore, audits by the APA are used in combination with inspections by IGAMAOT as a more cooperative approach to collaborate with the operators of Seveso establishments.

Overall, it seems that the operators, park providers and responsible authorities are managing the existing risks well.²⁵ At the same time, satellite and smaller industries are frequently more problematic, but less monitored, as they are not covered under the Industrial Emission Directive (EID directive) and the SEVESO III Directive.

In addition, due to a lack of capacity at municipal level, the national level deals with much of the Seveso-related information, and it remains unclear whether sufficient risk-related information is available at municipal level to develop effective DRM processes. The information needed for the external emergency plan is delivered by the operator directly to the ANEPC, where it is validated and then sent to the municipalities, who have to draft the external emergency plans. On the one hand, this is a way to harmonise and ensure a certain level of quality of the data provided by operators. On the other hand, however, it does not promote direct interaction between the Seveso operators and the municipalities about aspects of the external emergency plan that need to be concerted and coordinated.

In the Portuguese Seveso-related law, there are obligations that are not subject to administrative penalties, so when operators do not comply with them, the ANEPC does not have the possibility to fine them.

From a **technical** point of view, several examples exist that facilitate the consideration of risks in policies and planning. For example, in the Coimbra Intermunicipal Community, a platform has been developed that facilitates policy support in several areas, including an assessment of the effects of climate change. The reshaping of the civil protection system at district level might strengthen this intermediate level to further support the municipalities in their efforts to translate risk assessments into policies and planning.

From a **governance** perspective, in spite of what the regulation says, risk assessments seem to not be consistently translated into land-use planning. There are examples integrating risk datasets into the land-use data. However, there should be a coordinated process with a national vision that implemented through the districts and municipalities. Potentially, this process might identify certain municipalities where the translation into land-use planning becomes mandatory. For example, in relation to Seveso, restrictions in land-use planning have to be assessed and executed. However, most municipalities do not incorporate urbanisation restrictions around Seveso sites and more binding national regulations have not been adopted. Overall, risk-related land-use planning should be executed coherently and there should be learning from good practices throughout the country.

One major challenge that relates to efficient land management is the lack of a cadastre. Land owners are currently being identified and registered. However, this process is ongoing and still impairs for example the effective management of fuels in certain areas in relation to wildfire management. It needs to be completed before further developing land-use strategies

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²⁵ In some cases, Seveso establishments are not cooperative in providing all the necessary information related with the external emergency plan. To ease the process, it might be helpful, to have a law which would enable the National Authority for Emergency and Civil Protection to apply fines in case of a lack of cooperation.

Box 16: Risk considerations and actions**Good practice:**

- ▶ **G31:** Training on civil protection and risk management is available to all mayors, parish leaders and Civil Protection Coordinators.
- ▶ **G32:** Platforms facilitating risk management planning have been developed and are used in some districts.
- ▶ **G33:** Wildfire-related activities are very advanced. They make use of additional data and advanced assessment methodologies that translate into dedicated forest and fuel management plans, based on a grid structure. **G34:** Seveso-related assessments, audits and plans go beyond the relevant EU directive, which has been fully integrated into national legislation.
- ▶ **G35:** The development of an upgraded cadastre is an important step in developing effective land management policies. This work is in progress.

Recommendations:

- ▶ **R36:** The advanced wildfire-related process of developing policies and planning activities shows that an integrated DRM approach is being established, taking advantage of having an umbrella organisation, although it is a fairly new concept for Portugal. It should be examined to what extent this example can be translated to other risks such as earthquake and tsunami or Seveso-related risk management.
- ▶ **R37:** The development of intermunicipal DRM legislative networks should be further elaborated in the restructuring process and ideally be targeted for all intermunicipal entities.
- ▶ **R38:** Risk assessments should be integrated into land management planning in a consistent manner across the country. Ideally, it should be mandatory at least for 'high-risk' municipalities (previously identified) and good practices in integrating risk assessment data into land-use planning should be exchanged. In terms of wildfire risk management, economic aspects of management and the role of bigger companies could be better integrated into the existing strategies, particularly against the background that the forest revenue is EUR 1.5 billion per year. Furthermore, the acquisition of strategically located parts of the forest through the government, municipalities or any other public body could be a relevant aspect that might be addressed upon completion of the cadastre.
- ▶ **R39:** Industrial HazMat risks outside the Seveso framework should be better monitored, for example via regulations related to chemical safety regulations. It should be evaluated whether the necessary information and operational assets are sufficient to manage Seveso-related risks at municipal level or whether more direct interaction between operators and the municipalities in the surroundings of installations should be promoted. By law, the ANEPC should have the possibility to fine non-cooperating Seveso establishment operators that fail to provide the necessary information for external emergency planning. This could also be useful to enforce other regulations and legislation.

3.2.2 Evaluation of disaster losses

Currently, no official evaluation of disaster losses is conducted in Portugal. All firefighter deployments are registered in a database that also includes the implemented activities. Losses are however not registered there. The UNDRR National Platform has set up a working group on a disaster loss database. This also involves the insurance sector, which encompasses data that it could share. Overall, the development of a loss database is encouraged to identify the required civil protection action, including the efficiency of expenses²⁶.

Box 17: Evaluation of disaster losses

Good practice:

- **G36:** Attempts are being made to develop a disaster loss database as a basis for further DRM planning.

Recommendations:

- **R40:** International standards should be followed to establish bases and criteria to develop a loss and damage database for major accidents and disasters at different territorial levels, including the procedures to complete the database and definition of who is in charge of it. The 2015-2030 Sendai Framework offers a template for developing such a database. Tools should be developed for consulting the public on the loss and damage database, with the main objective of supporting research or improving knowledge in the field of DRM. Overall, the firefighter incident database could build a basis for developing a disaster loss and damage database.

4. Preparedness

4.1 Disaster preparedness and contingency plans

Disaster preparedness and contingency planning activities also reflect the multi-level, multi-stakeholder setting described in **section 2.1.1**. Hence, there is a PNEPC, district plans and municipal plans. At municipal level, a generic plan is usually developed that is accompanied by specific plans dedicated to certain risks. All plans are regularly updated. The municipal-level plans are reviewed by the ANEPC and need to be approved. Overall, the emergency planning process builds on the 2015 revision of the Law of Civil Protection.

In terms of preparedness and contingency measures, hazards have to be differentiated. For example, in the **wildfire** context, a well-designed monitoring system exists. It includes surveillance walks by the National Guard to identify households that need to clean fuel on their properties, and monitoring during the summer months through watchtowers and electronic (camera-based) surveillance systems. Additionally, an elaborated response system exists, expressed under the Annual National Directive. This is run and coordinated by the ANEPC. In this directive, the concept of initial attack establishes the intervention of the three closest suppression vehicles (from the fire services, national guard, forest sappers or other entities with suppression capacity), supported by an initial attack helicopter carrying an intervention crew from the National Guard, that work for a maximum of 90 minutes on the initial attack mission. After the fire alert, the dispatch of all the initial attack resources is run through the National Authority District Coordination Centres, and done within the first two minutes after a fire is detected. In each district, there are several intervention bases prepared for initial attack, each made up of up to three vehicles, one helicopter, and about 20 members of staff from the National Guard, who are dispatched by the National Authority District Coordination Centres. If the resources dispatched are not able to contain the fire on its initial stage, additional resources from the fire services, National Guard, forest sappers, or other entities with suppression capacity, are dispatched, and the firefighting operation raises its level to extend attack.

Figure 13: Demonstration of the first response by helicopter to a wildfire



For the Seveso context, installations have their own emergency plans for different scenarios. It is not certain whether special provisions have been made for the anti-seismic strengthening of the facilities, in order to avoid cascading events. It is also not certain whether such provisions have been made for loading facilities, e.g. in ports. Especially taking into account the fact that some of the Seveso establishments are national critical infrastructure (e.g. the Sines Gas Terminal; also 40 % of Seveso establishments are located at the Sines ZILS), it is crucial that these provisions are made not only from a safety and security perspective, but also from the perspective of national resilience. Overall, for the Seveso establishments, it is not really clear whether the link between internal (facility related) and external (municipal) stakeholders in case of an emergency is sufficient and whether the internal and external operational resources are coordinated and sufficient.

In terms of **earthquakes**, we must take into consideration that, following Portugal's hazard map for a 500-year return period in relation to macroseismic intensity, the whole of Portugal, except a small portion close to the northern border, is affected by earthquakes of intensity VI on the European macroseismic scale (EMS), i.e. slightly damaging or higher. The highest value of intensity expected in the country is X EMS (very destructive) in the Algarve region and a small part of Lisbon, therefore special emergency plans for seismic risk should be mandatory throughout the country, at least in the areas where VI EMS earthquakes or higher are expected (500-year return period). Also, considering the high impact of this kind of hazard, which would easily affect most of the country, a National Seismic Risk Plan should be developed.

In relation to the seismic sources that can affect Portugal, it has to be considered that both offshore and onshore seismic sources exist. The majority of data available relate to offshore sources, which suggests that mainland Portugal could be affected by an earthquake generated far away. It is worth noting that some strong earthquakes have been generated close to Lisbon, such as those in 1909 and 1531. Few paleo-seismological studies exist and they are mainly concentrated along the lower Tagus Valley. No paleo-seismological studies exist in other areas, even in highly populated such as the Algarve region.

Considering the high tsunami and seismic risk of some areas (south-western coast, Algarve) multi-hazard maps and relative multi-risk maps should be developed. These multi-hazard and multi-risk maps should include at least four risks, namely seismic, tsunami, wildfire and Seveso related.

One of the key points on which seismic plans should focus is the ability to assess damage quickly, especially of buildings. The Azores have drawn up specific guidelines for the rapid assessment of buildings that were also adopted in mainland Portugal in 2019. In the case of the Azores, it would be very useful to further develop a special protocol for rapid assessment of damaged buildings that takes into account not only technical criteria, but also the training of the professionals (engineers and architects) who are in charge of these tasks. On the other hand, there must be sufficient data in order to be able to evaluate the number of damaged buildings that are forecasted in the different seismic risk scenarios.

However, the number of engineers or architects available to perform damage assessments seems not to be sufficient in case of a larger earthquake. Hence, there should be two classes of experts to be involved in rapid assessments: experts from the private sector, trained for one or two days in advance, and experts from the public sector, trained for a whole week.

Box 18: Disaster preparedness and contingency plans**Good practice:**

- ▶ **G37:** The wildfire surveillance and response system is very elaborate. The double role of the GNR is very efficient: they are involved in surveillance and firefighting activities (initial attack). Requesting that citizens clean their land gives them a lot of credibility.
- ▶ **G38:** Very good guidelines on earthquake-related building vulnerability and rapid damage assessments exist in the Azores and have also been recently adopted in mainland Portugal.

Recommendations

- ▶ **R42:** More paleo-seismological studies should be performed in order to better assess the seismic risk related to onshore seismic sources (faults), taking into account also the possibility of a 'silent fault', namely faults which have not released large earthquakes in a long time, but are active and hazardous. In addition, special emergency plans for seismic risk should be mandatory for high-risk municipalities throughout the country, including a National Seismic Risk Plan. Earthquake and tsunami events should play a more prominent role in contingency planning of ports, critical infrastructure and Seveso establishments. Finally, tsunami emergency plans for Lisbon and other affected regions need to be developed and integrated into earthquake planning, e.g. in terms of cross-checking whether escape routes are available. In particular, internal tsunami plans of authorities, for example the port authorities, need to take this into account.
- ▶ **R43:** Internal and municipal response capacities of Seveso establishments should be coordinated in the planning process on a regular basis. As Seveso establishments are bringing additional risks into a community, there should be a legal way to impose operators to finance specific risk-related equipment for local responders or oblige operators to provide specific assets (e.g. sirens for public warning, special extinguishing agents, etc.) on their own.
- ▶ **R44:** A special protocol for rapid assessment of damaged buildings should be developed. Experts (engineers and architects) should be trained to conduct rapid damage assessments in case of an earthquake. Precedence could be given to governmental and municipal employees. Private experts could be trained as reserves.

4.2 Early warning

Several technical solutions and procedures have been put in place to identify high-risk situations in the short or very short term, as well as to issue early warnings. For example, with respect to **meteorological risk** and the impact of meteorological parameters, a very close collaboration has been established between the IPMA and civil protection authorities at national and district level. The IPMA prepares situation reports on a daily basis for all actors to stay informed about the meteorological situation (forecast, situations of extreme weather, weather warnings, etc.). At national level, there is even a daily video conference between the IPMA and ANEPC. The reports are also disseminated to selected stakeholders. In the case of wildfires, IPMA produces daily maps with a meteorological risk index with warnings (five different levels, from reduced to maximum) for each municipality.

The IPMA also has developed a Special Plan for Meteorological and Warnings in case of extreme weather situations, which is aligned with the European ‘Meteoalarm’, following the same standards. The plan considers four different levels of warnings for different meteorological phenomena (rain, wind, snow, heat waves, cold waves, etc.):

- ▶ **Green:** No severe weather expected
- ▶ **Yellow:** Potentially dangerous weather expected
- ▶ **Orange:** Dangerous weather expected
- ▶ **Red:** Very dangerous weather

These warnings are sent to the ANEPC, which considering the type of emergency situations that this may cause, has established a system with five different levels of alert (one more than the meteorological system, which can sometimes cause a little confusion) for the mobilisation of response means (prevention or action).

For **tsunami risk**, an early warning system started to be established at the end of 2017. It is based on a seismic network to detect the earthquake origin, a sea-level network based on coastal observation systems (62 stations), as well as a decision matrix to guide the assessment of the alert level. After eight minutes, the IPMA sends an email and other electronic means to the ANEPC, which again passes on the information to the local authorities. Some municipalities (such as Portimão) are testing sirens to pass on the warning to the population and pictograms and route signs have been established in several coastal areas to guide the population.

In addition, it seems that procedures for emergency planning and evacuation are not clarified and trained everywhere. It can however be very dangerous to activate sirens if the emergency procedures are not clarified. For example, some municipalities were not fully aware of the potentially flooded area, inundation depths and population affected. Related assessments and procedures are however under construction and being trained. At the same time, very good examples also exist. For example, Portimão makes use of satellite data to plan evacuation routes. The biggest challenge for Portugal is the very short timeframe to prepare for the arrival of a tsunami, which lies between 15 and 30 minutes, according to the approximations of modelling.

The early warning system also should serve to alert special infrastructure such as ports (e.g. in Lisbon and Sines), which should develop internal procedures, in accordance with the general emergency plan, in order to reduce the effects of a possible tsunami as much as possible and to limit the subsequent cascade effect.

It is also necessary to highlight the leadership that Portugal plays on a regional scale with respect to tsunamis, because the IPMA is the responsible entity for issuing tsunami alerts for the North-Eastern Atlantic Area within the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and connected seas (ICG/NEAMTWS).²⁷

For **wildfires**, an advanced surveillance programme is implemented in some regions of Portugal (see also **section 3.2.1** above). The classical watchtower system is thereby complemented by camera-based surveillance systems which can cover a whole district, such as Coimbra. It contributes to a very early detection of ignitions and the corresponding triggering of the response operations.

In the **Seveso** context, early warning in the surrounding areas of Seveso establishments is currently mainly based on cars with loudspeakers that inform the public about an incident. However, this procedure seems insufficient in several situations. In addition, sirens should be used to ensure a fast warning, particularly during the night, since HazMat substances and vapour clouds can spread quickly. Because operators and municipalities in the surrounding areas are obliged to provide regular information to the public on how to react in case of an accidental release or incident, especially in the surrounding areas of Seveso establishments, sirens are a meaningful early warning tool. Also, individual facilities have information on their websites to inform the public. A central place where the public is informed about Seveso risks, as well as a coherent communication strategy, seem to be lacking. In addition, the authorities have to deal with the reluctance of the population to know about the related risks, which is also reflected in the low participation in consultation processes. In this context, a deeper understanding of their perception and the different societal groups is needed (see also **section 3.1**, 'Risk assessment').

Box 19: Early warning systems

Good practice:

- ▶ **G39:** Meteorological information is passed on and discussed on a daily basis between the IPMA and ANEPC.
- ▶ **G40:** A tsunami-early warning system has started to be established, since 2017. An SMS warning system is running and sends notifications to the population. Warning times are however currently too long in relation to the short time before a tsunami would arrive. A shorter timeframe between the steps is nevertheless being sought.

²⁷ <http://neamtic.ioc-unesco.org>

Recommendations:

- ▶ **R45:** The meteorological warning levels from IPMA and the emergency civil protection alert levels due to extreme weather situations should be aligned. A fact sheet on the divergence exists, but it would be easier – also to understand for the public – if they used the same system.
- ▶ **R46:** The procedures and responsibilities relating to the earthquake and tsunami early warning system need to be specified and simplified in order to take less time, particularly with respect to the very short warning time. This is especially true for earthquakes (less than 20 seconds). Portugal is one of the few countries that can develop such an early warning system, due to the long distance between the offshore seismic sources. For example, warnings should be issued directly by the organisation overseeing the system (IPMA) to the local authorities, and maybe directly to sirens, especially in case of early warning for earthquakes. Therefore, threshold values should be developed in relation to the activation of the early warning system. Evacuation procedures need to be outlined and tested, especially at municipal level. In initial tests and exercises, response times differed greatly among the municipalities. At the level of authorities, too, emergency plans need to be developed and trained for. This is not entirely the case for tsunami risk, for example.
Finally, the enhancement of the existing early warning system through mobile phones and the augmentation of the national mobile application (a dedicated civil protection application would be recommendable) could be very effective in crisis communications. For nation-wide or broader scale alerts, the tsunami early warning system could also be aligned with the neighbouring countries, particularly Spain.
- ▶ **R47:** The early warning for Seveso risks should be enhanced. A siren system should be put in place, at least on the premises of each upper-tier establishment, in order to facilitate fast issuing of warnings during the day and at night. In addition, an integrated Seveso risk communication strategy should be developed and information should be made available to the public via a central platform.
- ▶ **R48:** The monitoring of risk levels and the different early warning systems are separate solutions with related technologies and warning and information procedures. However, an integrated strategy among the hazards, ideally coupled with a single information source (such as an online portal where all information is centrally stored) would be very useful to streamline information and procedures. Taking as a reference point the NRA, it is necessary to implement a real and efficient multi-risk early warning system that allows all the population exposed to a hazard to receive relevant and timely information in a systematic way before a disaster in order to inform and take action.

4.3 Capability analysis and planning

In line with Decision 1313/2013/EU of the European Parliament and of the Council establishing the Civil Protection Mechanism, ANEPC conducted the National Risk Management Capability Assessment for Portugal as the next step of the NRA. Based on the guidelines developed by the EU (Commission Notice 2015/C 261/03), ANEPC carried out an exploratory analysis on the 51 questions. This was then complemented by a stakeholder consultation and validated by the CNPC. This analysis, as well as the findings of the peer review detailed above, show that Portugal has significant capacity levels at all stages of the risk management process, i.e. covering the components of risk assessment, the planning of prevention and preparedness measures, and the implementation of those measures.

Some outstanding examples of these capabilities outlined above include for example the integration of risk into the education system, the monitoring and surveillance of risks, the dedicated fuel management system to reduce wildfire risk, the development of shared operational pictures across the organisations²⁸, which also include a layer for the public, and the overall collaboration of the very large number of stakeholders at all levels. Overall, it was found that the available capabilities have very much increased and enhanced during recent years. In addition, districts are paired up to structure potential support in case of a major disaster. This is a very good practice, although it remains unclear who provides support in the event that both districts are affected.

Overall, professionals and volunteers collaborate very well in this system and there is no differentiation between the two groups in terms of the tools and training they receive. In many regions, these services depend heavily on volunteers who are able to request reimbursement for their deployment and time they spend on training. Nevertheless, it is often difficult to attract volunteers and hence in the Algarve region, volunteers receive an additional payment, which is due to the regional market pressure caused by high incomes in the tourism industry. Similarly, regions with high levels of resources not only possess better means to finance volunteers, but also have large amounts of equipment and logistical resources at their disposal.

Volunteers are an appropriate and cost-effective civil protection tool. Volunteers in Portugal are organised in three different forms:

1. In fire brigades,
2. In groups formally recognised by the ANEPC²⁹, and
3. In other NGOs or ad-hoc organisations. Most of the volunteers are however organised in NGOs that are not involved in official civil protection activities.

The volunteers of the recognised organisations have to attend a one-day ANEPC training session to provide a common ground and an option for networking. All volunteers are older than 18, but there is no upper age limit. About 30 % of the volunteer firefighters in fire brigades are women (as **Table 7** shows). The overall numbers of volunteers in the fire service have remained almost constant over the last 10 years.³⁰

²⁸ Provision of an equal picture or situational awareness to all the participants of a situation.

²⁹ Nine organisations were formally recognised by the ANEPC by a regulation adopted in March 2017.

³⁰ Figure provided by the National Directorate for Firefighters.

Table 7: Overview of male and female volunteers active in the fire service

| District | Active | | Command | |
|------------------|---------------|---------------|--------------|--------------|
| | Women | Men | Women | Men |
| Aveiro | 457 | 1 462 | 2 | 76 |
| Beja | 204 | 500 | 1 | 35 |
| Braga | 430 | 1 340 | 2 | 55 |
| Bragança | 226 | 722 | 1 | 36 |
| Castelo Branco | 164 | 861 | 0 | 38 |
| Coimbra | 414 | 1 414 | 2 | 63 |
| Évora | 135 | 504 | 1 | 37 |
| Faro | 273 | 976 | 1 | 47 |
| Guarda | 247 | 1 072 | 1 | 51 |
| Leiria | 456 | 1 397 | 1 | 71 |
| Lisboa | 915 | 3 446 | 6 | 147 |
| Portalegre | 171 | 574 | 2 | 29 |
| Porto | 916 | 2 895 | 8 | 125 |
| Santarém | 429 | 1 235 | 3 | 76 |
| Setúbal | 403 | 1 192 | 1 | 70 |
| Viana do Castelo | 177 | 534 | 0 | 30 |
| Vila Real | 254 | 1 045 | 1 | 58 |
| Viseu | 452 | 1 556 | 2 | 93 |
| Total | 6 743 | 22 725 | 35 | 1 137 |
| | 29 468 | | 1 172 | |

The existing volunteer system (relating to the organisational forms i and ii mentioned above) should be promoted and new approaches to involve and integrate volunteers in the existing organisations should be considered, recognising that the process of official recognition was only initiated in 2017. In volunteer systems, three main pillars are fundamental to encourage citizens to engage themselves in voluntary organisations such as fire departments: equipment, education and recognition. Therefore, it is necessary that the municipalities provide sufficient funds to the fire departments and voluntary associations to equip volunteer units with state-of-the-art equipment, enhance the existing training system and emphasise to the public that serving in the civil protection system as a volunteer is an honourable contribution that helps to be better prepared.

Especially in areas with a large number of interventions (e.g. touristic regions such as Algarve), it is crucial that enough professional firefighters are available to attend the daily operations and ensure that the volunteers are not overwhelmed by a large number of interventions. From an organisational point of view, a platform is used in which all volunteer firefighters are registered and can be assigned to certain incidents. This is a good example that might also be used by other volunteer organisations.

To decouple the capability planning from the local resources and to allow for a more coherent, risk-driven process, it could thus be useful to determine certain minimum capacity requirements for certain risk levels at national level. Ideally, this process should jointly consider private resources, as for example available at Seveso establishments, and public resources, enabling risk-related planning and sharing of equipment and resources. Potentially, this process could even require operators to fund specific Seveso risk-related equipment to the local public responders.

Another example is the retrofitting of schools to make them earthquake resistant. Pilot projects are being run in this area – similarly as in the case of tsunami early warning sirens – for example in Portimão. However, an enhanced programme and funding for the retrofitting of schools would be productive in this respect. Furthermore, some pilot projects (such as PERSISTAH) could be further incorporated into civil protection standards.

Box 20: Capability analysis and planning

Good practice:

- ▶ **G41:** The pairing of districts to structure emergency response in case of a major disaster is a very good approach to ensure the provision of resources. However, it should also be taken into account that both districts of a pair could be affected and hence might not be able to support each other.
- ▶ **G42:** The Portuguese system is very rich in capabilities. The firefighter system encompasses a mixed approach that includes both strong professionals who are needed for the fast and daily response, but also volunteers for larger incidents and in small communities.
- ▶ **G43:** This enables the provision of a common ground of information and networking between the members of different organisations.
- ▶ **G44:** The platform used for assigning volunteer firefighters might also serve as a good example for other volunteer organisations.

Recommendations:

- ▶ **R49:** Overall, capability planning at municipal level should be decoupled from the available local funding but be based on a risk-driven definition of minimum capabilities for certain risk levels.
- ▶ **R50:** Local capability planning should be a joint process between all stakeholders and include public and private resources.
- ▶ **R51:** A legal framework for volunteers in the civil protection services should be implemented or improved (e.g. insurance, supplement to pension fund, reimbursement of expenses to volunteers, obligation to release volunteers from work based on reimbursement of lost working time for their employers, mandatory rests between deployments and normal job). The framework should cover the volunteer fire services, as well as the volunteer organisations recognised by the ANEPC.
- ▶ **R52:** Major DRM topics such as the retrofitting of schools and housing could be embedded into a national strategy, exploiting the experience from pilot projects.

4.4 Training and exercises

The training of firefighters in Portugal is implemented by the National School of Firefighters (ENB) which is owned by the ANEPC (50 %) and by the Confederation of Portuguese firefighters (LBP) (50 %). There are four national training centres (Sintra, Lousã, S. João da Madeira and Madeira) with a certain focus each. For example, Lousã is specialised in forest fires. The training schools have to present their curricula to ANEPC.

The ANEPC's National Directorate for Firefighters proposes to the ENB the organisation and the training courses considered relevant, ensuring the necessary resources. The ENB is responsible for the content and the dissemination of the training programmes. Annually, the ANEPC, the ENB and the district training structures plan and define the training needs for the upcoming year for both professional and volunteer fire brigades of Portugal's mainland.

The formative skills covered are the following:

- ▶ Prehospital emergency;
- ▶ Rescue and release;
- ▶ Urban and industrial fires;
- ▶ Rural fires;
- ▶ Leadership in firefighter activity;
- ▶ Relief operations management;
- ▶ Driving as a firefighter (off-road and defensive);
- ▶ Wide angle rescue;

- ▶ Accidents with hazardous materials;
- ▶ Building shoring;
- ▶ Rescue boat driver;
- ▶ Telecommunications.

At the same time, and within the scope of the National Mechanism for Rural Firefighting Operations, ANEPC contracts to the ENB a training package aimed at those who may assume command or leadership functions in the context of rural firefighting.

The contracted formative skills are the following:

- ▶ Urban and industrial fires;
- ▶ Rural fires;
- ▶ Safety in rural firefighting;
- ▶ Organisation of command posts;
- ▶ Decision support techniques;
- ▶ Logistics and planning of relief operations;
- ▶ Air operations management;
- ▶ Recognition and assessment of the situation;
- ▶ Leadership.

Generally speaking, this training covers all the training needs for volunteer firefighters in order to be able to pursue their different careers, and to be updated with relevant knowledge, including technical improvements. The ENB provides the following overview of training courses:

- ▶ Forest fire suppression – initiation;
- ▶ Forest fire suppression – development;
- ▶ Forest fire suppression – advanced;
- ▶ Forest fire operations management – initiation;
- ▶ Forest fire operations management – development;
- ▶ Specialised training – forest fire behaviour and safety;
- ▶ Specialised training – reconnaissance and situation assessment in forest fires;
- ▶ Specialised training – heli-transported fire brigades;
- ▶ Specialised training – forest fire prevention;
- ▶ Specialised training – prescribed fire;
- ▶ Specialised training – planning and anticipation in forest fires.

According to figures of the ENB, 41 courses were taught and 588 trainees were trained in 2018.

Trainers are internal (members of the national fire school) and external (trained individuals that can give basic training at the fire stations, particularly the volunteer ones). The latter is based on a 'train the trainer' programme, which is also quality controlled (audited).

Two impressive training facilities encompass the ENB headquarters in Sintra (which also runs a virtual reality centre that can be used for exercises), as well as the GNR urban search and rescue training area in Lisbon.

In terms of training content, the training of mayors and parish leaders, performed at national and district level although not on a regular basis, is an outstanding procedure that few countries have implemented. This enables the minimum standard culture of civil protection to be passed on to mayors. It would probably be more effective if training became mandatory or in some way more disseminated, ensuring good and more uniform knowledge about risks and civil protection. Nowadays, civil protection activities in municipalities differ strongly depending on the local capacities and priorities set by the mayor.

Overall, Portugal is also actively implementing large-scale exercises such as CASCADE¹⁹, which involved all relevant national actors and also a range of international actors.

Box 21: Training and exercises

Good practice:

- ▶ **G45:** The system considers different risks and trains professionals and volunteers. A quality controlled 'train the trainer' programme has been developed, which also enables the implementation of training at local level. This also includes the training of mayors and parish leaders.
- ▶ **G46:** The virtual reality centre is a best-practice example of a modern learning environment for joint operational exercises of different stakeholders in a common scenario.

Recommendations:

- ▶ **R53:** To ensure cooperation and interoperability between various civil protection stakeholders from different locations and organisations, training and exercises should be standardised as far as possible from the national level. In particular, the training of officers and executive personnel of all organisations that are involved in civil protection operations should have standardised content regarding organisation, communication, command and control, and other relevant issues, to ensure full interoperability in the Portuguese civil protection system.
- ▶ **R54:** Training of mayors and parish leaders is an outstanding procedure. It would be more effective if training became mandatory or in some way more disseminated, ensuring a good and more uniform knowledge about risks and civil protection. Additionally, training sessions for civil protection stakeholders, e.g. for municipal civil protection service workers, should be integrated into the training programme and become mandatory for administrative representatives responsible for DRM at the local level.
- ▶ **R55:** Instead of engaging a very large amount of trainers (1 200), fewer, more qualified individuals should be engaged.

5. Recovery

During the peer review process, there was no focus on recovery and additional information and literature would have been needed to provide comprehensive feedback on this phase of managing disaster risk. However, some aspects that were identified during the review are mentioned in the section below, which might provide food for thought for further discussions.

For example, there seems to be no special, permanent strategy for recovery and reconstruction that covers all hazards. Overall, it seems that recovery efforts are handled on a case-by-case basis. For example, in São Brás de Alportel, a very good but improvised recovery example following the 2012 fires also took social recovery aspects into account. However, there would be the need to have a national strategy, particularly also for major incidents, that is integrated into the risk management planning process.

Respective strategies must take all aspects into account and always take into consideration that recovery must be considered as a tool to improve and reduce vulnerability and exposure if possible, and therefore the level of risks. For example, in the case of wildfires, they must not only consider reconstruction aspects, but also psychological support, reforestation and soil-related aspects, as well as insurance to rebuild structures. On the other hand, recovery is an issue that requires substantial funding to rebuild or repair buildings and infrastructure, restore essential services and meet the needs of the affected people.

Box 22: Recovery and reconstruction

Good practice:

- ▶ **G47:** In some recovery efforts, aspects of psychosocial recovery have been well addressed and community efforts implemented in addition to financial measures.
- ▶ **G48:** The insurance sector is integrated in the activities of the UNDRR National Platform.

Recommendations:

- ▶ **R56:** In fact, it is necessary to elaborate a national recovery plan in case of a disaster or major accident, taking into account all these considerations and covering financial mechanisms to deal with this problem. It would also need to take into account that the greater the disaster is, the greater the problems related to the recovery are and also the amount of money needed to face it.
- ▶ **R57:** Insurance coverage in Portugal should be enhanced and considered in an integrated way in recovery efforts.

6 Recommendations

6.1 Short-term

- ▶ **Governance structure:** Mainstream activities between intermunicipal cooperation and the district system
- ▶ **Collect post-event disaster data** (possibly by the methodology laid out in the Sendai Framework) and statistical analysis
- ▶ **Risk assessment:** Make it mandatory to prepare local risk assessments for the most profound risks and consideration of cascading events at all levels
- ▶ **Risk management planning:**
 - ▷ Pilot societal surveys concerning risk perceptions to guide risk prioritisation and communication
 - ▷ Prepare a comprehensive and integrated national risk communication plan, giving attention to vulnerable groups; develop campaigns to raise public awareness about risk management, using all possible means of communication in an integrated way, including the exploitation of social media to promote self-protection
 - ▷ Include earthquake and tsunami risk in the risk management planning of port facilities, Seveso establishments and other critical infrastructure
 - ▷ Pay special attention in planning to the rich cultural heritage of the country
 - ▷ Prepare and train teams of civil engineers and architects for rapid damage assessments concerning buildings and infrastructure after a disaster
 - ▷ Harmonise existing early warning systems and improve early warning for Seveso establishments
 - ▷ Enhance the legal framework for volunteers in the civil protection system (in fire brigades and in other organisations), including for example recovery times and refunding mechanisms

6.2 Medium-term

► **Governance structure:**

- ▷ Monitor the effectiveness of existing overarching organisations for the purpose of developing a limited number of them, for clusters of risks other than forest fires
- ▷ Integrate risk management strategies across all levels of governance (national-district-municipal)
- ▷ Better integrate the private sector, particularly the insurance industry, into DRM
- ▷ Establish a risk management knowledge network, including academia

► **Risk assessment:** Insert all stakeholders into the risk assessment cycle, starting from the risk identification phase

► **Risk management planning:**

- ▷ Examine the possibility of a horizontal and consequence-based planning approach, in addition to the existing risk-based paradigm, by studying current global trends in the risk management sector; this could include mass evacuation, mass casualty, mass hosting of population, etc.

6.3 Long-term

► **Governance structure:**

- ▷ Adopt a holistic approach to DRM that is more legally binding at the local level
- ▷ Align DRM procedures with the structured knowledge existing in local and international academia
- ▷ Increase risk awareness and risk perception of the population in Portugal through consequent implementation of civil protection topics in all levels of education, all phases of life and all kinds of population groups, using an integrated approach which considers different language for different means of communication

► **Risk assessment:**

- ▷ Consider societal risk perceptions, studied through surveys, in the process of national risk identification and prioritisation

Annex I – Terminology

- ▶ **Contingency planning** — a management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations.
- ▶ **Disaster** — any situation that has or may have a severe impact on people, the environment or property, including cultural heritage.
- ▶ **Emergency services** — a set of specialised agencies that have specific responsibilities and objectives in serving and protecting people and property in emergency situations.
- ▶ **Early warning system** — the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organisations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.
- ▶ **Peer review** — a governance tool by which the performance of one country in a specific area (in this case risk management/civil protection) is examined on an equal basis by fellow peers who are experts from other countries.
- ▶ **Preparedness** — a state of readiness and capability of human and material means, structures, communities and organisations enabling them to ensure an effective rapid response to a disaster, obtained as a result of action taken in advance.
- ▶ **Prevention** — is understood as
 - a. Where possible, preventing disasters from happening, and
 - b. Where they are unavoidable, taking steps to minimise their impact.
- ▶ **Resilience** — the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including by preserving and restoring its essential structures and functions.
- ▶ **Response** — any action taken at national or sub-national level in the event of an imminent disaster, or during or after a disaster, to address its immediate adverse consequences.
- ▶ **Risk management capability** — the ability of a Member State or its regions to reduce, adapt to or mitigate risks (impacts and likelihood of a disaster) identified in its risk assessments to levels that are acceptable in that Member State. Risk management capability is assessed in terms of the technical, financial and administrative capacity to carry out appropriate:
 - a. Risk assessments;
 - b. Risk management planning for prevention and preparedness; and
 - c. Risk prevention and preparedness measures.
- ▶ **Stakeholders** — actors with an interest in DRM include scientific communities (including engineering, geographical, social, health, economic and environmental sciences), practitioners, businesses, policy-makers, central, regional and local levels of government, and the public at large.
- ▶ **Sub-national level** — entities at the regional or local government levels tasked with DRM.

Annex II – List of documents

Prior to the mission, the peers were given access to 39 documents. Many (legal) documents were available in Portuguese only but machine translation provided by the European Commission was useful to transport the core content. Throughout the mission, the peers requested more background information, which was provided by the Portuguese authorities. Due to the multitude of documents provided, a core set of priority readings was developed by the Portuguese authorities, as listed below.

Table 8 – List of documents

| Title | Type of document | Version date |
|--|------------------|--------------|
| Law on Civil Protection | Legislation | 2015 |
| The Integrated System for Relief and Protection Operations (SIOPS) | Legislation | 2013 |
| National Risk Assessment | Policy document | 2019 |
| Framework for Civil Protection at the local level | Legislation | 2019 |
| The National Strategy for Disaster Reduction (ENPCP) | Legislation | 2017 |
| National Capability Assessment | Policy document | 2019 |
| National Operational Directive on Nuclear, Radiological, Biological and Chemical incidents | Legislation | 2010 |
| Transposition of the Directive 2012-18-EU_EN | Legislation | 2015 |
| Report on the Application in the Member States of Directive 96/82/EC on the control of major-accident hazards involving dangerous substances for the period 2009-2011 | Policy document | 2011 |
| Directive on Prevention and Response to Forest Fires | Legislation | 2018 |
| ‘Safe Village, Safe People’ guide for forest fire prevention and awareness | Policy document | 2018 |

Annex III – Actors/ Stakeholders

Table 9 - List of stakeholders

| Abbreviation | Stakeholder | Website |
|-----------------------------|--|--|
| ADAI/UCoimbra | Forest Fire Research Centre from Association for the Development of Industrial Aerodynamics from University of Coimbra | www.adai.pt |
| AFOCELCA | Afocelca | www.afocelca.com/ |
| AGIF | Agency for the Integrated Management of Rural Fire | www.agif.pt |
| AICEP Global Parques | AICEP Global Parques | www.globalparques.pt |
| ANACOM | National Authority for Communications | www.anacom.pt |
| ANEPC | National Authority for Emergency and Civil Protection | www.prociv.pt |
| APA | Portuguese Environment Agency | www.apambiente.pt |
| APS | Portuguese Association of Insurers | www.apseguradores.pt/Portal |
| APS S.A | Administration of the Ports of Sines and of the Algarve, S.A. | www.portodesines.pt/Portal |
| ASF | Authority for the Insurance Supervision and Pension Fund | www.asf.com.pt |
| CIVISA | Azorean Centre for Seismic and Volcanic Information and Surveillance | www.cvarg.azores.gov.pt/civisa/Paginas/homeCIVISA.aspx |
| CCDRLVT | Commission for the Coordination and Regional Development of Lisbon and Tagus Valley | www.ccdr-lvt.pt/pt |
| CCDR Algarve | Commission for the Coordination and Regional Development of Algarve Region | www.ccdr-alg.pt/site |

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| CDOS Coimbra/ ANEPC | Coimbra District Command of Relief Operations/National Authority for Emergency and Civil Protection | www.prociv.pt |
| CDOS Faro/ ANEPC | Faro District Command of Relief Operations/National Authority for Emergency and Civil Protection | www.prociv.pt |
| CDOS Leiria/ ANEPC | Leiria District Command of Relief Operations/National Authority for Emergency and Civil Protection | www.prociv.pt |
| CDOS Setúbal/ ANEPC | Setúbal District Command of Relief Operations/National Authority for Emergency and Civil Protection | www.prociv.pt |
| CIM Coimbra | Intermunicipal Community of Coimbra Region | www.cim-regiao-de-coimbra.pt |
| COM Sines | Council of Sines Communities | www.comsines.pt |
| CIMAL | Intermunicipal Community of Coastal Alentejo | www.cimal.pt |
| AMN | Portuguese National Maritime Authority | www.amn.pt/Paginas/Homepage.aspx |
| DGE | Directorate-General for Education | www.dge.mec.pt |
| DGEStE | General Directorate for School Establishments | www.dgeste.mec.pt |
| DGAV | Portuguese National Authority for Animal Health | www.dgv.min-agricultura.pt/portal/page/portal/DGV |
| DGT | Directorate-General for Territorial Development | www.dgterritorio.pt |
| EDP-D | EDP Distribuição (Portugal's mainland energy distributor) | www.edpdistribuicao.pt/en |
| ENB | National Firefighter School | www.enb.pt |
| Federation of Algarve Firefighters | Federation of Algarve Firefighters | |
| FFAA | Armed Forces | www.emgfa.pt |
| GNR | Republican National Guard | www.gnr.pt |
| GNR/UEPS | Emergency Unit for Protection and Relief (UEPS) of the Republican National Guard (GNR) | www.gnr.pt |

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| GTF CIM Coimbra | Forest Technical Office of the Intermunicipal Community of Coimbra Region | www.cm-coimbra.pt |
| ICNF | Institute for Nature Conservation and Forestry | www.icnf.pt |
| ICNF/PNSAC | Serra de Aires e Candeeiros Natural Park | www2.icnf.pt/portal/turnatur/visit-ap/pn/pnsac |
| IGAMAOT | General Inspectorate for Agriculture, Sea, Environment and Spatial Planning | www.igamaot.gov.pt |
| INEM | National Institute of Medical Emergency | www.inem.pt |
| IP S.A. | Infrastructures of Portugal, S.A. | www.infraestruturasdeportugal.pt |
| IPMA | Portuguese Institute for the Sea and Atmosphere | www.ipma.pt |
| IST | Instituto Superior Técnico (Lisbon School of Engineering) | tecnico.ulisboapt |
| LNEC | National Laboratory for Civil Engineering | www.lnec.pt |
| Lousã Firefighters | Lousã Firefighters | www.bombeiros.pt/cbs/cb.php?cb=606 |
| Municipality of Lisboa | Municipality of Lisboa/Civil Protection Department | www.cm-lisboa.pt/viver/seguranca/protecao-civil |
| Municipality of Olhão | Municipality of Olhão | www.cm-olhao.pt |
| Municipality of Portimão | Municipality of Portimão | www.cm-portimao.pt |
| Municipality of Porto de Mós | Municipality of Porto de Mós | www.municipio-portodemos.pt |
| Municipality of São Brás de Alportel | Municipality of São Brás de Alportel | www.cm-sbras.pt/pt/Default.aspx |
| Municipality of Sines | Municipality of Sines | www.sines.pt |

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| OTI | Independent Technical Observatory for Analysis, Monitoring and Evaluation of Forest and Rural Fires occurring in the National Territory | |
| POSEUR | Operational Programme for Sustainability and Efficiency in the use of Resources | poseur.portugal2020.pt |
| PSP | National Public Security Police | www.psp.pt |
| REN | REN (Portugal's mainland energy transport operator) | www.ren.pt |
| REN Atlântico | Natural Gas Infrastructure/REN | www.ign.ren.pt/en/terminal-de-gnl3 |
| Safe Communities Portugal | Safe Communities Portugal | www.safecommunitiesportugal.com/pt-pt |
| SPES | Portuguese Society for Earthquake Engineering | spes-sismica.pt |
| SRPCB Açores | Azores Regional Civil Protection and Fire Service | prociv.azores.gov.pt |
| Turismo | Tourism of Portugal | www.turismodeportugal.pt |
| UAlg | University of Algarve | www.ualg.pt/pt |



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