



**RESILIENT COMMUNITIES THROUGH AWARENESS AND PREPAREDNESS
AGAINST THE RISKS OF FIRE, FLOOD, AND LANDSLIDE**

CHAPTER 8. THE EU CIVIL PROTECTION MECHANISM

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THE EU CIVIL PROTECTION MECHANISM

8.1. Evolution and responsibilities**8.1.1. Introduction, background and membership**

The Union Civil Protection Mechanism (“Union Mechanism”, or UCPM), regulated by Decision No. 1313/2013/EU¹, strengthens cooperation between the EU and its member states to improve response to man-made and natural disasters. Although member countries are primarily responsible, the Union Mechanism promotes solidarity and coordination in dealing with these disasters. Such events can occur anywhere, often unexpectedly, and their impact is increasing due to climate; disasters can happen anywhere, hitting one or several countries simultaneously and without warning. Recent experiences have shown that voluntary assistance actions and measures adopted do not always meet the needs of the disaster-stricken population and adequately protect the environment. To overcome these shortcomings, all European instruments and procedures, including civil society participation, should be used flexibly. Disaster prevention and preparedness are crucial and member states should share risk assessment and management capacity with the European Commission who helps define the EU's overall strategy. The European Commission proposes new legislation and policies for adoption in the EU, monitors their implementation and manages its related finances. It also plays a significant role in supporting international development and granting of aid.

In the 1990s, natural disasters and conflicts (such as the Kurdish refugee crisis, tropical cyclones in Bangladesh, and tensions in the Balkans) brought a need for assistance in various countries around the world. In response to this need, the European Community Humanitarian Office (ECHO) was created in 1992 to provide support to countries across Europe and in the world. In 2001, the Union Mechanism was created under the Directorate General for Civil Protection and Humanitarian Aid Operations, which retained the acronym ECHO (or DG

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D1313>

ECHO). The creation of the Union Mechanism aimed to complement assistance activities with measures for prevention, preparedness and early response to disasters. Through the DG ECHO, the European Union works closely with nongovernmental organizations (NGOs), United Nations agencies, such as the Office for the Coordination of Humanitarian Affairs (OCHA), the International Committee of the Red Cross, and the International Federation of Red Cross and Red Crescent Societies. The main objective of the DG ECHO is to save lives, prevent and reduce human suffering and protect the integrity and dignity of populations affected by disasters. These values are highlighted in the Lisbon Treaty, which gives responsibility to the EU to give humanitarian assistance, relief and protection to the victims of natural or man-made disasters worldwide and to support and coordinate the civil protection assistance of its Member states, international organizations and third countries. The Union Civil Protection Mechanism currently has the participation of 36 countries²:

- 27 EU member states: Austria, Greece, Belgium, Bulgaria, France, Cyprus, Croatia, Czech Republic, Poland, Denmark, Estonia, Finland, Germany, Malta, Hungary, Ireland, Italy, Latvia, Lithuania, Sweden, Luxembourg, the Netherlands, Portugal, Slovakia, Slovenia, Spain, Romania.
- 6 EU candidate states: North Macedonia, Montenegro, Serbia, Turkey, Bosnia and Herzegovina, Albania;
- 2 EEA community states: Norway, Iceland;
- United Kingdom.

The DG ECHO's headquarter is in Brussels with a global network of more than 50 offices in more than 40 countries, providing the Commission with an overview of global humanitarian needs, monitoring EU-funded operations, better development of intervention strategies and policies and facilitating coordination. The office acts according to the humanity, cooperation, neutrality, impartiality and independence principles. The Union Mechanism provides assistance impartially, without political, national, religious, gender or ethnic preferences, for the sole purpose of aiding those in need. When a population is affected by a disaster, assistance must be promptly provided, ensuring that basic needs are met while preserving the dignity of those affected.

² In 2022, Ukraine and Moldova formally requested to become Participating States of the Union Mechanism.
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023DC0061>

8.1.2. Aims, tasks, responsibilities

The Union Mechanism supports Member and Participating States, and even third countries beyond Europe facing disasters where their capacities may not be sufficient to deal with the emergency. Participation in the Union Mechanism is voluntary. Each country can request help through the ERCC and Member and Participating States can then decide whether to respond to the request and offer help to the affected country. The main objectives of the Union Mechanism are:

- Ensuring that the ERCC is always ready to help EU countries in case of difficulties.
- Fostering cooperation and joint action among European authorities to effectively deal with man-made and natural disasters.
- Promoting partnership with United Nation Agencies, nongovernmental organizations (NGOs) and organizations of the civil society to increase the effectiveness of joint humanitarian interventions.
- Ensuring funding and complying with the budget rules.

Civil protection assistance provided to disaster-affected countries foresees the participation of member states and the supply of resources, expertise, intervention teams and specialized equipment. The Union Mechanism also deploys experts who coordinate with local authorities and international organizations. These experts give advice on prevention and preparedness measures to requesting countries.

According to European Parliament Decision 1313/2013, the scope of the Union Mechanism is very broad, encompassing natural disasters (such as earthquakes, forest fires, cyclones, and floods), man-made disasters, and measures to prevent or reduce disaster risks. Its objectives include improving disaster prevention and response capacities by facilitating timely and efficient responses to ongoing or imminent disasters, increasing people's awareness and preparedness for such events, and providing comprehensive guidelines for risk prevention activities within the EU to build resilience to disasters through prevention and awareness-raising campaigns on the culture of prevention. The Union Mechanism fosters solidarity among member and participating countries through cooperation and activities coordination, while recognizing that member states retain primary responsibility for protecting people, the environment, and property, including cultural heritage within their territories and for equipping their disaster management systems with sufficient means to adequately and consistently prevent and cope with disasters that are reasonably foreseeable.

8.1.3. European Union Disaster Resilience Goals

Improving resilience in several areas is a priority for the European Union:

- Climate resilience: resilience against the impacts of climate change, such as extreme sea level rise, weather events, and temperature changes. Through various strategies and policies, the EU aims to strengthen the resilience of critical infrastructure (physical resources, information technology, networks, systems services and infrastructure assets that would cause serious consequences to the society if damaged or destroyed, including the supply chain, security, health system and economic or social well-being of the population), natural ecosystems, and communities.
- Disaster Resilience: disaster risk reduction and preparedness. Member states should improve their ability to respond to and recover from man-made and natural disasters. This includes promoting coordination, rapid alert systems and joint response mechanisms.
- Health resilience: the coronavirus pandemic highlighted the need for a more resilient health care system able to ensure access to medical supplies and improve coordination during health emergencies.
- Socioeconomic resilience: The EU aims at increasing the resilience of economies and societies against shocks, such as economic crises, social crises or external threats. Measures include supporting social cohesion, creating jobs, and strengthening social safety nets.

On February 8, 2023, the European Commission adopted a Recommendation³ and a Communication⁴ regarding the establishment of common objectives to strengthen disaster resilience by enhancing the capacity of EU Members and Participating states of the Union Mechanism to prevent future disasters and emergencies, such as earthquakes, forest fires, floods, and withstand their repercussions. These objectives are non-binding and the time horizon for achieving them is set at 2027-2030, considering that systematic investments and long-term actions will be needed to strengthen civil protection capacities and improve resilience. The time frame overlaps with the UN Sendai Framework for Disaster Risk Reduction 2015-2030. Although the goals are addressed to civil protection, resilience will be

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<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023H0215%2801%29&qid=1676531610023>

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2023%3A61%3AFIN&qid=1675958089171>

strengthened for critical infrastructure, such as health, cybersecurity, and transportation. The EU Disaster Resilience Goals will also have a broader impact. The "EU model" of the "Union Civil Protection Mechanism" can also be adopted for disaster preparedness in other countries by supporting the political dialogue and providing assistance to civil protection systems. The Commission has set five objectives, jointly identified with the EU member states, to be pursued collectively in order to improve the EU's overall resilience. The objectives to be pursued through concrete initiatives are illustrated in Fig. 8.1.



Figure 8.1. The EU resilience goals and corresponding flagship initiative (https://ec.europa.eu/echo/files/aid/countries/factsheets/thematic/factsheet_disaster_resilience_goals.pdf).

To promote investments in resilience, Member and Participating states of the Mechanism will be able to draw on financial support from instruments such as Cohesion Policy funds, the Recovery and Resilience Facility (RRF), the LIFE program (achievement of climate and environmental objectives), the European agricultural fund for rural development (EAFRD), the EU Climate Change Adaptation Mission, and the Technical Support Instrument (TSI). Technical assistance provided by the Union Mechanism helps to create "smart" prevention investments contributing to climate change adaptation, citizens protection from disasters, environmental degradation reduction, and advancements toward the green transition.

Financial support is provided to disaster prevention and preparedness projects, technical assistance funds to prepare for investments in this field, support to carry out peer reviews, training and exercises among civil protection operators, support for activities related to evidence gathering, risk assessment, risk communication, and enhancement of the Emergency Response Coordination Center's operational tools. Disaster resilience goals are periodically reviewed for adequacy as conditions change; they also require an ongoing commitment by states to find available investments to strengthen activities of disaster prevention and response.

In 2023, both at the EU and national levels, works to operationalise the recommendations have been started, to ensure adoption of implementing measures of proposed concrete initiatives and to raise awareness among key stakeholders in member states with respect to the goals foreseen. Despite the long time horizon mentioned above, the flagship initiatives will provide concrete results sooner. For instance, Goal 4 flagship initiative, 'Strengthen the RescEU Strategic Reserve,' plans to double the fleet of air assets for RescEU firefighting by 2023, with the addition of 3 helicopters and 12 light aircrafts. Another example is Goal 1 flagship initiative, 'Europe-wide disaster scenarios,' where 10 disaster scenarios will be developed by the end of 2023, covering 16 major hazards and related effects to which Europe could be exposed, such as floods, health threats (including pandemics), tsunami, heat/cold wave, wildfire, volcanic eruption, blackout and disruption of energy supply, armed conflict effects, cyber and terrorist attacks, nuclear emergencies, marine pollution, industrial emergencies, population displacement.

8.1.4. Legislation

The EU Civil Protection Mechanism, established by European Council Decision 2001/792/ on October 23, 2001⁵, is a tool of the Directorate General of Civil Protection and European Humanitarian Aid Operations (DG-ECHO) to reinforce cooperation, facilitate collaboration in civil protection and provide timely response in case of emergencies .

The Union Mechanism can be activated in case of man-made and natural disasters occurring inside or outside the EU territories in order to share resources among all Member and participating states and to respond immediately and effectively to emergencies. In January 2006, the European Commission revised the Union Mechanism based on the experience gained and to establish appropriate legislative basis for future interventions. In addition,

⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32001D0792>

Council Decision 2007/162 /EC⁶ Euratom, establishing a Civil Protection Financial Instrument ("CPFI Decision") began the funding of activities aimed at improving prevention, preparedness, and response to disasters, particularly those implemented through the cooperation of the countries within the Union Mechanism.

The Union Mechanism was amended by Decision 2007/779/EC⁷ on November 8, 2007 establishing a Community Civil Protection Mechanism (the "Founding Decision of the Mechanism"). The aim was focusing on the increase, frequency and severity of man-made and natural disasters. The Lisbon Treaty⁸, which entered into force on December 1, 2009, reinforced the idea that the EU Member states are required to act with a solidarity spirit if a country is hit by a natural or man-made disaster or a terrorist attack. The Lisbon Treaty introduced a legal basis for civil protection policies and European humanitarian aid. Before that, the EU's civil protection actions and legislation were all based on a provision within Article 308 of the EC Treaty, which allowed the Council, if necessary to act non-unanimously, to achieve the Treaty objectives in those areas where the Treaty provided no alternative legal basis. With Article 196⁹ of the Treaty on the Functioning of the European Union (TFEU)¹⁰, the Union Mechanism was formally given its own space. Until early 2010, the European Environmental Council was responsible for the civil protection activities. Civil Protection responsibilities were transferred under the Directorate General for Humanitarian Aid and Civil Protection (DG-ECHO) to strengthen synergies and coherence of European disaster response operations.

With Decision 1313/2013/EU¹¹ the European Parliament and the Council adopted the Union Mechanism which came into force on January 1, 2014. This decision introduced new elements to the Civil Protection Cooperation System by regulating the reinforcement of emergency management policies at all stages: planning, prevention and assistance (Emergency Response Coordination Centre, and European Emergency Response Capacity), support for participating countries, disaster preparedness (Emergency Response Coordination Centre the European Emergency Response Capacity.)

⁶ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32007D0162>

⁷ <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32007D0779%2801%29>

⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12007L%2FTXT>

⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016E196>

¹⁰ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12012E/TXT:en:PDF>

¹¹

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D1313#:~:text=This%20Decision%20strengthen%20the%20cooperation,reason%20of%20scale%20and%20complementarity.>

In November 2017, the European Parliament adopted a new proposal (2017/0309) amending Decision No 1313/2013/EU¹² on the Union Mechanism. Specifically, the proposal introduced some changes on the UCPM under which the European Union supports, coordinates, and integrates Member States' Civil Protection. Based on the principles of shared responsibility and solidarity, this proposal wants to ensure that the Union Mechanism can give better emergency support and response to European citizens and beyond, recognizing that efforts to prevent disasters are crucial to mitigate the damages of a disaster. The current UCPM structure is intended to provide a planned response at international level and shared by each country. The Union Mechanism supports countries in disaster prevention, preparedness and resource allocation to make them capable of responding quickly and in a coordinated way when an emergency occurs. In addition to initiatives that focus on prevention and preparedness, such as training for civil protection personnel abroad, exercises for civil protection response capabilities, and exchange of civil protection and prevention experts, the UCPM (following Decision 1313) allows for increased capacity for coordinated response and better use of resources.

8.1.5. How it works

Countries interested in offering their support can make available their resources in terms of tools, means, experts and volunteers (to become a civil protection volunteer and be registered on state lists, one must have attended health and safety training courses in order to intervene in emergencies without endangering one's own life and the lives of team members), registered with the EERC (European Emergency Response Capacity (EERC) or Pool of Volunteers.

When a man-made or natural disaster occurs, inside or outside the EU, the country in distress can request assistance through the ERCC. This results in the activation of the UCPM which can deploy a team of experts according to the disaster scenario if necessary. Specialized teams such as firefighters, search and rescue teams, and doctors can be mobilized quickly. Member states and participants in the Union Mechanism who have offered assistance and their resources are available to the requesting country. Once the necessary resources are sent, the experts finish their work. The affected country remains the responsible party in managing the intervention, and the aid provided by the Union Mechanism is managed according to what is required by the country and in line with the culture of the affected country.

¹²

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D1313#:~:text=This%20Decision%20strengthen%20the%20cooperation,reason%20of%20scale%20and%20complementarity.>

The Office for the Coordination of Humanitarian Affairs (OCHA) is part of the United Nations Secretariat. The OCHA is responsible for gathering humanitarian organizations to ensure a coherent response to emergencies. It also ensures the respect of a framework through which each actor can contribute to the global response effort. OCHA's mission is to mobilize and coordinate effective and ethically acceptable humanitarian actions in collaboration with national and international actors in order to reduce suffering during emergencies, defend fragile people rights, promote preparedness and prevention, and facilitate sustainable solutions. The Union Mechanism ensures integrated coordination with OCHA during operations in non-European countries. The Union mechanism activation process is illustrated in Fig. 8.2.

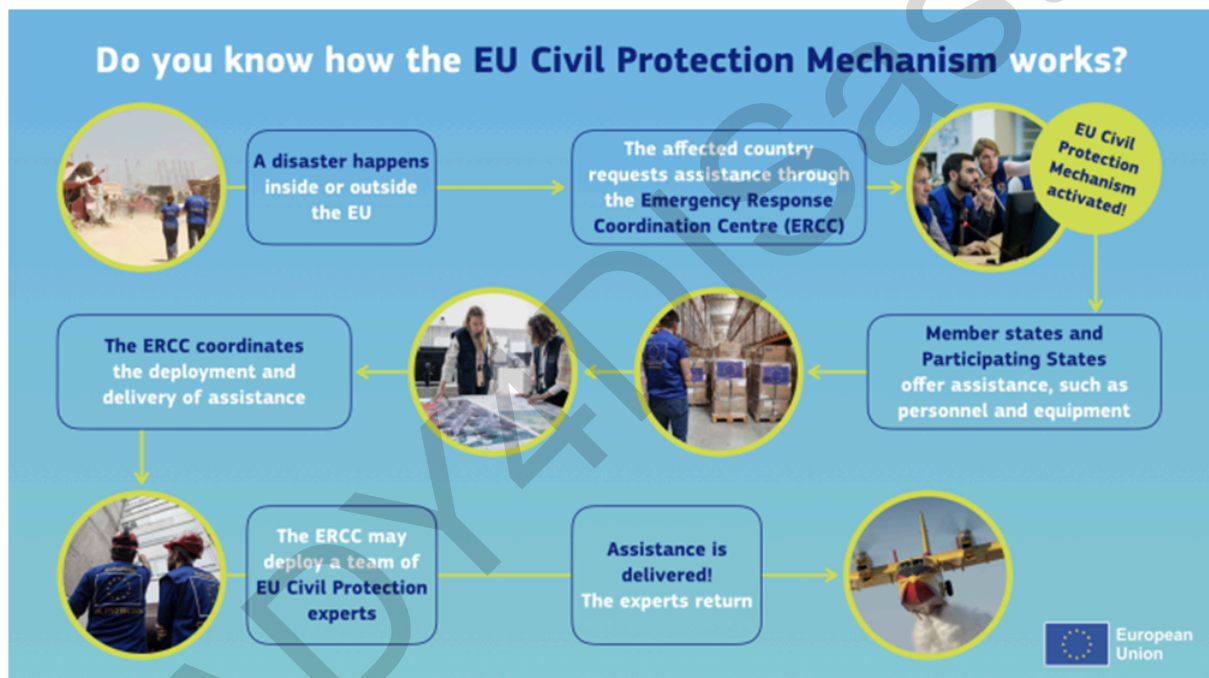


Figure 8.2. The EU Union Civil Protection Mechanism (https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/eu-civil-protection-mechanism_en).

In Italy, 800 million Euros are allocated for civil protection for the implementation of 'new projects' (year 2023, subject to change) thanks to the Piano Nazionale di Ripresa e Resilienza (Next Generation EU funds)¹³. These projects must address hydrogeological risk and flood risk reduction, and have the aim of regenerating affected areas and increasing the resilience of territories to natural disasters.

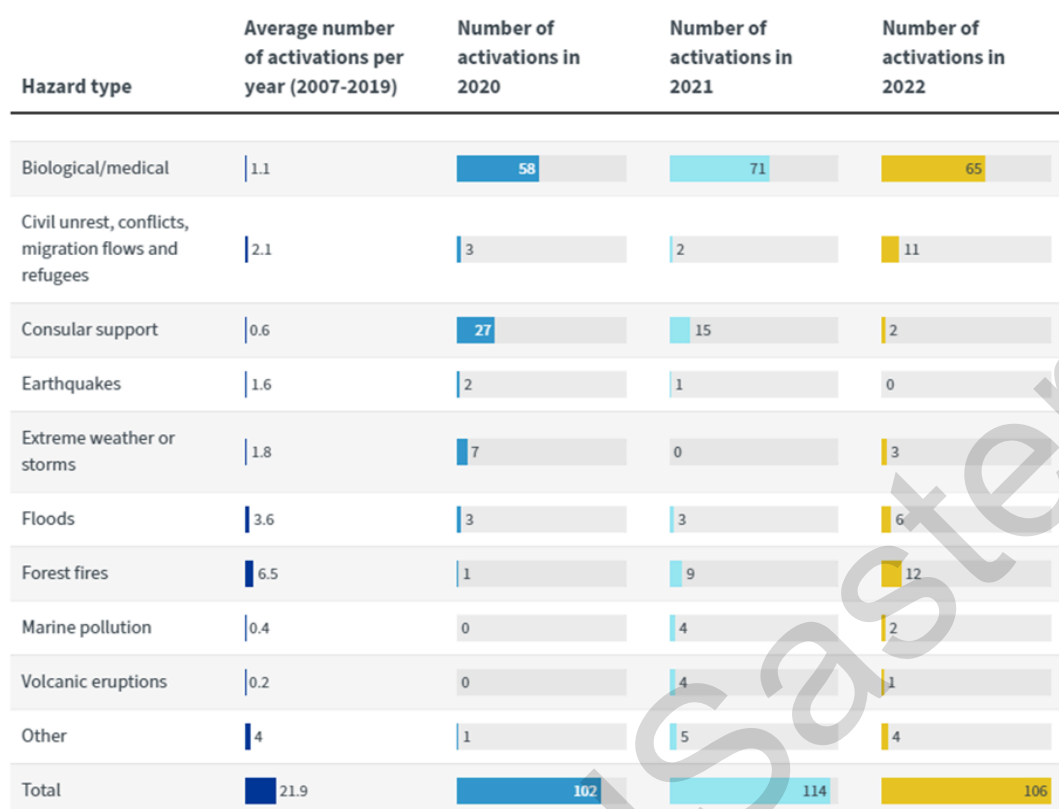
¹³ <https://pnrr.protezionecivile.gov.it/it/il-pnrr-il-dipartimento-della-protezione-civile/>

8.1.6. European activation

When an emergency overwhelms the response capabilities of a country in Europe and beyond, it can request assistance through the Emergency Response Coordination Centre (ERCC) which receives requests and informs all other countries involved in the Union Mechanism. The Common Emergency Communication and Information System (CECIS) is responsible for communicating the request, allowing immediate dialogue between centers operating H24 in different countries. The request from the affected countries, with the countries that have offered their intervention. CECIS provides all the Union Mechanism countries with information and updates on the emergency. The type of intervention varies depending on the emergency. The ERCC facilitates the verification and/or coordination of teams, experts, civil protection operators, and ensures co-financing of assistance transportation offered by the Union Mechanism countries. Rescue management is the responsibility of the country requesting the Union Mechanism activation.

8.1.7. Worldwide activation

Since 2007, the Union Mechanism has been activated more than 650 times to respond to emergencies. Between 2020 and 2021, it has been activated 106 times. Fig. 8.3 illustrates the types of Union Mechanism activation between 2007 and 2022 at global level.



Source: European Commission

Figure 8.3. Union mechanism activations by hazard type 2007-2022 (<https://www.consilium.europa.eu/it/infographics/civil-protection/>).

In 2022, the Union Mechanism provided humanitarian aid to Ukraine after Russia occupied the country in February. The main interventions include the delivery of 84,000 tons of material assistance, including power generators, safe shelters, medicines, food, water pumps and fire-fighting equipment; and the evacuation of 1700 sick and injured patients from Ukraine to 18 EU countries and Norway.

The worldwide activation regarded 72 countries that received assistance in 2022 through the Union Mechanism¹⁴. Most countries sent one or two requests for assistance but some made up to four. There are 4 categories to explore: Russia's war on Ukraine, COVID-19, Natural disasters and other emergencies (e.g. oil spill, conflicts, medicine shortages). As said, the ERCC monitors events around the world 24/7 and ensures rapid deployment of emergency support through direct communication with national civil protection authorities. Satellite maps produced by the Copernicus Emergency Management Service also support civil protection operations. In 2022, the Copernicus service was triggered 86 times and produced 475 satellite maps.

¹⁴ <https://www.consilium.europa.eu/it/infographics/civil-protection/>

When the disaster-stricken country is not part of the European Union, emergency management falls under the responsibility of the United Nations and not the Union Mechanism. In many countries outside Europe, civil protection operations often go hand in hand with humanitarian aid. The DG-ECHO gathers experts in both areas who work closely together to ensure a more coherent analysis and response, particularly in complex emergencies. For example, one of the last Civil Protection and Humanitarian Aid Operations outside Europe regarded the floods in Pakistan, one of the world's most disaster-prone countries. Heavy monsoon rains and flooding hit Pakistan in June 2022. On August 29, the Union Mechanism was activated following a request for assistance from Pakistani authorities. A French water purification module went into operation on October 16 in Dadu, Sindh province. The module produced a total of 629,000 liters of clean water. The operation took place on Nov. 5. In parallel, a Belgian water purification module arrived in Karachi on October 25 and produced more than 100,000 liters of clean water at 2 sites: Bhiria (Sindh province) and Kot Diji. The team completed the mission and returned on November 4, but all the equipment was donated and continued to operate for at least six months.¹⁵

8.1.8. Interaction between national civil protection organization and the Union Mechanism

As members of the Union Mechanism, each country must take the necessary steps to ensure that civil protection modules are able to operate with other civil protection modules; and when intervening outside the EU, civil protection modules and technical assistance support teams, are able to operate with international disaster response capacities that intervene in aid of the affected state.

In 2010, a group of civil protection experts on modules, after the lessons learnt in past civil protection operations, identified and highlighted the need to develop EU guidelines for the provision of host nation support (HNS)¹⁶. Although these guidelines have a non binding nature, UCPM members are encouraged to apply them during operations inside the EU and, when possible, in case of bilateral assistance (EU or non-EU countries). The EU HNS Guidelines are complementary to existing international documents on disaster management.

“Host Nation Support” implies all actions undertaken in the preparedness phase and the disaster response management by UCPM members, receiving or sending assistance, in order

¹⁵ https://civil-protection-humanitarian-aid.ec.europa.eu/where/asia-and-pacific/pakistan_en

¹⁶ https://ec.europa.eu/echo/files/about/COMM_PDF_SWD%2020120169_F_EN_.pdf

to remove as much as possible any obstacle to international assistance. The ultimate aim is ensuring that disaster response operations are carried out smoothly. The EU HNS Guidelines foresee the creation of, a HNS team in a disaster-stricken country by the local emergency management authority (LEMA). There are three areas of intervention:

- HNS-R: Registration and support at the Point of Entry or Relief Amassing Point established by the affected country.
- HNS-A: assistance to teams during their activities in the affected country.
- HNS-C: coordination of HNS teams at Local Emergency Management Authorities (LEMAs), collecting and disseminating information from international teams.

The HNS team represents the connection between the LEMA and the EU Civil Protection Pool throughout their mission in the country. During emergencies, the HNS team aims to:

- Ensure better utilization of the UCPM capacities from the very beginning of the missions;
- Integrate operations between national and international civil protection teams;
- Support the civil protection teams in all logistical needs, including fuel, transportation, food and shelter;
- Facilitate the communication between the civil protection teams and the local population and/or governments;
- Facilitate communication between teams and local/national coordination centers.

On the other hand, HNS team has to be considered apart from the local incident commander and it is not responsible for both the operational coordination of the team, and the technical counseling during the rescue/relief operations. Fig. 8.4 illustrates the Union Mechanism and Host Nation Support activation process in all its stages.

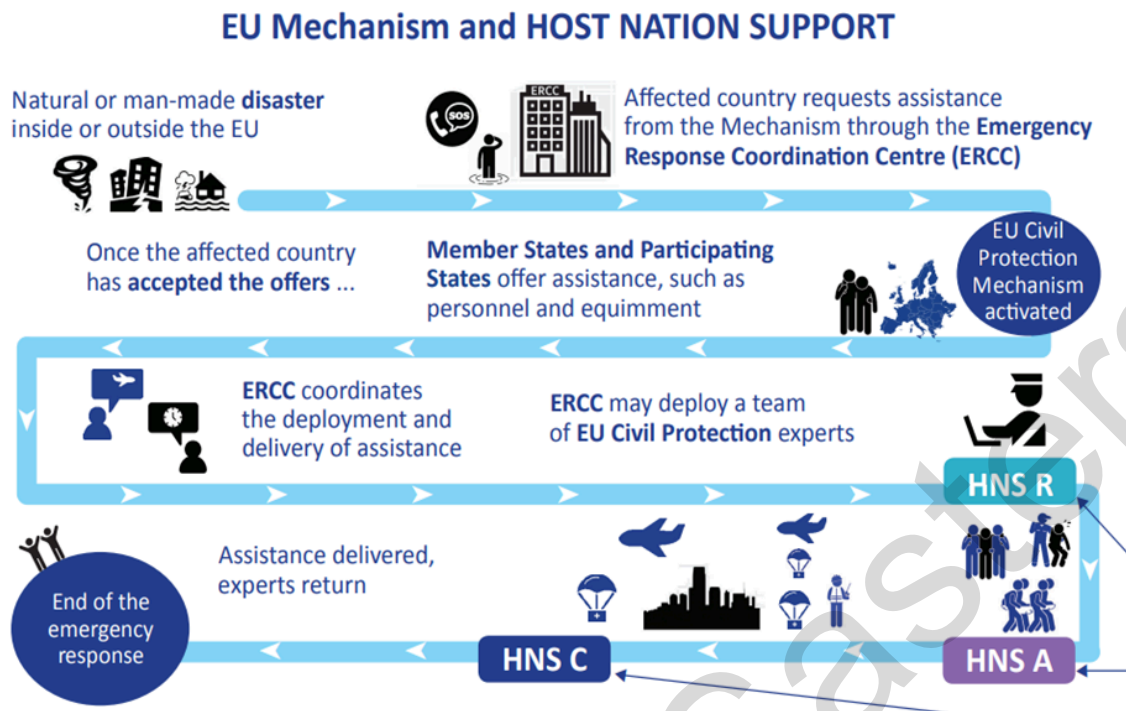


Figure 8.4. EU Mechanism and Host Nation Support procedure (https://euhns.eu/wp-content/uploads/2023/06/HNS_Quick_Reference_Guide.pdf).

8.2. Organization and resources

The European Emergency Response Capacity (EERC), also called the European Civil Protection Pool, consists of all the human resources and equipment made available by and the Union Mechanism members. In addition to these, there are firefighting, medical, and research teams to strengthen European capabilities (RescEU Reserve). To be part of Union Mechanism capacities, all resources must be certified for the international context of intervention by Civil protection experts. The European Union also provides funding to support disaster-stricken countries, contributing to expenses such as training, transportation of equipment and means, deployment of specialists and special teams. The main features of the Union Mechanism are the Emergency Response Coordination Centre (ERCC); the Common Emergency Communication and Information System (CECIS); and the European Emergency Response Capacity (EERC).

8.2.1. ERCC, CECIS, EERC

The Emergency Response Coordination Center (ERCC)

The Emergency Response Coordination Center (ERCC) is at the core of the Mechanism. It is established in Brussels at the civil protection unit in DG ECHO. The ERCC is a coordination

hub between all EU Member and participating states, the affected country, civil protection and humanitarian experts. It coordinates the deployment of emergency support assistance to disaster-stricken countries, from needs to special requests, from civil protection teams to specific equipment. Operating 24/7, the ERCC helps any country inside or outside the EU hit by a disaster upon request from the national authorities of civil protection or United Nations representatives. The ERCC can also communicate directly with the national civil protection authorities of the country in need to facilitate the emergency response. The ERCC also financially supports the delivery of civil protection teams and assets to the affected country. The ERCC has monitoring systems available to be used in emergencies to map affected areas and to better organize the deployment of resources spread out across regions. This monitoring system relies on the European Copernicus satellite system and can be used by affected countries to have updated and current maps or to collect information concerning the specific areas during the disaster prevention stages. Through the Common Emergency Communication and Information System (CECIS), the ERCC provides emergency communications and monitoring tools. The ERCC communicates the specific needs of the disaster-stricken country to the Union Mechanism partners and, if necessary, coordinates and assesses teams composed of humanitarian aid and civil protection experts to carry out joint needs assessments of the affected area. Once organized appropriate evaluations, equipment, medical and specialist teams are quickly sent inside and outside Europe. The ERCC monitors hazards, prepares plans for the use of resources (experts, teams and equipment) from the Volunteer Pool. It also works with the countries to map activities, and coordinates field response following a request for assistance. In addition, it provides access to financial resources for the development of Civil Protection Modules and supports a wide range of prevention and preparedness activities, from awareness-raising campaigns for citizens to simulation and field exercises for operators.

The Common Emergency Communication and Information System (CECIS)

The "Common Emergency Communication and Information System" (CECIS) is web-based alert and notification application used by the ERCC experts that enables a real-time exchange of information between countries' operations centers, with the task of facilitating communication between ERCC and national authorities. The CECIS plays a key role on three levels:

- as a network connecting the civil protection national authorities, and the ERCC;

- as a database and information systems necessary for the Union Mechanism operational aspects;
- as a set of online tools, standards and procedures necessary to ensure the integrity, authenticity, and confidentiality of the data shared through the CECIS.

The CECIS contains a specific section where detailed information concerning the registration and availability of response assets in the ERCC are collected. The DG ECHO ensures its around-the clock availability for national civil protection authorities. The European Commission manages and develops CECIS, having regard to member states needs and requests and it is in continuous development. The System processes requests from disaster-stricken states and related offers of assistance from countries that decide to intervene.

The European Civil Protection Pool (EUCP)

The EU decided to increase its preparedness to respond to disasters by developing a European Emergency Response capacity (EERC). The EUCP brings together a range of experts, equipment, and relief teams, which EU Member and Participating States of the Union Mechanism make available in case of civil protection missions all over the world. It includes modules, rescue teams, experts, and specific equipment. Specifically, the EUCP includes: search and rescue teams, field hospitals and medical labs, forest fire fighting aircraft, flood rescue and containment modules, medevac planes and many others. Registration of modules, experts, and equipment in the EUCP is necessary to make the most appropriate use of resources in terms of availability, location, time, cost, and previous experience. Fig.8.5 illustrates the offered capacities of the EUCP as for 31/10/2022.

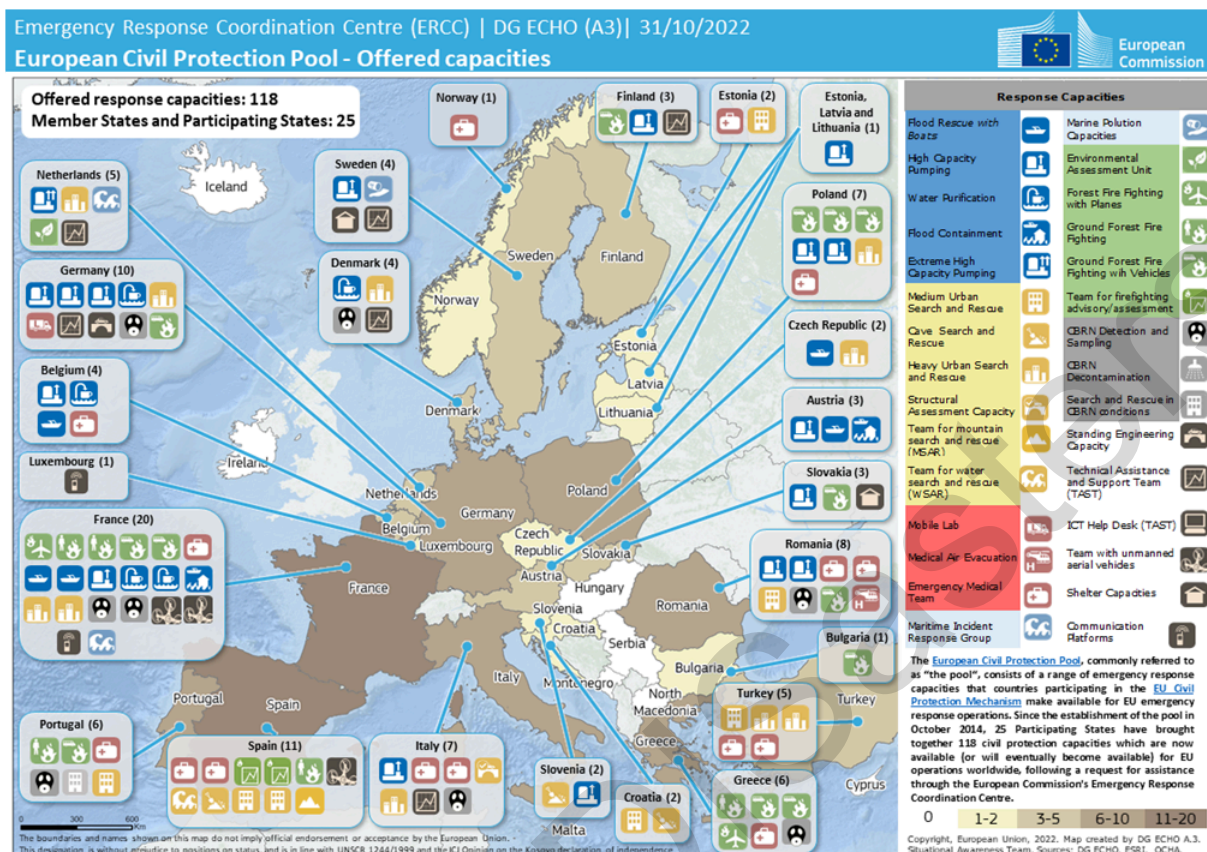


Figure 8.5. Emergency Response Coordination Centre (ERCC), DG ECHO Daily Map, 16/12/2022 European Civil Protection Pool - Offered capacities (<https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps#/maps/4331>).

The European Commission promotes exercises and collaborations. The training program for Civil protection experts of the Member and Participating States ensures quality and interoperability among response teams, while at large scale it keeps resources trained when disasters strike. The EU complements and supports the prevention and preparedness efforts of its Member States and associated countries by focusing on areas where the joint European approach is more effective than the separate actions of individual nations. This includes risk assessment to identify the hazards present in Europe, supporting research to promote disaster resilience, and strengthening pre-alert tools. Civil protection teams and assets are located around the world and ready to be activated as soon as a disaster strikes. The EERC innovation lies in having reduced the activation time of resources, people and assets significantly. The EERC ensures a fast and effective response to disasters together with a more accurate planning and coordination of civil protection missions.

The **European Medical Corps (EMC)** are part of the EERC and are formed by experts in medicine and public health. EMC teams represent the European contribution to the World Health Organization's (WHO) work in health emergencies to significantly increase the availability of medical personnel and equipment. Their objective is to improve planning and preparedness for response to emergencies that threaten human health. The EMC was created in response to the shortage of trained medical teams during the Ebola crisis in 2014. The EMC coordinates the European response in health emergencies under the Union Mechanism¹⁷.

Civil Protection Modules are divided into Civil Protection Intervention Modules and Technical Assistance Support Teams (TAST) and are units with specific tasks for disaster response. They operate in line with internationally-recognized guidelines which describe minimum requirements. The primary task of TAST teams is to support the experts or teams deployed through the Union Mechanism and ensure their ability to work by providing assistance in different areas depending on the mission's circumstances and needs (administrative, technical and IT support and/or logistical and livelihood support etc). The Principle of Standardization was proposed by the European Council and parliament following the Tsunami in Southeast Asia in 2004. Resources are made available on a voluntary basis by Member and Participating States of the Union Mechanism.

EU Civil Protection Teams (EUCP) teams are civil protection experts from countries participating in the Union Mechanism sent to a disaster-stricken area to facilitate assistance and coordination, in support of the requesting country. Candidates for EUCP teams are evaluated by trainers and receive individual feedback upon completion of the training. In addition, the training coordinator may request to receive evaluation forms for a particular expert of the same nationality.

European Civil Protection Modules are composed of human resources (experts, rescuers, medical personnel) and special equipment made available by countries participating to the Union Mechanism. During their missions, the human resources must collaborate in the safest possible working environment by preventing getting hurt themselves. They must take all appropriate measures to prevent any kind of risk, ensuring effective interventions to assist disaster victims. The Commission Decision of July 29, 2010 (2010/481/EU, Euratom¹⁸) is the

¹⁷ https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/european-medical-corps_en

¹⁸ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32010D0481>

most recent document outlining the Modules characteristics and their main task. The general characteristics of the modules are:

- Certified quality, tested in EU-funded exercises;
- Ability to intervene within a very short time frame according to internationally recognized standards described in Decision No. 2010/481/EU, Euratom;
- Self-sufficient for several days (e.g. at least 4 days for food, shelter, energy, hygiene, resource management, communications, local transportation, logistics, base of operations); Interoperable with other modules at international level;

Certification of the ECPP capacities

The Decision No. 1313/2013/EU introduced a certification and registration system to manage capacities or resources listed in the ECPP to further elevate the quality of response capacities. The Union Mechanism countries must submit their resources to a certification and registration process before being part of the Pool and being listed in Common Emergency Communication and Information System (CECIS). The main objective of this certification and registration process is to continuously improve the quality of available capacities and resources to better respond in case of emergency. It involves regular exercises for team members, equipment inspections, and promotes a fruitful exchange of experience and knowledge among participating states and experts. Ultimately, the goal is to ensure the proper functioning of resources during emergency responses. Through this process, the ECPP ensures that registered capacities meet high quality standards to be deployed where needed at international level, helping to improve Member and Participating states' knowledge and skills about different modules and resources. This process is described in the Guidelines “Certification and registration of response capacities in the European Civil Protection Pool (ECPP)”¹⁹ published in 2019. The main elements of the certification and registration process are shown in Fig. 8.6.

¹⁹

<https://erccportal.jrc.ec.europa.eu/DesktopModules/ResponseCapacity/Documents/Certification%20Guidelines%20-%20October%202019.pdf>

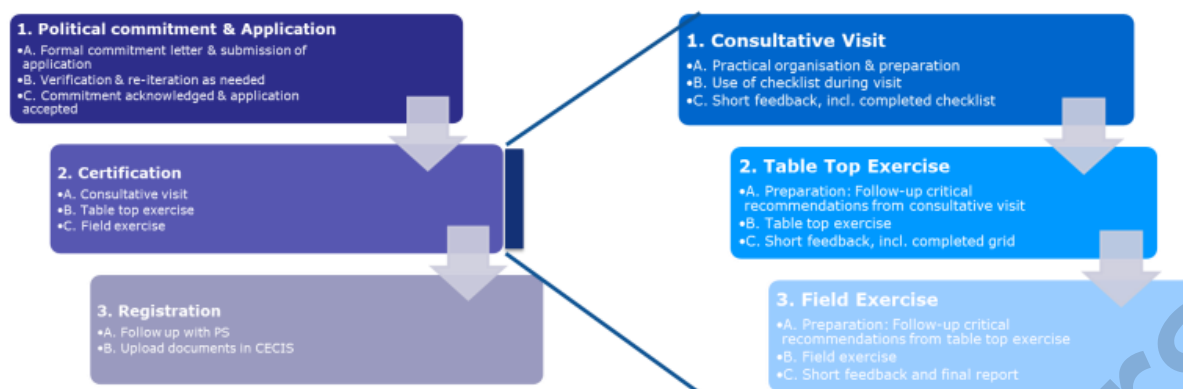


Figure 8.6. Elements of the certification and registration process from the Certification Guide, October 2019

(<https://erccportal.jrc.ec.europa.eu/DesktopModules/ResponseCapacity/Documents/Certification%20Guidelines%20-%20October%202019.pdf>)

Inside the Certification phase, the ECPP capacity generally follows a three-step process: a consultative visit, a table-top exercise, and a field exercise. Experts from the different countries inside the Mechanism act as “peer certifiers” to support the Commission in this process. Experts are people with a high degree of technical expertise regarding one or several types of resources. The certification process phases are described below:

1. During the consultative visit, the responsible desk officer in the Commission verifies and discusses the information given in the application with relevant interlocutors at technical and political levels in the country concerned. A questionnaire guides this visit.
2. The table-top exercise serves to test the decision-making and managerial preparations associated with a deployment of the resource. A certification grid for table-top exercises guides the Commission representative and peer certifiers in this process.
3. The field exercise provides an opportunity to test operational aspects during the different phases of an international deployment. A certification grid for field exercises provides guidance to the certification team.

The criteria necessary for a resource to be certified are:

1. Self-sufficiency, so as not to require additional help from the affected nation;
2. Interoperability, so that it can work with other international capacities;
3. Preparation from the logistics, financial, legal and administrative point of view, for adequate preparation in case of departure

4. Coordination, to be able to ensure efficient coordination and the ability to interact with other countries.

At national level, civil protection authorities are responsible for their commitment to make resources available to the ECPP and must take care of their maintenance and organize their prompt departure in case of an emergency. Union Mechanism countries can also support the ECPP by providing experts as peer certifiers during the Certification processes.

Recertification process of ECPP capacities

The 2018 Commission Implementing Decision amending Decision 1313/2013/EU determined the need for re-certification ‘at the latest after 5 years’: “the certification of a module, technical assistance and support team, other response capacity, or expert should be reassessed at the latest after 5 years, if the asset is submitted for “re-registration into the EERC” (Article 16.8). The recertification and re-registration process are key elements, designed to verify the continuous investments in the development of the capacity, with the objective to ensure that the ECPP quality assurance and minimum standards are strengthened and improved. The recertification maintains the certification’s overall aims and key criteria of self-sufficiency, interoperability, preparedness, and coordination. The capacity’s certification is the starting base on which the recertification process builds up. Therefore, the capacity’s development in terms of training, exercises, deployment and other investments in the previous five years (period since certification) is taken into consideration when determining the process. Recertification and re-registration process consists of three phases: the renewal of the political commitment and application; the validation visit; and the re-registration in the European Civil Protection Pool (ECPP).

Certification procedure for Medical and Search&Rescue Modules

According to the World Health Organization (WHO), the Emergency Medical Team (EMT), is a team of medical and technical personnel operating outside their country with the objective of providing health care to a disaster-stricken population. Care is provided for a limited time and in stable or temporary facilities, with or without a field hospital.

- EMT Type 1: Ambulatory Emergency Care - Treatment of wounds and other pathology on an outpatient basis (without hospitalization).

- EMT Type 2: Emergency Care + Surgery and Hospitalization - Medical, surgical, orthopedic and obstetric treatment with hospitalization.
- EMT Type 3: Referral facility for complex cases - Hospitalization for complex cases with intensive care option.

Objectives of these guidelines are providing technical and care standards to be met in assisting disaster-affected populations; and facilitating disaster-affected populations in communicating contingent needs and quickly and appropriately selecting the appropriate type of health care.

Certification for Urban Search & Rescue (USAR) teams

The International Search & Rescue Advisory Group (INSARAG) is a network of more than 90 countries and organizations of the United Nations. The 2015 INSARAG Guidelines aim at reinforcing national and local capacity building and increase interoperability at different levels (see Fig.8.7). It also recommends countries to establish a national USAR team accreditation procedure to allow countries to “*manage, monitor and establish the same standards officially and adhere closely to the INSARAG standards and guidance in developing its USAR national response systems*”. These intervention guidelines allow USAR teams to maximize their efficacy during the search and rescue missions. Successful completion of the test, evaluated by UN commissioners, enables USAR fire fighting teams in heavy configuration (such as with an organizational structure of vehicles, logistics, personnel and equipment that allow them to operate 24 hours a day on two different sites for 10 days) to be part of the international relief effort and also intervene in the most complex disaster scenarios. INSARAG-certified Urban Search&Rescue teams and WHO-certified Emergency Medical Teams (EMTs) are considered certified and accepted in the EU Civil Protection Pool of teams and assets.



Figure 8.7. INSARAG - Capacity building - National Accreditation Process (<https://www.insarag.org/capacity-building/national-guidelines/>).

The INSARAG certification provides a framework ensuring interoperability between different levels of USAR response: *“it is vital that working practices, technical language and information are common and shared through all levels of the USAR response framework”*. Therefore, the standards developed for the accreditation of national teams must be aligned with the INSARAG methodology and therefore should be recognized within the same framework.

8.2.2. The rescuEu reserve

A new initiative to strengthen European capabilities called rescEU Reserve has been proposed in addition to the main elements of the Union Mechanism mentioned above. The European Commission created rescEU to further protect citizens from disasters and manage emerging risks. RescEU counters natural disasters presented by the European Commission in November 2017. It was included in a larger proposal that aims to improve disaster response, following a series of emergencies that caused tragic human losses and significant material damage in several European countries. During 2017, more than 200 people were killed by natural disasters in Europe and more than one million hectares of forest were destroyed.

RescEU was established as a reserve of European capacities, fully funded by the EU. It includes a fleet of firefighting planes and helicopters, medical evacuation planes, and a stockpile of medical items and field hospitals that can respond to health emergencies. These resources complement national resources and will be managed by the commission to support

countries affected by disasters such as floods, forest fires, earthquakes, and epidemics. All costs and capabilities are covered by European funding, and the commission owns operational control of rescEU resources deciding on their deployment. RescEU resources cover four areas of intervention: aerial firefighting assets, high-capacity flood pumping equipment, urban search and rescue resources, field hospitals and emergency medical assistance. Immediately after an EU country activates the Union Mechanism following a disaster, the commission will check whether the country's assets are sufficient to respond-if not, the commission will then decide to deploy its assets through rescEU. In return for the commitment, states that provide resources are eligible for financial support to develop and transport the committed resources.

8.2.3. Monitoring systems

The EU's Copernicus program provides several services for monitoring and preventing natural disasters. The Copernicus Emergency management Service is part of the Copernicus program and is managed by the European Commission in cooperation with member states, the European Space Agency (ESA), European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), the European Centre for Medium-Range Weather Forecasting (ECMWF), EU Agencies and Mercator Océan. Two are the main components of this service: The Early Warning and Monitoring System (EMS) and the EMS Mapping Service.

Copernicus EMS - Early Warning and Monitoring

Alerting citizens and emergency services is a priority when disasters occur or are imminent. Warning must be as quick as possible to protect jobs, save lives and preserve the environment. Continuous early warning and hazard monitoring systems are used to better anticipate hazards, prepare necessary resources, and warn people in danger. Copernicus Emergency Service (EMS) is an online platform providing information for emergency response and disaster risk management. The Early Warning and Monitoring for floods, fire and droughts is one of its services (Fig. 8.8).

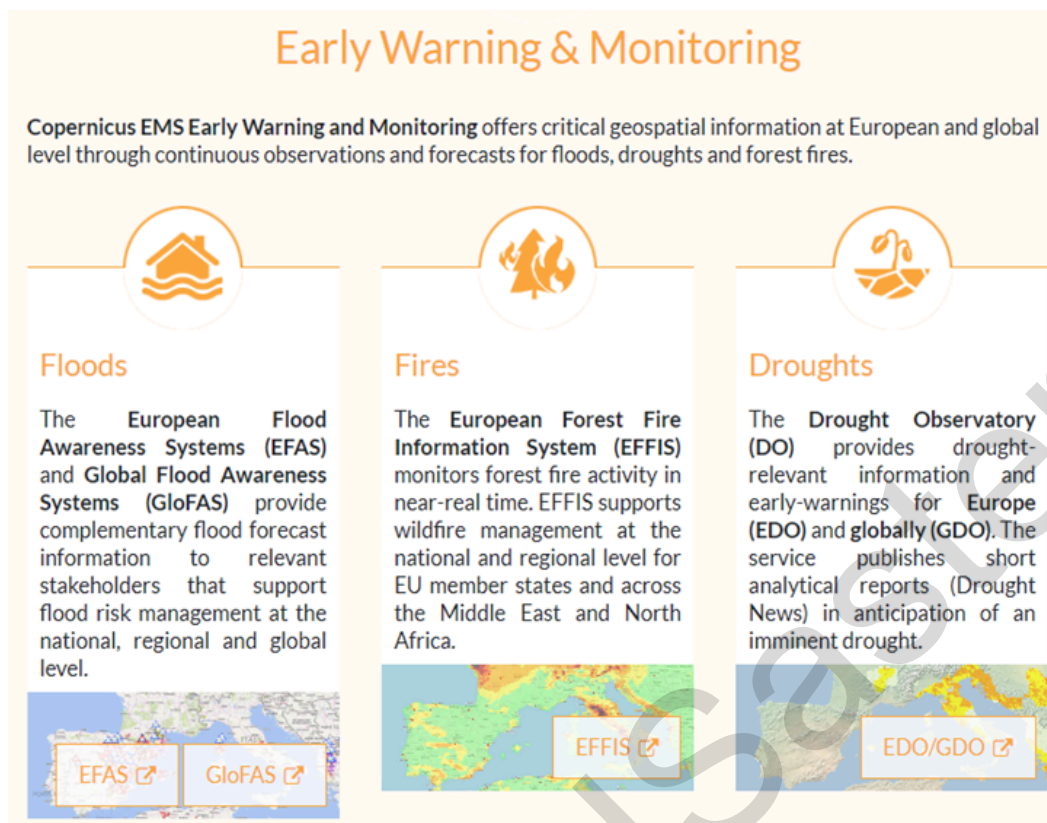


Figure 8.8. Copernicus EMS Early Warning and Monitoring (<https://emergency.copernicus.eu/>).

Copernicus EMS Early Warning and Monitoring provides geospatial information at European and global level through continuous forecasts and observations of droughts, floods, and forest fires. Various research institutions collaborate in the Copernicus programme promoting the development of disaster prevention and management tools. Copernicus EMS relies on data shared by:

- ✓ **Global Disaster Alert and Coordination System (GDACS):** It is a collaboration between the United Nations, the European Commission and disaster managers worldwide to improve alerts, coordination, and information exchange since the beginning of a disaster. It warns and estimates of the impacts of earthquakes, tropical cyclones, tsunamis, volcanoes, floods, , and droughts worldwide.
- ✓ **European flood awareness System (EFAS):** It provides an overview of current and possible flooding up to 10 days. It supports preparatory measures for flood events, particularly in large transnational watersheds.

✓ **European Forest Fire Information System (EFFIS) and Global Wildfire Information**

System (GWIS): They provide weather risk forecasting up to 10 days with real-time information on active fires and burned areas. These systems analyze the severity and risk that each forest fire poses to local people and the environment. This allows to take decision based on the information received on the deployment of rescEU fire fighting capacity.

✓ **Global Drought Observatory (GDO):** It provides information on potential and ongoing droughts, including meteorological indicators, soil moisture anomalies, vegetative stress, and low river flows.

Copernicus EMS Early Warning and Monitoring is a free of charge service and it can be used in two ways:

1. **Urgent Mode:** It is used for emergency management activities that require immediate response;
2. **Standard Mode:** It supports emergency management activities not related to immediate response, such as risk assessment and vulnerability of population, or post-disaster recovery and reconstruction. It can be activated only by authorized users.

With regard to landslides, countries can refer to the European Ground Motion Service (EGMS), which provides information on natural and anthropogenic ground movements throughout Europe, with millimeter accuracy. This service makes it possible to explore geological hazards such as landslides, subsidences, volcanic events, movements due to mining and groundwater exploitation. The data can also be used in the study of ground movements affecting the stability and construction of buildings and infrastructure. The EGMS service is based on the analysis of Sentinel-1 radar images, using buildings, man-made structures and non-vegetated areas as reference points to calculate the speed of movements and ground deformations. EGMS provides three levels of products, updated annually:

1. **Basic:** includes velocity maps in ascending and descending orbit, with geolocation and quality measurements for each measured point. The maps refer to a local reference point.

2. Calibrated: includes velocity maps in ascending and descending orbit, but refers to a model that takes into account data sets derived from the Global Navigation Satellite System. They are absolute and do not require a local reference point.
3. Ortho: these products include vertical and horizontal movement components, anchored to the geodetic reference model

At European level, the **European Soil Data Center (ESDAC)**, which is the thematic reference center regarding European soil data. Being the only reference point in Europe, its purpose is to be able to provide important information and data regarding different types of soils. From the ESDAC website, organizations and citizens can access many useful resources for studying and cataloging soils or request information in the field. Among the resources available there are: data collection, applications, maps, documents, events, projects, scientific articles, and external links. For example, in the section on types of threats to soils, it is possible to find information regarding landslides' vulnerability.

Copernicus EMS – Mapping services

The Copernicus EMS Mapping component (Copernicus EMS - Mapping) has worldwide coverage and provides civil protection authorities and humanitarian aid agencies with satellite maps. Copernicus Mapping has been active since April 1, 2012, and is managed by the European Commission's DG Joint Research Center (JRC). The maps generated by Copernicus can be used as digital maps, or combined with other data (e.g., digital feature sets in a geographic information system) to support geospatial analysis and decision-making by emergency managers. The Copernicus EMS Mapping component can support all phases of the emergency management cycle: forecasting, prevention, disaster risk reduction, emergency response and restoration of initial conditions (Fig. 8.9).

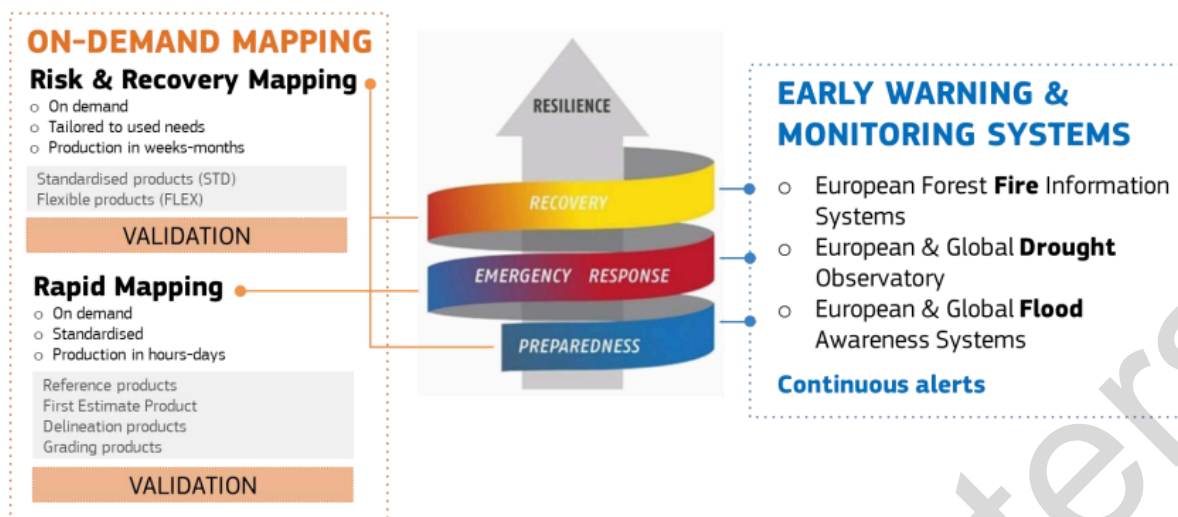


Figure 8.9. Overview of the Copernicus EMS, September 2020 (https://emergency.copernicus.eu/mapping/sites/default/files/files/EMS_Mapping_Manual_of_Procedures_v2_September2020.pdf).

8.2.4. Additional training resources

Countries that make available their resources and experts must participate in exercises designed to improve communication and collaboration during interventions. In addition, the resources made available must meet standards and be subjected to quality control to ensure effective interventions when needed. International exercises improve preparedness and strengthen collaboration among European civil protection experts and operators. These exercises are open to countries inside and outside Europe willing to host and, particularly to Modules, Technical Assistance Support Teams (TAST) and other response capacities registered in the Common Emergency Communication and Information System (CECIS) and European Civil Protection Team (EUCPT) experts. Exercise scenarios can be based on forest fires, flood risk, biological, chemical, radiological and nuclear (CBRN), seismic events and health emergencies. There are 2 main types of exercises: Module field and table-top exercises (EU MODEX) and Full-scale exercises²⁰.

- **table-top exercise:** It is based on a simulated scenario, the exercise focuses on strategic decision making and managerial preparation for possible international deployment (coordination, procedures, reporting and communication methods);
- **on field exercise:** It focuses on the operational aspects of international team deployment phases: mobilisation/arrival, operations and demobilisation/departure;

²⁰ <https://civil-protection-knowledge-network.europa.eu/disaster-preparedness/civil-protection-exercises>

- **full-scale exercise:** It aims to improve response to all types of disasters within or outside UCPM member states, providing a testing environment and learning opportunity for all actors involved in civil protection assistance interventions.

The EU MODEX²¹ is used for preparing and certifying modules/capacities/civil protection authorities and experts for international deployments under the Union Mechanism. It also has the capacity to support the INSARAG International re-classification of Urban Search&Rescue teams and the WHO certification for Emergency Medical Teams (EMT).

8.2.5. Funds and financing

In order to improve disaster prevention, preparedness and response, funds and funding are provided by the European Union. The following activities are eligible for financial assistance if the Union Mechanism is activated:

- Deployment of expert teams and related logistical support;
- Co-financing of transportation costs incurred by member states;
- Adoption of other necessary complementary and supporting actions in order to facilitate coordination of the response in the most effective manner possible.

The European Union Solidarity Fund (EUSF)²² was created in 2002 as a response to major natural disasters that occurred in Europe and to offer solidarity to affected countries. Member states can apply for funds to deal with catastrophic events such as floods, fires, earthquakes, storms and droughts. In April 2020, as a result of the pandemic caused by the COVID-19 virus, the scope of the solidarity fund was also extended to include health emergencies²³.

8.3. Case studies

8.3.1. Emilia Romagna floods, May 2023

The Italian situation is particularly critical concerning the arising catastrophic events of floods and landslides. In the last decade, extreme weather events in Italy, including heavy rains, heat waves, droughts, fires, landslides, and hailstorms, have more than quadrupled from 348 events in 2011 to 1,602 in 2021, mainly affecting urban areas and causing damage to territories and risks to the lives of citizens. In total, between 2013 and 2022, natural disasters (earthquakes,

²¹ <https://10years.eu-modex.eu/what-is-eu-modex>

²² https://ec.europa.eu/regional_policy/funding/solidarity-fund_en

²³ https://ec.europa.eu/regional_policy/funding/solidarity-fund/covid-19_en

landslides, floods, droughts, etc.) caused damage in Italy for about 34 billion euros. In May 2023, the flooding in the northern Italian region of Emilia-Romagna displaced more than 36,000 people and killed 14. According to the climate risks report published by Legambiente, one of the largest environmental NGO in Italy, from January to September 2022, Italy has already been hit by 62 floods including flooding from rainstorm²⁴. The overall figure for the last few years is also worrying: from 2010 to September 2022, 510 floods were recorded all over Italy of which 57 were registered in Lazio, 36 in Tuscany, 26 in Marche, and 6 in Umbria.

Italy is among the European countries without a Climate Adaptation Plan which is facing different emergencies without a clear prevention strategy that can protect urbanized areas and the natural environments. From a technical point of view, Italy is characterized by hydrogeological instability. The flooding in Emilia Romagna has led to over 36,000 people internally displaced. Many have found alternative accommodations moving to second homes, friends and relatives, and 2,694 have been hosted in hotels and in facilities set up by municipalities in schools, arenas and gyms; 16 victims, 23 rivers flooded, more than 280 landslides and very serious damage to land, people and businesses. It involved 43 municipalities included in the provinces of Rimini, Cesena, Forlì, Ravenna, Ferrara Modena, Bologna. There are currently 603 roads closed, of which 197 are partially closed and 406 totally closed.

From the hydrogeological point of view, the rain storm made the rivers (Lamone, Sillaro, Savio, Montone, Rabbi, Bidente-Ronco, and Santerno) and the streams (Idice, Quaderna, Ravone, Senio, Marzeno, Pisciatello, and Rigossa) flood. The Italian Railway Network suspended the circulation of many trains and, moments before the disaster began, the national railway immediately stopped traffic on some sections of the highways and secondary roads. With rainfall on May 2 and 3, 2023 Emilia Romagna in 48h counted the same amount of rain that normally falls in three months, exceeding the historical highs recorded by the region's weather alert service. Immediately it was reported to be a phenomenon in some ways surprising in scope and duration. Since then, the first damage to the territory and the population was heavily affected, especially in Romagna. Since the morning of May 16, various areas of Emilia Romagna have been ravaged by torrential rains, with showers and

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https://www.legambiente.it/wp-content/uploads/2022/11/Rapporto-CittaClima-2022.pdf?_gl=1*_112wo4o*_up*_MQ..*_ga*ODAxODE5Nzg1LjE2OTM4Mzc1ODQ.*_ga_LX7CNT6SDN*MTY5MzgZzNzU4MS4xLjAuMTY5MzgZzODE4MS4wLjAuMA..

thunderstorm pulses, continuing to cause landslides, flooding, and the inundation of coastal areas. This was the second extreme weather event to affect Emilia Romagna in two weeks. Within a few hours, between 100 and more than 200mm of rain fell. The Regional President of Emilia Romagna declared a state of emergency.

The cause was an intense Mediterranean cyclone that originated on the coast of North Africa, moved up along the Peninsula from the south beginning in Sicily, and then more directly affected central and northern Italy. This rainstorm was already violent in itself with vigorous rainfall, but once it reached Emilia Romagna the rainfall was further exacerbated by the so-called 'stau effect'. The low-pressure mass, developed over the southern Tyrrhenian Sea and loaded with moisture, was trapped under two areas of high pressure to the west and east, stopping on the Emilia-Romagna slope and prolonging the disturbance over the same area. The moment they collided with the Apennine barrier, the currents continued to rise. As they rose, the currents tended to condense even more and so they dumped even greater amounts of rain, consistently, all over the same area. Two other factors may have contributed to exacerbating the rainfall, as ISPRA explains in a note: strong winds on the coast and rising sea levels, due to strong winds, may have hindered the flow of water from the Apennines into the Adriatic Sea, further favoring the flooding of coastal areas.

Emilia Romagna is among the Italian regions with the highest percentages of potentially flood-prone territory and population exposed to flood risk, both because of its hydrographical network and its dense network of artificial drainage canals. It is also the second region in Italy, after Lombardy, for the spread and extension of landslides on its territory. Potentially floodable areas reach 45.6 percent of the entire regional territory and the exposed population far exceeds 60 percent. The provinces with the highest percentages of floodable territory are Ravenna and Ferrara with percentages reaching 80% (87% of the population) and almost 100%, respectively, in the case of a medium flood hazard scenario. From the Apennines, several rivers usually depart towards the sea, but in May 2023 the magnitude of the rainfall and the soil that failed to absorb the water accumulated caused river overflows, flooding, and landslides, precisely in the most exposed territories and where most of the population and economic activities are concentrated. In fact, all the most affected areas are located in the plains close to the Apennines.

The composition of the soil is another important aspect. Floodplains such as the Po Valley are composed essentially of clay, silty, and sandy soils. Clay rocks are among the most

impermeable elements in nature, and so water cannot infiltrate and ends up staying on the surface. There is also some evidence that converges toward a role for global warming and the climate crisis. Today, anthropogenic global warming has changed not only the average temperatures, but also the atmospheric circulation in the Mediterranean area. In the past, this circulation was almost always in the west-east direction, now it arises along south-north or north-south directions. This results in periods of good weather and bad weather persisting for several days over the same territory. In the case of rainfall, it potentially creates flooding conditions even when the rainfall itself is not really heavy. This is the case of the Emilia-Romagna floods. Recent studies show that in the Mediterranean area it is expected to happen rarer but more violent cyclones. Finally, the higher sea temperatures impacted by the influxes arriving over the Mediterranean create conditions for more violent precipitation.

Finally, there is always a greater alternation between drought periods and others of flooding. Even without the drought, the intensity of the weather event that hit Emilia Romagna would have done enormous damage. Further studies could confirm, however, that the repetition of the alternation between periods of drought and flood is an effect of global warming. The entire national system, municipalities, the region, the state and the Civil Protection set to work to provide answers to an unprecedented event supporting all the provinces and territories affected by the flood emergency. The major criticalities were immediately identified, through dialogue and coordination with affected provinces experts and technicians to have a clearer idea of what was really needed, in terms of human resources and adequate personnel, as well as means and equipment. In the Imola area, a scouting team of the Veneto Civil Protection team was immediately put to work. At the same time, the gathering of volunteers' availability for setting up the mobile column was started.

On Tuesday-May 16, 871 firefighters were involved (between Emilia-Romagna and other regions) with 313 vehicles used, which allowed to perform (including ongoing calls) 4,092 interventions, 78 interventions were carried out with helicopters allowing the rescue of 187 people. Four 118 helicopters were available on the territory, deployed in Pavullo (MO), Parma, Bologna and Ravenna. The Italian Red Cross (Croce Rossa Italiana, CRI) has been engaged since the first hours of the emergency in rescue operations and evacuation of the population, to help affected communities and territories. About 300 CRI Volunteers were on the front line in relief and assistance to the population and 87 vehicles were deployed. Specialized teams and vehicles were mobilized and arrived in the affected areas from Tuscany, Rome, Piedmont, Lombardy, Lazio, Veneto and Abruzzo. About 1,400 military

personnel from the Army, Navy, Air Force and Carabinieri Corps were also at work in support of the people of Emilia Romagna. The Armed Forces, which provided personnel and means for the relief operations at the beginning, have deployed 109 vehicles of various types, 33 helicopters, 48 inflatable boats, 22 excavators, 7 motor pumps/hydro trucks, and 6 aircraft including one remotely piloted.

The Italian government activated the Union Mechanism on May 20 2023 and 8 European countries immediately sent equipment needed for restoration work in flooded areas. The EU's Copernicus service has provided emergency satellite mapping of the affected areas. Different resources, including pumping equipment came from Austria, Bulgaria, Germany, France, Poland, Romania, Slovenia, and Slovakia. Offers from Slovenia and Slovakia were immediately accepted by Italy. On May 22 2023, Slovakian and Slovenian modules arrived in Italy. French modules arrived on the following day and Belgian ones arrived on 26 May. A total of 110 rescuers were deployed by the Mechanism. On 4 June, the Italian civil protection authorities confirmed the end of the Union Mechanism operations. After the flooding, cities and villages of the area were invaded by water and mud, piles of garbage. Nevertheless, hundreds of people went to the streets with shovels and wheelbarrows, spades, rubber boots and gloves (Fig.8.10).

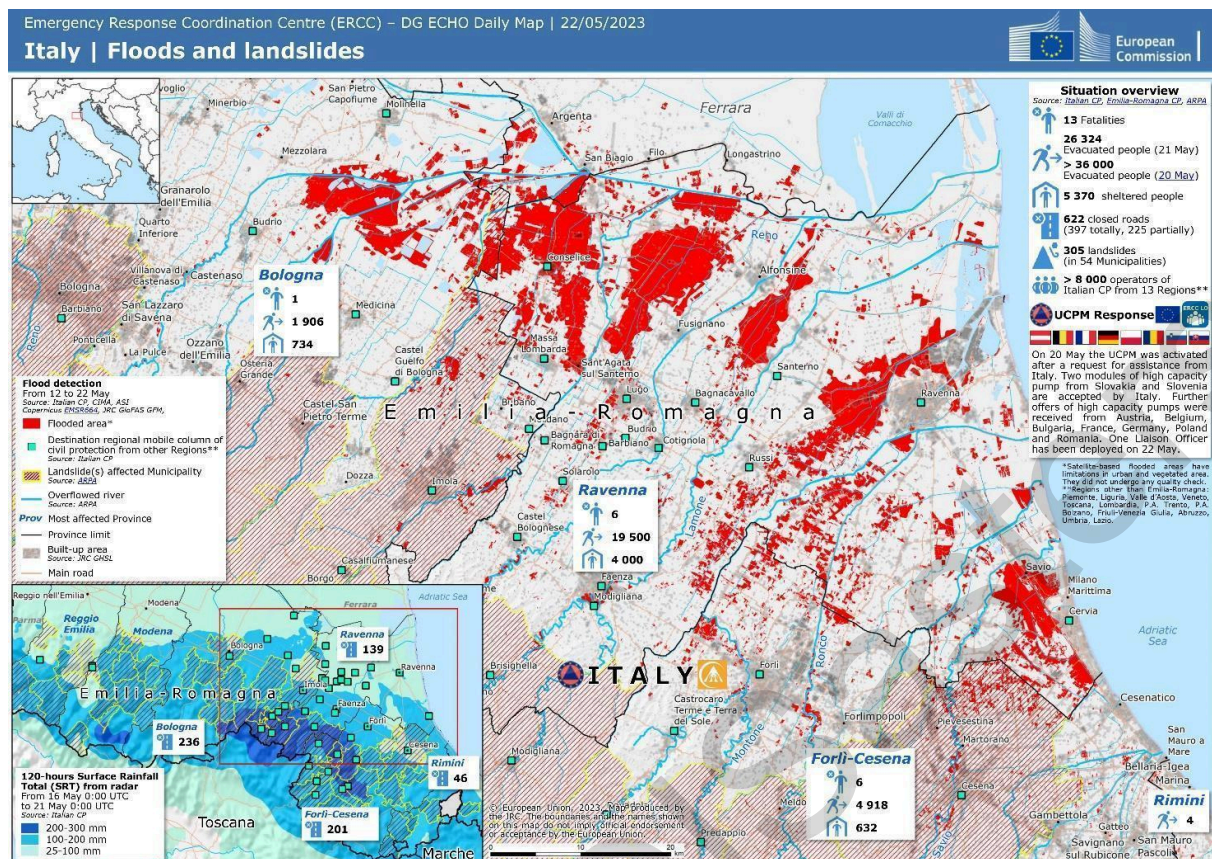


Figure 8.10. DG ECHO daily map, 22/05/2023- Italy, floods and landslides (<https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps#/maps/4497>).

In conclusion, the Emilia Romagna floods shows how interventions such as relocations of the residential and productive settlements are needed to reduce land fragility. From the administrative point of view, there is the need to ban building in risk areas; together with the maintenance of ditches and rivers which were closed in the past; the restoration of soil permeability through the deployment of Sustainable Drainage Systems (SUDS) that replace asphalt and concrete; and the restoration of areas of natural overflow of waterways wherever possible. The intensification of extreme events in recent years also requires extraordinary attention to underlining the importance of informing and training citizens on how to behave in emergency situations.

8.3.2. Wildfires in Greece, July 2023

The frequency, extent, and intensity of fires have increased over the past century. The fire season is becoming more extreme and longer to the extent of 15 percent over the past 50 years, fueled by long periods of extreme heat and little rain. 2022 was the worst year for Europe in 500 years. According to the European Commission's Joint Research Center, in 2022 forest fires burned 700,000 hectares in the European Union. Hectares of forests and

biodiversity as well as entire towns are razed to the ground. Almost all habitats (forests, steppes, prairies, savannas) are significantly affected by the changes produced by global warming: changes in the rainfall cycle, in the amount of water and moisture in the soil, in the energy of the winds, in the frequent droughts, in the drying up, in the progressive desertification that is advancing across the planet at the rate of 11 million hectares per year. In addition, degradation, unsustainable consumption, deforestation, lack of management, abandonment are caused by humans all over the world. Fires turn in an instant into mega fires (or even giga fires): fires that grow larger and larger in size of the flame front. Frequent fires can release as much of the CO₂ stored in soils: trees and soil, in fact, store carbon dioxide, the gas that plays the most important role in global warming. The more CO₂ there is in the air, the higher the temperatures and the more droughts grow, which promotes wildfires. Moreover, deforestation prevents the forest's natural evapotranspiration that helps retain moisture. Cutting down forests, then, makes them hotter and drier and, as a result, more prone to wildfires.

At European level, since 1998, the European Commission (EC), in cooperation with national administrations, has established the European Forest Fire Information System (EFFIS). A modular web-based geographic information system that provides near-real-time and historical information on forest fires and forest fire regimes in the European, Middle Eastern and North African regions in order to assist the services in charge of forest fire protection in the EU and neighboring countries, as well as to provide the Commission services and the European Parliament with harmonized information regarding forest fires in Europe. Fire monitoring in EFFIS covers the entire fire cycle, provides information on pre-fire conditions and assesses post-fire damage. The group currently consists of experts from 43 countries in Europe, the Middle East and North Africa. Starting from the pre-fire phase, EFFIS includes the following modules:

1. Fire risk assessment;
2. Rapid damage assessment, which includes:
 - Active fire detection;
 - Assessment of fire severity;
 - Assessment of damage to ground cover;
3. Assessment of smoke emissions and dispersion;
4. Assessment of potential soil loss;

5. Vegetation regeneration.

In addition, EFFIS has another module to support fire monitoring, namely the "Fire News" module, which localizes all forest fire information posted on the Internet in any European language. Real-time information on the first two modules mentioned above is provided through the so-called "current situation" viewer. The core of EFFIS is the so-called "Fire Database," a database containing detailed information on all fire reports provided by the countries in the EFFIS network. Information on the data in the database is provided through the EFFIS "Fire History" application. To minimize the time required to arrive at the scene of operations, planning the ground deployments of available air assets is critical. The firefighting aircraft and helicopters of the state's air fleet are deployed to the territory taking into account the risk areas and weather conditions that make forest fires more likely to start.

A forest fire of enormous proportions developed in Greece west of Athens, particularly in Attica (in the Athens metropolitan area), central Greece, the Peloponnese and the island of Rhodes in the month of July 2023. A total of 47 fires developed in the country, causing evacuations and widespread damage. In the Attica region, a fire in the municipality of Mandra burned more than 8500 hectares, while in the municipality of Kaylvia, near Athens airport, about 3600 hectares were invaded by flames. In the Peloponnese more than 1000 hectares were burnt.

Seven fire-fighting aircraft and nine helicopters, including four Canadair aircraft sent from Italy and France, operated within the framework of the European Civil Protection Mechanism. The rescue operations were facilitated by the presence of a team of Union Mechanism experts, including two experts from France and Greece and one expert from the European scientific consortium ARISTOTLE, who provided support to the local coordinator. Other fronts have been created near the town of Loutraki, in the region of Corinth where 4 Canadair and three helicopters have intervened, and in Rhodes in a particularly inaccessible and difficult to reach area. In particular, the Italian Canadairs have completed 33 hours of operating flight with 122 launches, pouring on the fires 732 thousand liters of water and extinguishing liquid. Also under the European Civil Protection Mechanism, Romania provided 50 firefighters and 10 fire engines, Slovakia provided 31 firefighters and 15 fire engines, while Poland provided 149 firefighters and 49 fire engines. In addition to the teams sent out following the emergency, teams prepared in Greece as part of the fire prevention plan for the fire season from Romania, Bulgaria and Malta intervened. Greece activated the Copernicus Emergency Satellite System

(ESM) four times to help assess the damage in the affected areas. The scorching heat and strong winds made firefighting operations more difficult and arduous. Weather conditions did not facilitate rescue operations due to strong winds, high temperatures and low humidity (Fig.8.11).

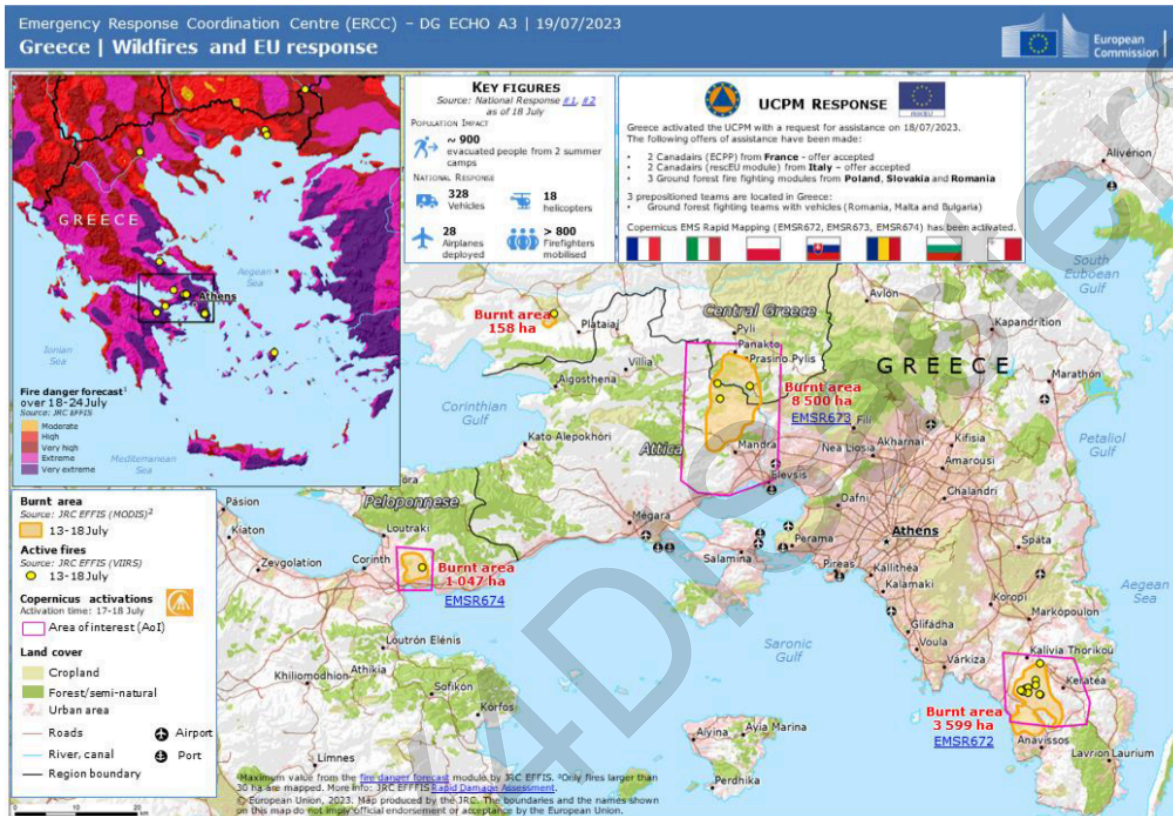


Figure 8.11. DG ECHO daily map, 19/07/2023 - Greece, wildfires and EU response (<https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps#/maps/4574>).

Considering this situation, the European Commission has financed the purchase of 12 new fire-fighting aircraft which will become operational in 2026 by Member States. Since 2019, the Union Mechanism has been strengthened with the rescEU fleet, a European reserve that includes fire-fighting aircraft and helicopters and is fully funded by the EU, which also co-finances the availability of additional aerial fire-fighting capabilities, on standby, to address potential shortfalls in fire response. For the 2023 forest fire season, Cyprus, the Czech Republic, Germany, Greece, Spain, France, Croatia, Italy, Portugal and Sweden made available to the other EU Member States 24 fire-fighting aircraft and 4 helicopters in the event of an emergency. This is twice the resources of the rescEU 2022 fleet. The reserve of aircraft also includes 28 fire-fighting aircraft, or rather 24 aircraft and 4 fire-fighting helicopters made available by several states. The ground fire brigades, composed of about 440 firefighters, will

be deployed in France (about 170), Greece (about 200) and Portugal. Austria, Bulgaria, Finland, France, Germany, Latvia, Malta, Poland, Romania, Slovakia and Slovenia will send about 450 firefighters to be stationed in France, Greece and Portugal.

For targeted and timely interventions, the EU supports and complements the prevention and preparedness efforts of these states, focusing on areas where a common European approach is more effective than separate national actions. These include risk assessment to identify disaster risks across the EU, encouraging research to promote disaster resilience and strengthening early warning tools. Prevention, preparedness and rapid response are key to save lives and limit the further spread of fires. During the fire season, regular meetings will be held with EU Member and Participating States in the Union Mechanism to exchange information on their preparedness and fire risks. In addition, a forest fire support team is being established within the Emergency Response Coordination Centre (ERCC), in order to allow real-time monitoring and analysis of the forest fire situation from mid-June to mid-September.

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