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# RESISTANT

## Crisis Training Platform

**Training and Knowledge Sharing Platform for First Responders and Educational Tools for students' and citizens' awareness and preparedness against Natural and Manmade Disasters and Risks**

### D3.2 RESISTANT Use case implementation and evaluation report

**Workpackage:** WP3 – RESISTANT Validation and Demonstration

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## RESISTANT Project Profile

**Grant Agreement No.:** 101017819

<b>Acronym:</b>	RESISTANT
<b>Title:</b>	Training and Knowledge Sharing Platform for First Responders and Educational Tools for students' and citizens' awareness and preparedness against Natural and Manmade Disasters and Risks
<b>URL:</b>	<a href="http://www.resistantproject.eu/">http://www.resistantproject.eu/</a>
<b>Start Date:</b>	01/01/2021
<b>Duration:</b>	18 months

### Partners

 INTERNATIONAL HELLENIC UNIVERSITY	DIETHNES PANEPISTIMIO ELLADOS (IHU)	Greece
	ENOSI PTYCHIOYCHON AXIOMATIKON YPAXIOMATIKON PYROSVESTIKOY SOMATEIO (EPAYPS)	Greece
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	UNIVERSITY GOCE DELCEV-STIP, MILITARY ACADEMY GENERAL MIHAILO APOSTOLSKI-SKOPJE, ASSOCIATE MEMBER (MAGMA)	Republic of North Macedonia
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## Document History

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## Abbreviations and acronyms

Definition	Abbreviations and acronyms
Augmented Reality	AR
Croatian Crisis Management Association	CCMA
Expected Outcomes	EO
Emergency Management Framework	EMF
Enosi Ptychiorychon Axiomatikon Ypaxiomatikon Pyrosvestir Oy Somateio (Association of officers and sub-officers with university degrees of Hellenic Fire Corps)	EPAYPS
Full-Scale Exercise	FSE

International Hellenic University	IHU
Konnekt-able Technologies Ltd. – Greek Branch	KTGR
Military Academy General Mihailo Apostolski	MAGMA
Natural disasters trigger technological accidents	Natech accidents
Non-governmental organization	NGO
Operational Objectives	OO
Rescue Team DELTA	RTD
Evia Rescue Team	S.A.R. 312
Strategic Objective	SO
Standard operating procedures	SOP
Tabletop Exercise (Discussion Exercise)	TTX
Use Case	UC
Union Civil Protection Mechanism Programme	UCPM
Virtual Control Room	VCR

## Executive Summary

RESISTANT is a 18 month duration project co-funded by the Union Civil Protection Mechanism Programme (UCPM-2020) under grant agreement no. 101017819.

The overarching objective of the RESISTANT project is to build the first European Crisis Training Platform to train first responders through threefold comprehensive training: educational training with the state-of-the-art knowledge in safety, including tools for characterisation of hazards and associated risks, operational training on mock-up real scale transport, and innovative virtual reality training reproducing the entire accident scenarios, intervention strategies and tactics, including the whole chain of command and communications between all members of the first responders team, facility managers, and public (e.g. volunteer fire fighters, school children, citizens with disabilities). RESISTANT will also put in place a virtual 'agora' for first and second responders, academia, market practitioners, volunteers and other civil protection stakeholders to share knowledge and exchange best practices, especially in cross-border crisis management. The 'agora' will facilitate discussion and contribute towards the development of a common prevention and protection culture.

The project Consortium will evaluate the overall approach of RESISTANT with the help of a series of tests that will be based on real life scenarios and case studies and that will be implemented in 4 pilot use cases. The main purpose of this document is to present the RESISTANT's pilot use cases, the guidelines for use cases implementation and management, the evaluation methodology and instruments for the use cases to assess the impact of the project to its target communities as well the User's Handbook for the COncORDE platform.

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# 1. Introduction

## 1.1. About the project

RESISTANT (Training and Knowledge Sharing Platform For First Responders and Educational Tools for students' and citizens' awareness and preparedness against Natural and Manmade Disasters and Risks) is a 18 months project that has been started on 01/01/2021 and is implemented by a consortium led by the International Hellenic University – IHU (Greece) in cooperation with the Association of officers and sub-officers with university degrees of Hellenic Fire Corps -E.P.A.Y.P.S. (Greece), Konnekt-able Technologies Limited, Greek Branch – KTGR (Ireland), Military academy „General Mihailo Apostolski“, Skopje – MAGMA (North Macedonia), Croatian Crisis Management Association – CCMA (Croatia), Evia Rescue Team – S.A.R. 312 (Greece) and Rescue Team DELTA – RTD (Greece). The project is co-funded under the **Union Civil Protection Knowledge Network : Network Partnership (UCPM-2020-KN-AG) call of the Union Civil Protection Mechanism.**

RESISTANT's aim is to build the first **European Crisis Training Platform** to train first responders through threefold comprehensive training:

- **educational training** with the state-of-the-art knowledge in safety, including tools for characterisation of hazards and associated risks,
- **operational training** on mock-up real scale transport, and
- **innovative virtual reality training** reproducing the entire accident scenarios, intervention strategies and tactics, including the whole chain of command and communications between all members of the first responders' team, facility managers, and public (e.g. volunteer fire fighters, school children, citizens with disabilities).

### RESISTANT Operational Objectives (OO)

**OO.1:** Support civil protection and disaster risk management actors that promote and facilitate the development, dissemination and exchange of knowledge, good practices and expertise.

**OO.2:** Update and expand a **training programme** through further development of emergency scenarios to reflect the latest state of the art

**OO.3:** Implement an **educational platform**, where educational and training programs for primary, secondary schools, residents of endangered areas, citizens with disabilities of the aforementioned areas and tourists, as well as, for municipalities' employees, could be demonstrated with the help of **Augmented Reality (AR)** Techniques.

**OO4: Mapping and status of current initiatives, procedures and resources for coordination, education and training for natural disasters and technological risk mitigation.**

### RESISTANT Strategic Objectives (SO)

**SO.1: Support new and consolidate existing partnerships** in civil protection and disaster risk management that **enhance cooperation and synergies** in prevention, preparedness and response.

**SO.2:** Establish a **European network of trainers for first and second responders**, supported by stakeholders from EU and beyond, to share best practices and facilitate dissemination of knowledge and experience generated within the RESISTANT project and relevant follow-up projects from EU to national level.

**SO.3: Educate and train tomorrow's responder trainers** through established and regularly updated comprehensive educational, operational and virtual reality training.

**SO.4: Establish strong links between first responders' activities from different countries and constituencies and research and educational projects;** Valuing the responders' experience and their feedback to **enrich and harmonise harm criteria, models for hazards and risk assessment**, expand communications to other stakeholders, including but not limited to legislators, technology experts, insurance companies, citizens and students to raise awareness and increase preparedness.

### **RESISTANT Expected Outcomes (EO)**

**EO.1:** The implementation of a **Trans-European Network of trainers for first and second responders**.

**EO.2:** Design and implementation of **innovative training programs for natural disaster and technological risks prevention and mitigation especially focusing on cross-border events** that will be implemented in Virtual Control Room (VCR) with an integrated state of the art emergency management system.

**EO.3:** Implementation and deployment of a **dual-purpose platform** which will incorporate **the training programs for natural disaster and technological risks prevention and mitigation** along with **a series of educational and awareness programs enhanced with AR techniques for students', citizens' and tourists' preparedness**.

**EO.4: Mapping of current activities in Croatia, Greece and North Macedonia in the areas of disaster management and of disasters' education and training.** A comprehensive report with data derived from the mapping training exercises will allow decision and policy makers to evaluate the current state, challenges and opportunities for collaborative disaster management across Europe. Results and the mapping itself will serve as a basis for collaboration, knowledge sharing/exchanging and training among the network member countries.

## **1.2. Purpose of the document**

The purpose of this document (**D3.1 RESISTANT Use case guidelines and User's Handbook**) is to present the methodology and plans for demonstration and validation of RESISTANT's overall approach for training and education of first responders and civilians. D3.1 will guide RESISTANT's deployment and the actual execution of the use cases under realistic conditions and data through a series of trials with end-users who will evaluate the demonstrators and apps and assess the quality and usability of the RESISTANT education and training infrastructure. This document is the output of two tasks: **Task 3.1 Preparation of RESISTANT use cases** and **Task 3.2 RESISTANT Pilot Running and Monitoring**.

## **1.3. Work Package Objective**

**D3.2 RESISTANT Use case implementation and evaluation report** is a deliverable of Work Package (WP) 3: **RESISTANT Validation and Demonstration**. WP3 defines the implementation framework for the training use cases and the evaluation procedures for the use cases to assess the impact of the project to its target communities. The main purpose of this WP is to implement and evaluate the overall approach of RESISTANT methodology and educational and training infrastructure and to define validation activities in order to assure validity of results. The following are

specific WP3 objectives:

- To define the use case scenarios to pilot and evaluate RESISTANT.
- To setup the pilot environment considering all the special requirements / needs of the end users and stakeholders based on the infrastructure of IHU and the technology of KTGR (COnCORDE emergency management platform).
- To fully operate and test the RESISTANT solution on specific piloting experiments.
- To validate the RESISTANT from a usability and end-user point of view.
- To make the capabilities of the RESISTANT educational and training infrastructure available to policy stakeholders willing to use RESISTANT methodology.

## 1.4. Relation to other deliverable/Work Package

The current deliverable - **D3.2 RESISTANT use case Implementation and Evaluation Report** is related to the Deliverable **D3.1 RESISTANT Use case guidelines and User's Handbook** that presents the evaluation procedures and instruments that will be used for the overall assessment and evaluation while the deliverable D3.2 will present the results of the evaluation activities based on the procedures and instruments defined in deliverable D3.1. The current deliverable is the output of the Task **T3.1 Preparation of RESISTANT use cases, T3.2 Resistant pilot running and monitoring, and T3.3 Overall assessment evaluation and pilot improvement**

## 1.5. Intended audience

The intended audience of this deliverable consists of the following target groups:

- Trainers, educators and students who intend to become future trainers for first responders and for civilians (e.g pupils from primary and secondary schools, residents of endangered areas, citizens with special needs -disabilities, limited or no vision and even those with no reading capabilities- tourists, municipalities' employees) on topics related to natural and manmade Disasters and Risks
- UCPM National Training Coordinators
- Representatives from civil protection and risk disaster management community - First responders (fire fighters, law enforcement, emergency services, etc.), civil protection experts
- Civil society organisations / NGOs and their networks with interest in the Crisis Management domain, Humanitarian organisations
- International and national networks of civil protection and disaster management actors
- Members of the projects funded under the same call as RESISTANT project (Union Civil Protection Knowledge Network: Network Partnership (UCPM-2020-KN-AG)
- Information Communication Technology entities (industry organisations and SMEs)
- Primary and secondary schools, Vocational Education Training Institutions, Universities and research centres with interest in the training and education for civil protection and disaster management
- Civil protection authorities and public health authorities of European countries
- Policymakers at local, national, EU and the wider Neighbourhood level
- RESISTANT project partners and Advisory Board
- The Project Officer at the Knowledge Network and Evidence-Based Policy (ECHO.B.3) Unit in

the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO) of the European Commission

## 2. Pilot Use cases and scenarios for education and training

The project Consortium will evaluate the overall approach of RESISTANT with the help of a series of tests that will be based on real life scenarios and case studies and that will be implemented in 4 pilot use cases (UC) aimed at education and training for emergency preparation and disaster response:

- **UC1: Educational and Training Seminars for students and Citizens of endangered areas**
- **UC2: Emergency Management Frameworks (Cross-border Use Case)**
- **UC3: Full-Scale Exercise - Flood case caused by torrent**
- **UC4: Tabletop training exercise - Earthquake response during the COVID-19 pandemic**

The aim of UC1 is to educate civilians of different ages and to raise their awareness and preparedness against Natural Disasters and Technological Risks while the aim of **UC2**, UC3 and UC4 is to test the technologies, equipment and uniforms proposed by RESISTANT in real settings, focusing on how the first responders utilize them in real scenarios.

A review of training literature will usually bring up the names of five common types of exercises commonly used in emergency preparation and disaster response (EPDR) training: Orientation, Tabletop, Drill, Functional and Full. In case of RESISTANT, there will be organized:

- **Tabletop exercises** - A tabletop exercise is conducted in a classroom setting, usually at a table, with a facilitator guiding the process. Participants are given an EPDR scenario to work through. Props, scale models and maps, can be added for realism and as training tools. The exercise can be made more challenging by adding multiple events, or limiting available time, or adding an unforeseen complication. Tabletop exercises encourage teamwork and group problem-solving skills but also allow for testing and evaluation of a plan.
- **Full scale exercises** – They take place in real time and test both participants and the plan. They usually take place in the field and are designed around realistic EPDR situations that require participants to react as they would if the situation was real. Participants use their equipment and procedures to successfully address EPDR issues. Full scale exercises provide participants with the opportunity to practice, interact and communicate but can be stressful. Additional realism can be achieved through controlled fluctuation of resources during the exercise such as communication hitches, or equipment that is unavailable or non-functioning.\*

The training exercises will be based on scenarios that are reality based and derived from multiple real life incident reports. Scenarios in simulation exercises will aim to test the response of professionals and will be enabled by **modern monitoring and tracking technology**.

For the educational training both for civilians and the first responders/future trainers of first responders, all educational and training materials will be available on the **RESISTANT Training platform**.

The **full-scale exercises** for first responders will focus on gathering real time data from the field and communicating them via the **COncORDE emergency management platform**.

**In this document there will be a further analysis of UC2.**

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\*<https://www.researchgate.net/publication/320288691>

## 3. Use Case 2: Emergency Management Frameworks

### 3.1 General Description

**Partner leading the UC2:** EPAYPS

**Other partner(s) involved:** Evia Rescue team (S.A.R. 312), Rescue Team Delta (RTD), IHU, MAGMA

**Location(s) of the UC2:** Southern part of North Macedonia (South-eastern district, Vardar district and Pelagonia district).

**Target audience:** firefighters, police officers, ambulance personnel, government employees, military personnel, and private industry emergency responders from North Macedonia and members of RESISTANT Consortium (EPAYPS, IHU, SAR3.1.2 and RTD).

### 3.2 Use case scenario

The pilot use case will be based on a specific scenario named: **Emergency Management Frameworks (EMFs)** and will consist of a six-day **discussion exercise (TTX)** focus on three Hazards (Technological Accident, Forest Fire and Flood) in a cross-border area aimed at common EMFs preparation and implementation.

### 3.3 Aim/Objectives

Reflecting the ever-changing emergency management environment and risk landscape, this scenario will be aimed at creating innovative Emergency Management Frameworks in the Southern part of North Macedonia (Southeastern district, Vardar district and Pelagonia district). Recognizing that Emergency management is a shared responsibility across all sectors of society, the Emergency Management Frameworks for the above-mentioned areas will aim to guide and strengthen the way local governments and partners assess risks and work together to prevent/mitigate, prepare for, respond to, and recover from the threats and hazards that pose the greatest risk to citizens of the region. In addition, given that each local government has a responsibility for emergency management and public safety in North Macedonia, the Frameworks' design aims to strengthen collaboration with all the parties (authorities, volunteers etc).

### 3.4 Characteristics of scenario context

Emergency management of a country will need to adopt an all-hazards approach to address both natural and human-induced hazards and disasters. These are increasing in number and frequency worldwide, resulting in ever-growing human suffering and economic cost. Greece and North Macedonia are not immune to these events. Natural and human-induced hazards and disasters have become more prevalent in urban and rural communities. Human-induced hazards, such as terrorist attacks and hazardous material incidents are likely to persist. In addition, scientists predict that climate change will continue to increase the frequency and intensity of extreme weather events such as heatwaves, heavy rainfalls, and related flooding, droughts, forest fires, serious winter storms; that may increasingly strain emergency management capacities and budgets across North Macedonia and Greece. These events can have profoundly negative effects on citizens of study areas.

Most emergencies in Greece and North Macedonia are local in nature and are managed by municipalities and communities, or at the provincial or territorial level. Moreover, accumulating risks associated with increased urbanization, critical infrastructure dependencies and interdependencies, terrorism, climate change, environmental change, animal and human diseases, and the heightened movement of people and goods worldwide have increased the potential for various types of catastrophes. Such events could

transcend geographic boundaries to challenge cross-border emergency management, including the response.

The fundamental concepts and principles will be outlined in the framework flow from emergency management activities and measures are undertaken in North Macedonia. Frameworks will support legal and policy frameworks, programs, activities, standards, and other measures to enable and inspire all emergency management partners and the whole-of-society in the above-mentioned areas to work in better collaboration to keep citizens safe.

The frameworks will align with key international agreements, including the Sendai Framework for Disaster Risk Reduction 2015-2030, which was built on previous agreements, including Hyogo (2005) and Yokohama (1994), to advance disaster risk reduction priorities globally. In addition, the framework will support the implementation of the Paris Agreement, aimed at reducing the impact of climate change, and the United Nations Sustainable Development Goals (SDGs). Each of these agreements aligns with the tenets of these frameworks to advance North Macedonia's domestic approach to Disaster Risk Reduction.

Moreover, in the mirroring area of Greece, Kastoria (Ptolemaida), Pella, Florina, and Kozani prefectures are situated. The above-mentioned Greek prefectures have already been supplied with Emergency Management frameworks by the Greek Civil Protection Secretary, but by considering these brand new Emergency management frameworks, could probably improve their own EMF plans, given that these are plans of neighborhood areas with similar geomorphological and vegetation cover conditions. Both Greek EMF plans that already existed and North Macedonia's EMF plans that will be implemented under this project could be used for the realization in the future of some common Transboundary EMF plans. This will be a very useful tool for the Civil Protection authorities of both countries.

### **3.5 Pedagogical approach**

"Constructivism" will be used as a basic pillar of the Pedagogical Approach because the emphasis of case-based instruction is on learning by simulating real situations, problem-based instruction emphasizes solving realistic but ill-defined problems as a learning tool. Constructivism's central idea is that human learning is constructed, that learners build new knowledge upon the foundation of previous learning. This prior knowledge influences what new or modified knowledge an individual will construct from new learning experiences (Phillips, 1995).<sup>2</sup>

The second notion is that learning is an active rather than a passive process. The passive view of teaching views the learner as 'an empty vessel' to be filled with knowledge, whereas constructivism states that learners construct meaning only through active engagement with the world (such as experiments or real-world problem solving).

Information may be passively received, but understanding cannot be, for it must come from making meaningful connections between prior knowledge, new knowledge, and the processes involved in learning. Learning is a social activity - it is something we do together, in interaction with each other, rather than an abstract concept (Dewey, 1938).<sup>3</sup>

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<sup>2</sup> Phillips, D.C (1995). "The Good, the Bad, and the Ugly: The Many Faces of Constructivism", *Educational Researcher*, 24(7), 5-12.

<sup>3</sup> Dewey, J. (1938). *Experience and Education*. New York Macmillan Company

For example, Vygotsky (1978)<sup>4</sup>, believed that community plays a central role in the process of "making meaning." For Vygotsky, the environment in which children grow up will influence how they think and what they think about. Thus, all teaching and learning is a matter of sharing and negotiating socially constituted knowledge.

Problem-based instruction, like case-based instruction, is also an active learning method. The learner becomes actively engaged in the process of learning by either engaging in an exercise or by actively thinking about the learning. Like case-based instruction, it derives its theoretical underpinnings from the learning theory of constructivism. While the emphasis of case-based instruction is on learning by simulating real situations, problem-based instruction emphasizes solving realistic but ill-defined problems as a learning tool.

### 3.6 Type of activities

#### Study visit and survey: October - January 2022

A working team consisting of EPAYPS, MAGMA, and IHU representatives will implement study visits to mountainous and remote areas of Kastoria (Ptolemaida), Pella, Florina, Kozani (Greece), and the Vardar, Pelagonia, and south district (North Macedonia) to implement a survey. The visit and the survey in the above-mentioned areas are quite essential because only under this way, the risk factors that create and affect natural disasters (forest fires, floods, landslides, etc), could be determined and evaluated, something that could lead to a successful and integrated EMFs implementation.

#### Discussion exercise: May 2022

It is expected that several training sessions will be required for all participants in UC2 regarding the RESISTANT technologies. For example, first a multi-day discussion exercise (TTX) will be organized to provide an overview of emergency response activities. Within this type of training exercise, the participants from Greece and North Macedonia will discuss in a roundtable setting how they should and do respond to transportation events (test all major aspects of transportation emergency response supported by the COncORDE platform). Emphasis will be placed on participation and coordination among the participating organizations to demonstrate integrated response capabilities.

The core TTX will take part for all the participants in 1st, 3rd, and 5th day, while the 2<sup>nd</sup>, 4th, and 6th-day will participate only the RESISTANT project members to evaluate the previous date and prepare the next day.

### 3.7 Narrative of the emergency scenario

(i) **The first day of the discussion exercise** will test the existing Flood Emergency Plan and Consequences Management. The basic aim of an EMF is the immediate and coordinated response of the involved Bodies at the Central, Regional and Local level:

- for the implementation of preparatory measures and civil protection actions that contribute to the preparedness of human resources and the means for dealing with emergencies and the immediate/short-term management of the consequences of the occurrence of flood phenomena.

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<sup>4</sup> Vygotsky, L.S. (1978). "Mind in Society: The development of higher psychological processes." Cambridge, MA: Harvard University Press

- for the effective response to emergencies from the occurrence of floods and the immediate management of their consequences, actions aimed at protecting the life, health, and property of citizens, as well as the protection of the natural environment, wealth resources, and infrastructure of the country.

A prerequisite for achieving this goal is the synergy, cooperation, and interoperability of the involved Bodies at the Central, Regional and Local levels. Moreover, Flood Risk Management Plans must comply with the requirements of the European Flood Directive (2007/60 / EU) "On the assessment and management of flood risks".

According to Directive 2007/60 / EU, flood is defined as the temporary subsidence of soil from water which, under normal conditions, is not covered by water. This concept includes floods from rivers, mountain streams, and ephemeral streams overflows of lakes, floods from groundwater, floods from the sea in coastal areas, as well as floods caused by gravity waves. It also includes floods from major hydraulic disasters, such as the breaking of embankments and dams. Also, the above Directive 2007/60 / EU defines the risk of flooding as the combination of the likelihood of a flood occurring and the potential adverse effects on human health, the environment, the cultural heritage, and the economic activities associated with that flood.

Land or river floods are caused by rapid rainfall and heavy storms or by the sudden melting of snow, or even a combination of the above resulting in a large increase in river runoff, as well as the failure of large hydraulic projects. Land or river floods can be further divided into slow-moving floods (field floods) and rapidly emerging floods (flash floods). Land or river floods are caused by rapid rainfall and heavy storms or by the sudden melting of snow, or even a combination of the above resulting in a large increase in river runoff, as well as the failure of large hydraulic projects. Land or river floods can be further divided into slow-moving floods (field floods) and rapidly emerging floods (flash floods).

Although the intensity, duration, and spatial distribution of rainfall is a major cause of flooding, the occurrence of a flood depends on a number of other factors that can act either as a deterrent or as a support. Such factors that can determine the occurrence or not of a flooding phenomenon are:

- the ability of the hydrographic network to effectively drain the surface runoff
- the geology, size of and geomorphology of the catchment
- the saturation of the surface soil from previous rainfall
- the vegetation
- land uses

For the assessment and management of flood risks, based on which flood protection projects should be launched, it is clarified that there should be an integrated framework for their assessment in order to reduce their negative consequences.

Useful tools are the Flood Risk Management Plans which include:

- basic objectives for flood risk management
- measures and priorities necessary to achieve the above objectives
- findings of the Preliminary Flood Risk Assessment in the form of a map with potentially high flood risk zones and flood risk and flood risk maps



(ii) **The third day of the discussion exercise** will be tested the existing Plan for Emergency Response due to Forest Fires.

The basic aim of an EMF is the immediate and coordinated response of the involved authorities at the Central, Regional and Local levels for the suppression of forest fires and the effective response to emergencies due to forest fires. A precondition for achieving this goal is the synergy, cooperation, and interoperability of the involved Bodies at the Central, Regional and Local levels.

The scientific approach and investigation for the causes of forest fires of the Mediterranean countries, has concluded that forest fires are part of their ecology, thus their complete elimination is impossible even if there was the most perfect fire planning. The high temperatures, the prolonged drought, and the strong winds that prevail during the summer months combined with the flammability of various types of natural vegetation compose an extremely favorable environment for the occurrence of forest fires. Fires as an ecological factor of a country's terrestrial ecosystems are a natural force that affects humans, vegetation, and animal organisms. Forest fires can cause injuries and loss of life, loss of civilian property, direct and indirect losses in the primary sector (forestry, agriculture, livestock), damage to infrastructure (electricity, telecommunications, etc.), forest recreation and tourism in general.

Fires contribute positively to the natural renewal and increase of the biodiversity of forest ecosystems, and negatively causing their destabilization and degradation to other simpler forms (shrubs, shrubs, etc.), or even their complete collapse when they are re-ignited relatively short intervals in this place. The concern and importance given to managing the problem of forest fires is therefore reasonable, as they have an adverse effect on human activities and contribute to catastrophic floods by simultaneously sweeping mountainous terrain causing gradual desertification of affected areas.

Finally, it is clarified that in the forest-city mix zone, i.e., where urban areas have great proximity or extend within forests and forest areas in general, as well as in individual buildings near or within forests and forest areas in general, the protection of buildings as well as and all types of infrastructure from an impending fire is determined primarily by their proximity to the fire. That is, how close can the flames and the produced thermal loads of a forest fire (heat propagation is done by conduction, transport, and radiation) with individual building materials of a building or an infrastructure causing their ignition.

The spread of a fire is a process that evolves and spreads in space, only when the requirements for combustion are met, i.e., when the three factors coexist: fuel, oxygen, and heat. If one of the three factors ceases to exist, the fire stops, and its development is stopped. Therefore, it is obvious that a forest fire spreads to buildings when the requirements for potentially available fuels and thermal loads are met which, in the presence of oxygen, meet the conditions for ignition and continued combustion.

Potentially available fuels that will allow a forest fire to develop into an urban environment include, in addition to plant fuels, the individual building materials of a building, including materials adjacent to the building, of non-vegetable origin, whose flammability in combined with their exposure to heat caused by an impending fire, will ensure or interrupt its continuity. Therefore, potential losses in buildings and infrastructure due to forest fires are mainly related to their distance from the flammable fire front which produces a heat flow that is sufficient or insufficient to ignite building materials or infrastructure of a building.

(iii) **The fifth day of the discussion exercise** will be tested the Large-Scale Technological Accident Management Plan. Via the Large-Scale Technological Accident Response Plan the immediate and coordinated response of the involved author to all levels of Administration (central, regional, local) is aimed:

- To support the work of the responsible authority in the suppression of incidents / major accidents in SEVESO facilities,
- For the effective response to emergencies and the immediate/short-term management of the consequences due to a major accident to be achieved, which are actions aimed at protection of the life, health, and property of citizens, as well as the protection of the natural environment, the wealth-producing resources and the infrastructure of the country.

A precondition for achieving this goal is the synergy, cooperation, and interoperability of the involved authorities at all levels of Management. Objectives of a Successful Plan will be aimed:

- To define the roles and responsibilities of all involved Bodies at each level of Administration (central, regional, local) in all phases of mobilization of the Civil Protection system,
- To coordinate the activities of all involved civil protection bodies based on their institutional framework, in order to support the work of suppression of incidents / major accidents which is the responsibility of the Fire Brigade,
- To coordinate the activities of all involved civil protection bodies, based on their institutional framework, to deal with emergencies and the immediate/short-term management of consequences due to a Large-Scale Technological Accident, with the ultimate goal of restoring the daily operation of areas that have been in a state of emergency because of this.
- To provide guidelines for the preparation of the Special Plans for the Response of Large-Scale Technological Accidents of the higher-level facilities by the Regions.

This type of plan is activated and implemented whenever an unexpected event of leakage, fire, or explosion occurs within the SEVESO installation, which is due to accidental factors during the operation of the installation and not within its conventional operation, as the latter can develop into a major accident and cause serious effects inside and outside the installation.

In each day that takes part the discussion exercise, we will follow the procedures below:

**a) Performance Objectives:**

- Implement the incident command system.
- COncORDE emergency management platform will be used for incident management during the multi-day discussion exercise (TTX)
- Successfully resolve problems that arise while managing an incident related to 3 hazards.
- Simulate the allocation of emergency response resources.
- Demonstrate all the functions for simulated sub incident.
- Report a summary of actions taken.

b) **Condition:** Participants will respond to a simulated scenario at each of the above hazards conducted as a discussion exercise in a classroom setting.

c) **Standard:** Participants will demonstrate the tasks in accordance with the appropriate performance checklists and with the written portion of the appropriate lessons.

**d) Instructions:**

- Divide into 4-6 groups.
- Each group given the same scenario.
- Function as an incident management team
- Create and implement the incident management system.
- Each member has equal say.
- Share duties; do NOT delegate.
- Develop a written plan.
- Document all proceedings.
- Report to the class.

**e) Handouts and Materials :**

- Incident Command Checklist
- Resource Response List
- Diagram of Incident Area
- Close-up Diagram of Incident Area
- Incident Command Information Sheet
- Related to hazard Forms.
- Worksheets
- White paper
- Colored markers

**Timetable:**

<b>Title of training</b>	<b>Topics</b>	<b>Participants</b>	<b>Due date for implementation</b>
Emergency Management Framework (EMF) for Flood in a cross-border area will be tested via Discussion exercise (TTX)	Flood Emergency Plan and Consequences Management	Representatives of MAGMA, IHU, EPAYPS, SAR 3.1.2 and RTD	May 2022
Emergency Management Framework (EMF) for Forest Fire in a cross-border area will be tested via Discussion exercise (TTX)	Plan for Emergency Response due to Forest Fires	Representatives of MAGMA, IHU, EPAYPS, SAR 3.1.2 and RTD	May 2022

Emergency Management Framework (EMF) for Large Scale Technological Accident in a cross-border area will be tested via Discussion exercise (TTX)	Large Scale Technological Accident Management Plan	Representatives of MAGMA, IHU, EPAYPS, SAR 3.1.2 and RTD	May 2022
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## 4. Flood Emergency Management Framework (Flood EMF)

### 4.1 Introduction

According to Directive 2007/60/EC "For the assessment and management of flood risks", a flood is defined as the temporary inundation of the ground by water which, under normal conditions, it is not covered by water. This concept includes flooding from rivers, mountain streams and ephemeral watercourses, lake overflows, floods from groundwater, flooding from the sea in coastal areas, as well as flooding that caused by marine gravity waves. It also includes floods from disasters of large hydraulic works such as levee and dam breaches.

Also, in the above Directive 2007/60/EC, flood danger is defined as the combination of probability of a flood occurring and the potential negative human consequences health, the environment, cultural heritage and economic activities, which associated with this flood. The most frequently occurring floods area are due to natural causes and they can be distinguished in terrestrial or riverine and coastal. Overland or river flooding is caused by rapid rainfall-heavy from storms or from the sudden melting of snow, or even from a combination of the above with consequence of the great increase in the discharge of the rivers, as also from the failure of large ones hydraulic works.

Overland or river floods may be further distinguished into slow development floods (field floods) and in floods that develop rapidly (sudden or flash floods). The sudden floods, with their main characteristic of their rapid evolution, happen due to the peculiar geomorphology, which contributes to the development of a large number of streams with relatively small basins runoff, which are dominated by steep slopes that contribute to rapid drainage. Flash floods have in the past caused large disasters in infrastructure (road network, etc.), agricultural holdings, residences, etc. and they have put human lives at risk (pedestrian and vehicle entrainment, etc.).

Although the intensity, duration and spatial distribution of rainfall is an important factor causing flood phenomena, the occurrence of a flood phenomenon also depends on a number of other factors that can act either as a deterrent or as a booster. Such factors that can determine the occurrence or not of a flood phenomenon are the:

- Ability of the hydrographic network to effectively drain surface water runoff
- Geology, size and geomorphology of the catchment
- Saturation of topsoil from previous rainfall
- Plant cover of the soil
- Land uses, etc.

## 4.2 Instructions for the activation and implementation of the Plan

This plan is activated and implemented for actions of:

- Increased preparedness in view of the imminent risk of flooding phenomena.
- Dealing with emergencies and the immediate/short-term management of the consequences from the occurrence of flood phenomena.

It is clarified that the issuance of a decision to declare the area in a State of Civil Protection Emergency is not a condition for activation and application of this EMF.

It is also clarified that the emergency actors/forces mobilization, due to their special institutional frameworks and regulations, are determined by their operational planning and the respective decisions of their natural leadership, and is not linked to decisions declaring a disaster or declaring an area in a state of civil protection emergency. The same applies to the health sector, which is mobilized to provide assistance based on its design and independently of decisions to designate a disaster or declare an area in a state of civil protection emergency.

Coordination in this plan means the organization and maintenance of cooperation between various organizational units of a service or agency or management structure, as well as between agencies or services or other involved potential civil protection means, for ensuring the appropriate unified and synchronized action.

The involved organic units of each agency, the human resources and the means that will be called upon to implement them, are determined by the its organizational structure, the institutional framework of its operation and the regulatory acts of the its administration.

It is pointed out that the EMF is the basis for the implementation of a series of actions which may vary in each event, depending on the requirements of managing a catastrophic effect, by the agencies involved, and is not restrictive in terms of range of these actions.

## 4.3 Purpose

The EMF's purpose is the immediate and coordinated response of the involved Agencies at Central, Regional and Local level for:

- the implementation of preparatory measures and civil protection actions, which contribute to the readiness of human resources and means for the response emergencies, and the immediate/short management of the consequences of the flood phenomena.
- the effective response of the involved agencies emergencies in flood phenomena, and the immediate management of their consequences, actions that aim at the protection of life, health and property of citizens, as well as in the protection of natural environment, wealth-producing sources and infrastructure of the country.

A prerequisite for achieving this goal is synergy, cooperation and interoperability of the involved Agencies at Central, Regional and Local level.

## 4.4 Objective Objectives

- Determining the roles and responsibilities of all involved Agencies in Central, Regional and Local level in all phases of mobilization of the Civil Protection system.
- Routing preparatory measures and civil protection actions that contribute to the readiness of human resources and means for the emergencies response and the immediate/short management of the consequences of the flood phenomena.
- Coordinated action of the Agencies involved in dealing with emergencies and the immediate/short-

- term management of the consequences of flood phenomena.
- Harmonization of the planning of all involved Agencies with the EMF.

## 4.5 Risk Analysis

There is the need for assessment and management of flood risks, based on which flood protection projects are launched via a comprehensive framework for their evaluation that aims to reduce their negative consequences.

The country should be divided in Water Divisions, and Flood Danger Maps and Flood Risk Maps to be created, taking into account the European Commission's Directives (European Environment Information and Observation Network) <http://cdr.eionet.europa.eu/gr/eu/floods/>.

Also, Flood Risk Management Plans should be drawn up and approved for each Water Department's high flood risk zones. These plans should include a) the main objectives for flood risk management, b) the necessary measures and priorities to achieve the above objectives and c) preliminary Flood Risk Assessment maps.

The Approved Flood Risk Management Plans, in accordance with the requirements of the European Flood Directive (2007/60/EC) and national legislation, should be posted on the relevant Ministry's website.

## 4.6 Situation

Floods are a phenomenon that belongs to the category of natural disasters. The most frequently occurring floods are due to natural causes and they can be distinguished into terrestrial or riverine and coastal ones.

Overland or river flooding is caused by rapid rainfall-heavy from storms or from the sudden melting of snow, or even from a combination of the above with consequence the great increase in the discharge of the rivers, as also from the failure of large ones hydraulic works.

Overland or river floods may be further distinguished into floods which show slow development (field floods) and in floods that show rapid development (sudden or flash floods).

The sudden floods, with their main characteristic their rapid evolution, happen due to the peculiar geomorphology, which contributes to the development of a large number of streams with relatively small basins runoff, which are dominated by steep slopes that contribute to rapid drainage. Flash floods have in the past caused large disasters in infrastructure (road network, etc.), agricultural holdings, residences, etc. and they have put human lives at risk (pedestrian and vehicle entrainment, etc.).

Also, a flood phenomenon may cause induced natural or technological disasters, such as landslides, leakage of dangerous materials, etc.

## 4.7 Assumptions

The occurrence of flood phenomena may cause:

- Injuries and loss of human life and feeling of insecurity of the citizen.
- Damage to the country's infrastructure
- Direct and indirect financial losses from disasters to citizens' property, in primary sector (agriculture, animal husbandry), in various infrastructures of the country (networks electricity, telecommunications, etc.), as well as consequences for tourism in general.

## 4.8 Conditions

Conditions for the implementation of the EMF are the following:

- The clarification of the roles and responsibilities of all involved policy bodies protection per action, based on the current institutional framework.
- Reviewing - updating - harmonizing civil protection plans for those involved bodies in accordance with this plan and drawing up or updating the corresponding memoranda actions.
- The determination of the human resources and means that can be made available to Central, Regional and Local level for dealing with emergencies and immediate management of the consequences of flood phenomena.
- Ensuring the readiness of all operationally involved Agencies at every operational stage.
- Ensuring communication between all parties involved for seamless flow of information.

## 4.9 Design Parameters

- Flood phenomenon with consequences in infrastructure, residences, as well as the citizens' health.
- Involvement of agencies at Central, Regional and Local level.
- Impossibility of immediate/short-term management of the consequences at the local level.

## 4.10 Concept of Operations

In the context of this plan, the following main actions are launched:

- Increased preparedness actions in view of flood risk.
- Actions to deal with emergencies and immediate / short management of the floods' consequences.

Basic principle of the implementation of the EMF is the cooperation of all the Agencies involved and their coordinated action, such as this determined by the current institutional framework. The involved Agencies are activated in each Phase of the Civil Protection Mobilization System (usual readiness, increased readiness, direct mobilization-intervention, rehabilitation).

## 4.11 Preparatory Actions (Normal Readiness – Phase 1)

During this phase, preparatory measures and actions are carried out by all the agencies involved, which contribute to their preparation (maintenance of equipment, ensuring communications, memoranda of cooperation, convening of civil protection coordinating bodies etc, for dealing with emergencies).

In this phase, the following preparatory actions and measures are mainly launched:

- Review - update - harmonization of civil protection plans of the involved agencies in accordance with this EMF and drafting or updating the existing memoranda of actions.
- Securing the financial resources needed for the implementation of the actions provided in the corresponding planning of the entities involved (maintenance and operation of machinery and equipment, leasing of machinery, hiring of seasonal personnel, supply of materials, etc.).
- Control the operation of the communication system and flow of information to ensure the ability to securely exchange information between the involved agencies.
- Check the proper operation and maintenance of equipment and media to be used for dealing with emergencies and the immediate/short management of flood phenomena.
- Preparation of memorandums of cooperation with private entities to secure additional resources to strengthen the work of dealing with emergencies and the management consequences of flood phenomena.
- Information and awareness of citizens to take preventive measures and self-protection from risks arising.
- Establishment and formation of damage recording committees for the granting of financial aid to those who find themselves in need as a result of floods.

- Preparatory convocation of the Local Coordinating Agencies of the Municipalities and Civil Protection Coordinating Agencies of the Regional Units for dealing with flood risks.
- Ensuring the interconnection and cooperation of the Agencies' Operational Centers central level.
- Preparation of training programs and exercises of the personnel involved in civil protection actions to deal with flood risks, based on the respective design - conduct and evaluation of policy exercises protection.

#### **4.12 Actions of increased preparedness in view of a threatened risk for the event of flood phenomena (Increased Preparedness - Phase 2)**

The state of readiness of civil protection is defined for the areas provided by the Meteorological Service's Emergency Deterioration Weather Bulletins and Emergency Bulletins for Forecasting Dangerous Weather Phenomena, and the increased preparedness of the agencies involved is mainly linked to the following actions:

- Readiness of personnel and means to immediately respond to emergencies and the immediate/short-term management.
- Informing the public for taking measures of self-protection.
- Informing farmers, breeders and beekeepers about the expected weather phenomena.

In cases where the Meteorological Service issues Emergency Weather Deterioration Bulletins and Emergency Hazardous Weather Forecast Bulletins, these should be taken into account by all agencies, in order to be put state of civil protection readiness.

Although the intensity, duration and spatial distribution of rainfall is an important factor causing flood phenomena, the occurrence of a flood phenomenon also depends on a number of other factors that can act either as a deterrent or as a booster. Such factors that can determine the occurrence or not of a flood phenomenon are:

- The ability of the hydrographic network to effectively drain the surface runoff
- The geology, size of and geomorphology of the catchment
- The saturation of the surface soil from previous rainfall
- The vegetation
- Land uses

#### **4.13 Actions of increased preparedness in view of a threatened risk for the event of flood phenomena (Increased Preparedness - Phase 3)**

In this phase, the following actions are launched in order to deal with risks due to floods:

- The search and rescue and extraction of citizens.
- Road traffic management measures in order to support the movement of emergency vehicles, as well as surveillance and traffic stoppage, especially at the points where the road network crosses unbridged streams (Irish crossings), to avoid accidents when vehicles are crossing.
- The taking of measures to protect citizens and workers by those in charge of operations on infrastructures or facilities (archaeological sites, camps, hospitals, facilities Armed Forces, etc.), according to their emergency evacuation plans necessity.
- Taking a decision on the organized evacuation of citizens.
- The clearance of the road network to support the movement of emergency vehicles.



- The check of the drinking water supply network (aqueduct, distribution network, etc.) and the ensurance of the drinking water's quality.
- The direct visual inspection of infrastructure and technical works to determine damages that are caused by floods or other flood-induced phenomena (landslides, etc) and assessment of the potential means required for immediate rehabilitation of the operation.
- Ensuring the operation of services at a local level after the occurrence of flood phenomena and ensuring communication with other operational stakeholders.
- Dealing with civilians' health incidents.
- The adoption of order and security measures, where this is required, for protection of the life and property of citizens in the affected area.
- The immediate re-operation of power supply networks, etc., which have suffered damage or have stop their operation due to the destructive effect.
- Informing the public about civil protection actions related to the emergency response.
- Informing the public to take measures to protect their health from the occurrence of flood phenomena.
- The cleaning within the flooded areas of the eschars, wells and the other anti-flood works from portable materials, to restore their functionality.
- Restoring the passability of blocked roads by removing haulable materials and flood waters from the road surface.
- The check of the proper operation of the anti-flood works.
- The restoration of damages to the water supply and drainage network.
- The declaration of the area in a State of Civil Protection Emergency.
- Taking the decision to stop classes due to extraordinary circumstances.

#### **4.14 Immediate relief actions for those affected and immediate/short recovery of the consequences of the disaster (Recovery / Relief – Phase 4)**

In this phase, further actions to help those affected are launched, a damage assessment is made and decisions are taken for the immediate/short restoration of the disasters.

The framework of the present phase deals with the following:

- Provision of assistance to the affected citizens in terms of accommodation, who due to disaster, their staying in their homes has become impossible.
- Financial assistance to those affected in order to cover their basic needs and replace their household appliance.
- Mark the area affected by flooding for financial aid.
- Providing a financial aid to industrial and craft units, shops, agricultural holdings, other businesses and non-profit organizations that are affected by flooding.
- Recording and compensation of damages to animal and plant capital that were caused by flood phenomena.
- Immediate re-operation of communication and electricity networks by the operation and maintenance agencies.
- Restoration of the road network.

It is clarified that in the actions of immediate/short recovery, urgent simple technical works, such as pumping flood waters, removal of transportable materials, lifting falls and obstacles in the road network, blockages in the rainwater network, etc.

The subsequent mid-term and long-term completion of damage restoration and removal of risks due to the occurrence of catastrophic flood phenomena, the related urgent rehabilitation works in the affected area, is not subject of this EMF.

## 5. Wildland Urban Fire Emergency Management Framework

### 5.1 Introduction

The Country is divided in 8 Statistical Regions; they are for legal and statistical purposes. The regions are: Eastern, Northeastern, Pelagonia, Polog, Skopje, Southeastern, Southwestern, and Vardar. The Country is also subdivided into 84 administrative municipalities.

Starting from 30 July 2021, the Republic of North Macedonia was hit by a heat wave that resulted in severe fires in several regions in the country. The fires have been raging for over 16 days despite the enormous efforts of the state institutions responsible for crisis management as well as the local population.

The hot weather and high temperatures resulted in intensive recurring fires in many regions in the country. The severe fires in numerous regions resulted in devastation of forests, fertile land, crops and property of the population. One casualty and several injured persons (inhaling smoke) have been reported. Numerous houses as well as other facilities have burnt down and were damaged in many villages.

The hardest hit area was the driest, eastern half of the country, where every forest lost will have a negative effect on the local climate, where every destroyed pasture threatens the livelihoods of local farmers, and where bare, scorched hillsides now conceal another danger – landslides and flash floods.

The most affected regions are as follows: Strumica, Kochani, Kumanovo, Gevgelija, Valandovo, Bitola and Prilep, Shtip, Berovo, Pehchevo, Delchevo Skopje, Radovish, Ohrid, Kriva Palanka, Veles.

The crisis management system of the country coordinated its efforts to put out the fires and to assist the affected population. Response teams from the Fire Brigade, the Crisis Management Centre, the Directorate for Protection and Rescue, the Army, and the Red Cross of the Republic of North Macedonia coordinated efforts in the field in order to cope and respond to the crisis situation.

However, due to the limited resources of the state for dealing with fires, an expansion of wildfires was observed almost on the whole territory of the country.

The situation with the raging forest fires will continue during the upcoming years, due to the extreme high summer temperatures in South-East and Central Europe.

### 5.2 Instructions for the activation and implementation of the Plan

The Fire Brigade should have the responsibility and the operational planning of the suppression of fires and the provision of assistance for the rescue of persons and material goods threatened by them (fires).

Operational planning means the organization, management and coordination of all involved fire and rescue forces, equipment and other means. "Suppression operational planning" includes actions that ensure early detection, notification and intervention, in order to achieve the immediate and effective treatment of fires and the risks arising from them.

In particular, the actions related to dealing with forest fires (control and suppression of forest fires) are carried out in principle at the local level by the local competent services of the Fire Brigade and in accordance with their operational plans.

This project may also be supported by other civil protection bodies. The assistance of the other operationally involved sources in the work of the Fire Brigade is carried out as a result of the request of the head officer that is responsible for the fire operation.

The means of the organizations which are available to support the work of the Fire Brigade for the control

and suppression of forest fires (water tankers, machines, etc.), are under the head officer's orders, who has also the responsibility of utilizing them at the local level.

The coordination of the allocation of the means of the Municipalities' and Region's to support the work of the Fire Brigade for the control and suppression of forest fires, is the responsibility of the Decentralized Bodies of Civil Protection (Mayor, Deputy Regional Governor, etc.).

This plan is activated and implemented on a daily basis during the fire fighting season (or when it is required outside the fire fighting season) to take measures and implement actions:

- increased preparedness in view of the threatened risk of the occurrence of forest fires
- supporting the fire department in task of suppressing forest fires
- emergency response and management of the consequences due to forest fires

This plan is not an operational plan of the Fire Brigade for the announcement, control and suppression of forest fires, but its purpose is the coordinated response of all civil protection agencies involved a) to support the work of the Fire Brigade in suppressing forest fires, which is carried out based on its operational planning and b) to effectively deal with emergencies and the immediate/short management of their consequences.

It is clarified that the issuance of a decision to declare the area in a civil protection emergency is not a condition for the activation and implementation of this plan.

Coordination in this plan means the organization and maintenance of cooperation between the various organizational units of a service or an agency or a management structure, as well as between agencies or services or other involved potential and means of civil protection, to ensure unified and synchronized action.

The involved units of each institution, the human resources and means that will be called upon to implement them, are determined by its organizational structure, its institutional framework of operation and the regulatory acts of its administration.

It is pointed out that the institutional framework forms the basis for the implementation of a series of actions which may be differentiated in each event, depending on the management requirements of the catastrophic phenomenon by the involved bodies, and is not restrictive in terms of the scope of these actions, either for the supporting the work of suppressing forest fires, which is the responsibility of the Fire Brigade, or for dealing with emergencies and the immediate/short-term management of the consequences of the occurrence of forest fires.

### **5.3 Purpose**

The EMF's purpose is the immediate and coordinated response of the involved Agencies at Central, Regional and Local level:

- To support the work of the Fire Brigade in the suppression of forest fires.
- For the effective response to emergencies due to forest fires and the immediate management of their consequences, actions aimed at protecting the life, health and property of citizens, as well as the protection of the natural environment, the wealth-producing sources and the infrastructure of the country.

A prerequisite for achieving this goal is the synergy, cooperation and interoperability of the agencies involved, at Central, Regional and Local level.

## 5.4 Objective Objectives

- The determination of roles and responsibilities of all involved Agencies at Central, Regional and Local level in all phases of mobilization of the Civil Protection system.
- The coordinated action of the agencies involved in their mission to support the work of suppressing forest fires which is the responsibility of the Fire Brigade, including the announcement for the timely mobilization of the mechanism with the aim of controlling forest fire incidents in the initial stage.
- The coordinated action of the agencies involved in dealing with emergencies due to forest fires and in the immediate/short term management of their consequences.
- The harmonization of the planning of all involved bodies with the present EMF.

## 5.5 Risk Analysis

The particularly dangerous areas of the country for the occurrence of fires in forests and forest lands should be well known. In the context of supporting the Administration and informing the citizens, with the aim of more effectively dealing with forest fires, a Daily Fire Risk Prediction Map is drawn up and issued during the fire season under the responsibility of the PDR.

The Fire Risk Prediction Map's main objective is to inform the agencies involved in dealing with forest fires, about the areas where there is a high risk of occurrence and spread of forest fires in the next 24 hours. It does not predict the behavior of a fire that develops in real time.

The map should be an integral part of forest fire response planning, which effectively contributes to the preventive organization and coordination for the preparedness of the entities involved, as well as to the awareness of citizens to prevent the start of forest fires by negligence.

The preparation of the Daily Fire Risk Prediction Map should be done by scientists with special knowledge (Forestists and Meteorologists).

The Daily Fire Risk Prediction Map should be issued from June 1 to October 31 of each year. The preparation of the Map should be completed by 12:30 of the previous day from the day for which it is valid.

The minimum geographical division in which the risk is assessed on the Daily Fire Risk Prediction Map is the administrative boundaries of the country's Forestry Departments, given that they are connected to the country's forest complexes. The presentation of the data in the form of a map aims at the comparative evaluation of the various regions depicted.

In the Fire Risk Prediction Map, published by the PDR, there are risk categories, low, medium, high and very high, rated respectively with numbers from 1 to 4. Risk category 5, as a rule, rarely appears on the map. This category corresponds to an Alarm status. In particular, the risk categories are analyzed as follows:

- Risk Category 1 (Low). The risk is low. The probability of fire occurrence is not particularly high. If a fire occurs, the conditions (fuel condition, meteorological conditions) will not favor its rapid development.
- Risk Category 2 (Medium). The risk is usual for the summer season. Fires that may occur are expected to be of medium difficulty in dealing with them.
- Risk Category 3 (High). The risk is high. An increased number of fires are likely to occur, many of which will be difficult to deal with when local conditions are favorable (topography, local winds, etc.).
- Risk Category 4 (Very High). The risk is particularly high. The number of fires expected to occur is likely to be large but, most importantly, any fire can become large if it escapes from the initial infestation.

- Risk Category 5 (ALERT Status). The risk is extreme. The number of fires expected to occur is likely to be very large. All fires that may occur can quickly become large and develop extreme behavior immediately after they occur. The difficulty of control is expected to be very great until the conditions under which fires develop change.

The classification of an area in a very high risk category (category 4) or alarm status, (category 5), does not necessarily mean that a fire will occur in that area. Especially when citizens are systematically informed through press releases, actions that may cause a fire by negligence can be prevented. This is also one of the goals of this ranking. Even the classification of an area in the low risk category does not exclude the possibility of fire occurrence.

For the full utilization of the Daily Fire Risk Prediction Map, the different categories of risk require a corresponding escalation of preparedness and taking measures by all the agencies involved in dealing with forest fires, where they are concerned and involved. The uniform treatment of different levels of risk (especially risk categories 1,2,3), without a corresponding differentiation of measures and actions in the planning of the entities involved, partially exploits the possibilities of the Daily Fire Risk Prediction Map, as a supporting tool in decision-making and potentially lead operators to misjudge the level of preparedness.

It is understood that the issuance of guidelines for the implementation of measures and actions based on the prediction of the risk, as assessed by the Fire Risk Prediction Map, is the responsibility of the administrations of the organizations involved, to the extent that they are involved.

The levels of preparedness, the specific actions of each operationally involved Agency at each level and the taking of additional measures in relation to the predicted level of risk, are determined by their operational planning.

For the areas where the risk forecast is estimated from very high (category 4) to a state of alarm (category 5), a special warning signal will be issued.

It is understood that the Departments of Civil Protection of the Regions will competently inform the Regional Governor and will send the Fire Risk Prediction Map and the special warning signal to the Civil Protection departments of the Regional Units and the competent Deputy Governors.

In particular, for areas where the risk forecast is estimated from very high (category 4) to a state of alarm (category 5), the PDR will issue, at its discretion, warning announcements with appropriate instructions, to inform the public in these areas, with the aim of avoiding actions that may cause a fire by negligence.

For the areas where a very high risk is predicted and it is estimated that the conditions expected to prevail in the next 24 hours are favorable for the occurrence of fires with extreme behavior, the PDR may ask the civil protection bodies involved in dealing with forest fires to taking additional preventive and preparedness measures.

This action is deemed necessary when it is estimated that the preceding conditions (prolonged drought, high temperatures, etc.), as well as those expected to prevail in the coming days, are favorable for the occurrence of a large number of fires that may become large if they escape from the initial attack or to develop extreme behavior after their occurrence (risk categories 4 and 5) for a series of days, which requires special planning of personnel and means by the operationally involved agencies to take prevention and preparedness measures.

## 5.6 Situation

Forest fires are a phenomenon that belongs to the category of natural disasters. They can be caused by natural causes (e.g. lightning) or by human activities, such as burning crop residues near forested areas during the summer months or using a wheel/other tool that creates sparks, etc.

Forest fires by creating landscapes of destruction have a negative impact on human psychology, have adverse effects on human activities, destroy infrastructure and contribute to the subsequent creation of catastrophic floods with simultaneous drifting of mountainous lands causing gradual desertification of the affected areas.

Forests cover around 30% of the territory of the country. Some of the main threats and problems in forest management and governance are: illegal logging, forest fires which have affected nearly 100,000 ha. in the last ten years, climate change impact through the increased forests dieback process, insect calamities, and diseases.

About 30% of Europe is covered by forests. Under a warmer climate, it is expected that the northern range limits of most native tree species in Europe will expand. The southern boundary of some species will shift to north specifically at the boundary of steppe and forest zones. Limited moisture resulting from increasing temperature and possible reduced summer rainfall may lead to productivity declines in central and southern Europe. Summer temperature rise and reduction of precipitation may further increase fire risk. Forest productivity and total biomass is likely to increase in the north and decrease in central Europe, while tree mortality is likely to accelerate in the south.

Based on past experience, as well as on the results from climate change scenarios, climate change impacts on forestry in North Macedonia might be manifested through: a more intensive process of morphological changes to oak and fir; increased number of forest fires and burned area, due to the increased percentage of dead trees; and migration of tree species towards higher altitudes.

As an adaptation measure towards increased air temperature and decreased precipitation, migration of certain tree species at the highest altitudes and latitudes is evident over the last ten years. The North Macedonian, or Molika, pine, which originally emerged at a maximum latitude of 2,200 m a.s.l. on Mt. Pelister ten years ago, nowadays has migrated towards higher latitudes such as 2,600 m a.s.l. The situation is very similar on almost all abandoned pastureland in North Macedonia (for example Bistra), where the presence of some pioneer plant species, such as juniper, which are predecessors of the forest tree species, such as beech, is registered. Climate change is the largest factor that causes this tree migration, as well as abandoned pastureland, i.e. a small number of cattle and almost no human presence.

Among all European regions, the Mediterranean appears most vulnerable to global change. Multiple potential impacts are related primarily to increased temperatures and reduced precipitation. The impacts included water shortages, increased risk of forest fires, northward shifts in the distribution of typical tree species, and losses of agricultural potential. Mountain regions also seemed vulnerable because of a rise in the elevation of snow cover and altered river runoff regimes.

In parts of Europe with temperate forests, annual mean temperatures are below 17°C but above 6°C, and annual precipitation is at least 500 mm and there is a markedly cool winter period. Temperate forests are dominated by broad-leaf species with smaller amounts of evergreen broad-leaf and needle-leaf species. Common species include the oaks, eucalypts, acacias, beeches, pines, and birches.

Many of the major factors that influence these forests are due to human activities, including land-use and landscape fragmentation, pollution, soil nutrients and chemistry, fire suppression, alteration to herbivore populations, species loss, alien invasive species, and now climate change.

Forest productivity has been increasing in Western Europe. This is thought to be from increasing CO<sub>2</sub> in the atmosphere (9), anthropogenic nitrogen deposition, warming temperatures, and associated longer growing seasons.

Models suggest that the greatest climate change threat to temperate forest ecosystems is reduced summer precipitation, leading to increased frequency and severity of drought. This will probably be most prominent in temperate forest regions that have already been characterized as prone to drought stress, such as southern Europe. Drought-stricken forests are also more susceptible to opportunistic pests and fire. Together, these related effects can potentially change large areas of temperate forest ecosystems from carbon sinks to sources.

Adaptation measures are:

- Forest rehabilitation with the local endemic oak species and other endemic varieties through introduction of silvicultural and planning measures, improvement of species composition of forests (natural and afforested) with endemic tree species, resistant to climate change.
- Controlling the oak dieback process, as well as for other tree species, with a sanitary cut that could lead to prevention of development of some specific tree diseases and proliferation of harmful pests.
- Strengthen preventive measures that improve forest management and minimize the risks of fires.
- Increase monitoring and observation pilots in the most vulnerable and economically valued forests (thus minimizing the occurrence and magnitude of damage from wildfires).
- Afforestation of about 150,000 ha of barren land to increase the forest fund by about 15%.

Near-nature forest management and a move away from monocultures toward mixed forest types, in terms of both species and age classes, are advocated. In addition, natural or imitated natural regeneration is indicated as a method of maintaining genetic diversity, and subsequently reducing vulnerability. For management against extreme disturbances, improvements in fire detection and suppression techniques are recommended, as well as methods for combating pests and diseases. It is reported that through stricter quarantine and sanitary management, the impact of insects and diseases can be minimized. The establishment of migration corridors between forest reserves may aid in the autonomous colonization and migration of species in response to climate change.

## 5.7 Assumptions

Forest fires can cause:

- Injuries and loss of human life and a feeling of insecurity for the citizen.
- Direct and indirect economic losses from disasters to citizens' properties, to the primary sector (forest products, agriculture, livestock), to various infrastructures of the country (electricity networks, telecommunications, etc.), as well as consequences to forest recreation and tourism in general.
- Disturbance of ecological balance.

## 5.8 Conditions

Conditions for the implementation of the EMF are the following:

- The clarification of the roles and responsibilities of all civil protection agencies involved per action, based on the current institutional framework.
- The review - updating - harmonization of civil protection plans of the involved bodies in accordance with this plan and drawing up or updating the corresponding memoranda of actions.
- The determination of the human resources and means that can be made available at Central, Regional and Local level to deal with emergencies and manage the consequences of forest fires.
- Ensuring the readiness of all operationally involved entities at every stage of operations.
- Ensuring communication between all involved entities for the seamless flow of information.

## 5.9 Design Parameters

- The simultaneous existence of large-scale forest fire episodes.
- "Forest fires of a large area" are considered to be the fires that are not limited in their initial stage and due to the dimensions they take, there will be the need of fire fighting resources are allocated by all levels of administration.

## 5.10 Concept of Operations

Within the framework of this plan, the following main actions are launched:

- Increased preparedness actions in view of the imminent danger of forest fires.
- Supporting the fire brigade in the work of suppressing forest fires.
- Actions to deal with emergencies and immediate/short-term actions management of the consequences due to forest fires.

The basic principle of the implementation of the EMF is not only the cooperation of all the Agencies involved but also their coordinated action, as determined by the current institutional framework. The involved Agencies are activated in each Phase of the Civil Protection Mobilization System (usual readiness, increased readiness, immediate mobilization-intervention, recovery) according to the following:

## 5.11 Preparatory Actions (Normal Readiness – Phase 1)

During this phase, preparatory measures and actions are implemented by all involved bodies, which contribute to the preparation (maintenance of equipment, ensuring communications, memoranda of cooperation, convening of policy coordinating bodies protection, etc.) for the support of the forest fire suppression incident which is carried out under the responsibility of the Fire Brigade, as well as dealing with emergencies and the immediate/short management of their consequences.

It is clarified that for the purpose of drawing up this plan, preventive actions and projects, such as the execution of fire protection projects and works in forests and forest lands, the removal of part or all of the vegetation around infrastructures and areas of critical value, etc., do not constitute subject of this plan and are not included in it.

In the context of this plan, in this phase of the Civil Protection Mobilization System, the following preparatory actions and measures are mainly launched:



- Review - update - harmonization of civil protection plans of the involved entities in accordance with this plan in order to draw up or update the corresponding memoranda of actions.
  - Preparation of training programs and exercises for personnel involved in civil protection actions to deal forest fires, based on the respective planning - conducting and evaluating civil protection exercises.
  - Securing the financial resources for the implementation of the actions provided for in the respective planning of the entities involved, according to this plan (maintenance and operation of machines and equipment, rental of machines, recruitment of seasonal staff, supply of materials, etc.).
  - Control of the operation of the communication system and flow of information to ensure the ability to securely exchange information between the involved Agencies and make decisions.
  - Control of good operation and maintenance of equipment and means that will be used to support the suppression of forest fires, as well as to deal with emergencies and the immediate/short-term management of the consequences due to forest fires.
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- Preparation of memorandums of cooperation with private entities to secure additional resources to strengthen the work of dealing with emergencies and the management of the consequences due to forest fires, as well as supporting the work of the Fire Brigade to control and suppress them,
  - Informing and raising awareness among citizens for the taking of prevention and self-protection measures from risks arising from forest fires.
  - Establishment and formation of damage registration committees to grant financial aid to those who find themselves in a situation of need as a result of forest fires.
  - Preparatory convocation of the Local Coordinating Bodies (LCBs) of the Municipalities and the Regional Coordinating Bodies (RCB) of the Regional Units for dealing with risks due to forest fires
  - Issuance of decisions for the implementation of the measure of the ban on vehicle traffic and excursionists in national forests, forests and suspicious areas on days and times that are considered dangerous, taking into account the peculiarities that prevail in their area of responsibility.
  - Ensuring the interconnection and cooperation of the Operations Centers of the operationally competent bodies at a central level.

## **5.12 Actions of increased preparedness in view of a threatened risk for the event of flood phenomena (Increased Preparedness - Phase 2)**

The increased preparedness of the involved bodies based on general risk assessment, as well as the Fire Risk Prediction Map, is mainly linked to the following actions:

- Taking measures of increased surveillance in forests and forest lands by the involved bodies that cooperate and support this action, in the context of the implementation of the operational planning for the early detection of forest fires.
- Implementation of the measure of the preventive ban on vehicle traffic and excursionists in national parks, forests and "vulnerable" areas, as determined in the relevant meetings of the Regional Coordinating Bodies (RCB) of the Regional Units, with responsibility of the competent Deputy Regional Governors.
- Informing the public, through press releases for the areas where the risk forecast is estimated from very high (category 4) to a state of alarm (category 5), aiming to avoid actions that may cause a fire by negligence .
- Taking measures to avoid causing a fire in areas of uncontrolled municipal waste deposition.
- Taking measures during the execution of military training shots, in accordance with the circular orders of Military.
- Informing farmers, breeders and beekeepers at local level about the very high risk of fire with relevant announcements issued to avoid acts of causing fire by negligence due to work in the countryside .
- Readiness of the personnel and means of the involved bodies in order to directly support the work of the Fire Brigade in suppressing forest fires.

- Preparedness of the personnel and means of the involved bodies (local authorities, etc.) for the immediate response to emergencies and management of forest fires.

As already mentioned, for the areas where a very high risk is predicted and it is estimated that the conditions expected to prevail in the next 24-hours are favorable for the occurrence of fires with extreme behavior, the PDR may request the policy bodies of protection involved in dealing with forest fires the taking of additional prevention and preparedness measures.

This action is deemed necessary when it is estimated that the preceding conditions (prolonged drought, high temperatures, etc.), as well as those expected to prevail in the coming days, are favorable for the occurrence of a large number of fires that may become large if they escape from the initial attack or to develop extreme behavior after their occurrence (risk categories 4 and 5) for a series of days, which requires special planning of personnel and means by the operationally involved agencies to take prevention and preparedness measures.

### **5.13 Actions of increased preparedness in view of a threatened risk for the event of flood phenomena (Increased Preparedness - Phase 3)**

In the context of the EMF in this phase of the Mobilization System of Civil Protection in which the manifestation of the phenomenon is assumed, the handling of risks due to forest fires by the operationally involved bodies, focuses primarily on:

- Actions concerning the support of the work of the Fire Brigade for the control and suppression of forest fire with the support of the other operationally involved civil protection bodies.
- Actions related to dealing with emergencies due to forest fires and the management of their consequences, as well as their immediate/short restoration, by civil protection agencies.

The control and suppression of forest fires is the responsibility of the Fire Brigade and it acts in accordance with the provisions of its operational plan. Fire Brigade may also be supported by other civil protection bodies. The assistance of the other operationally involved entities in the work of the Fire Brigade is carried out at the relevant request of the head officer of the suppression operations and is mainly focused on the following actions:

- Provision of water vehicles, construction machinery, etc. by other civil protection entities in support of the work of suppression by the
- Police taking traffic measures to facilitate the movement of firefighting vehicles and vehicles of other agencies.
- Preventive interruption of electricity supply for the safety of forest fire suppression personnel.
- Provision of military personnel and means to support the fire suppression.
- Sending ambulances to the scene of the fire, to deal with any health incidents.

The means of the organizations which are available for the control and suppression of forest fires (water tankers, machines, etc.), are included operationally under the Fire Brigade head officer of suppression operations, who has also the responsibility of utilizing them at the local level.

Dealing with emergencies and the immediate management of the consequences due to forest fires, by the operationally involved Agencies, focuses primarily on the following actions:

- Evacuation and rescue of citizens who are in contact with, or within the burning area and their personal safety is in immediate and continuous danger that requires the provision of assistance, as soon as possible, so that there are no casualties, is done by the Fire Brigade.
- Implementation of the measure of the organized evacuation of citizens as a measure of their preventive protection, which is launched in time (while the disaster is in progress) and under certain conditions and limitations, the assessment of which is done only at the local level. This

action is implemented under the responsibility of the competent Civil Protection Bodies (Mayor, Deputy Regional Governor, etc.).

- Taking protective measures by those responsible for the operation of Nursing Institutions, Children's Field Camps, Holy Monasteries, archaeological sites, hotel units, installations of the Armed Forces and Security Forces, etc., within forests, forest areas and in their vicinity, in accordance with their fire protection and evacuation plans in the event of an emergency.
- Taking traffic measures to avoid traffic congestion, both in the affected area and more broadly, diversion of traffic flow of other vehicles to avoid them being caught in the fire, as well as measures to facilitate citizens moving away from the affected area.
- Dealing with health incidents of citizens from their exposure to combustion products or from injuries during the development of the catastrophic phenomenon.
- Immediate provision of assistance to the affected (administrative care) under the responsibility of the responsible Mayors, with the support of other bodies (Region, Armed Forces, etc) when deemed necessary.
- Adoption of order and security measures by Police., in cooperation with the Fire Brigade, where this is required, to protect the life and property of citizens in the affected area.
- Immediate re-operation of power supply networks, etc., which have suffered damage or have stopped functioning due to the catastrophic phenomenon.
- Contribution of the Armed Forces with the provision of personnel, means, materials and supplies and their promotion to the affected areas to deal with emergencies.
- Informing the public about the occurrence of forest fires and the operations of suppressing.
- Informing the public about civil protection actions related to dealing with emergencies due to forest fires and providing instructions aimed at minimizing their consequences.
- Informing the public to take measures to protect their health due to forest fires, in accordance with the circulars or relevant instructions issued by the General Directorate of Public Health & Quality of Life of the Ministry of Health.

#### **5.14 Immediate relief actions for those affected and immediate/short recovery of the consequences of the disaster (Recovery / Relief – Phase 4)**

In this phase, further relief actions for the affected are launched, damage assessment is done and decisions are made for the immediate/short recovery of the disasters.

Within the framework of this EMF, in this phase of the Civil Protection Mobilization System, the following are dealt with:

- Administrative care of affected persons who have been removed from their place of residence or residence due to a documented risk from the development of the Forest Fire.
- Financial support for affected persons to cover their basic needs, replacement of household goods, etc.
- Demarcation of fire-affected areas - granting of housing assistance (carrying out autopsies and recording the damage to businesses and homes by the Region and the Municipality respectively).
- Provision of grants to industrial and craft units, shops, agricultural holdings, other businesses and non-profit organizations affected by forest fires.
- Registration and protection of burned forest areas by the locally competent forestry services.
- Registration and compensation of the damage to animal and plant capital caused by fires.
- Restoration of infrastructure and networks by the operation and maintenance bodies.
- Restoration of damage to the road network by the operation and maintenance bodies (Technical Works Departments, etc.).

## 6. Technological Accident Emergency Management Framework

### 6.1 Introduction

Major accidents involving dangerous chemicals pose a significant threat to humans and the environment. Furthermore such accidents cause huge economic losses and disrupt sustainable growth. However, the use of large amounts of dangerous chemicals is unavoidable in some industry sectors which are vital for a modern industrialized society. To minimize the associated risks, measures are necessary to prevent major accidents and to ensure appropriate preparedness and response should such accidents nevertheless happen.

In 2012 Seveso-III (Directive 2012/18/EU) was adopted taking into account, amongst others, the changes in the Union legislation on the classification of chemicals and increased rights for citizens to access information and justice.

The Directive applies to more than 12 000 industrial establishments in the European Union where dangerous substances are used or stored in large quantities, mainly in the chemical and petrochemical industry, as well as in fuel wholesale and storage (incl. LPG and LNG) sectors. It aims to control major accident hazards involving dangerous substances, especially chemicals and contributes to the technological disaster risk reduction effort.

Considering the very high rate of industrialization in the European Union the Seveso Directive has contributed to achieving a low frequency of major accidents. The Directive is widely considered as a benchmark for industrial accident policy and has been a role model for legislation in many countries world-wide.

### 6.2 Instructions for the activation and implementation of the Plan

- The EMF is activated and applied whenever an unexpected incident of leakage, fire and/or explosion occurs within a SEVESO facility, due to accidental factors during the operation of the facility and not in the context of its contractual operation. The EMF is automatically activated as soon as the relevant Fire Brigade is informed about the incident by any public or private body and not only by the operator (after confirming the call). In addition, it is pointed out that for the implementation of the EMF it is not necessary to declare one or more areas in a state of civil protection emergency.

Consequently, it is not a condition for the activation and implementation of the EMF that the issuance of a relevant decision declaring the area in a state of emergency or any other relevant decision by the Decentralized Civil Protection Bodies (Mayor, Regional Governor/competent Deputy Regional Governor etc.) after a proposal of the Coordinating Bodies of Civil Protection. With reference to the above, the operators have obligation of record any relevant accident or "almost accident".

- **The EMF is implemented in the event of an incident or a major accident within a lower level facility.** In addition, similar procedures are also.
- This plan is also activated and applied in the event of a major accident during the loading and unloading of tanker vehicles or trains within SEVESO facilities, while in cases of accidents or incidents during the road or rail transport of dangerous goods outside the facilities.
- This plan is also activated in the event that it is established or suspected that the occurrence of the event/major accident is the result of a terrorist act, but in which no chemical warfare agents are involved (substances used to cause death, serious injury or the weakening of groups of people

through their chemical properties, NATO, "Handbook on medical aspects of NBC defensive operations (1996)"), as they are foreseen in the Special Plan for the Management of CBRN Consequences, so that the need to activate the last Plan becomes imperative. The levels of preparedness, the specific actions of the agencies involved and the taking of additional preparedness measures are determined by their planning, as well as the more general risk assessment at the local level.

- The mobilization of the services of the Fire Brigade for the control and suppression of the incident is decided by the competent bodies of the Fire Brigade, according to its operational planning of. In operations to control and suppress incidents/accidents at SEVESO facilities, operations are coordinated by the competent bodies of the Fire Brigade, according to its operational plan.
- The mobilization of the other operationally involved entities for the provision of means to strengthen the work of repression is decided by their competent administrative bodies, following a relevant request of the Fire Brigade.
- It is also clarified that the agencies are governed by a special institutional framework and regulations, the mobilization and movement of forces in the context of their mission, is determined by their operational planning and the decisions of their physical leadership and is not linked to decisions to characterize an area in a civil protection emergency.
- This also applies to the health sector, which is mobilized to provide assistance based on its planning and regardless of the decisions to characterize a disaster or declare an area in a state of civil protection emergency.
- The coordination of the civil protection actions required to deal with emergencies and the immediate/short management of the consequences due to the occurrence of a major accident is done by the competent Civil Protection Organ depending on the escalation of the incident. It is pointed out that with the term "coordination" is about the organization and maintenance of cooperation between the various organic units of a service or an agency or an administration structure, as well as between agencies or services or other involved potential and means of civil protection, to ensure unified and synchronized action in prevention, preparedness, response and disaster recovery.
- The roles, responsibilities and main actions of the bodies involved in dealing with risks due to an incident or accident within a facility with dangerous substances are determined by its organizational structure, its institutional framework of operation and the regulatory acts of its administration.
- It is highlighted that the institutional framework is the basis for the implementation of a series of actions which may be differentiated in each incident, depending on the management requirements of the catastrophic phenomenon, by the involved bodies and is not restrictive in terms of the scope of these actions, either for the support of the task of suppressing the incident, which is the responsibility of the Fire Brigade, or for dealing with emergencies and the immediate/brief management of the consequences of the occurrence of such an incident.

## 6.3 Purpose

With the EMF, the immediate and coordinated response of the involved Agencies at all levels of Administration (central, regional, local) is sought:

- To support the work of the Fire Brigade in the suppression of incidents/major accidents in facilities falling under the provisions of KYA 172058/2016 (SEVESO facilities).
- For the effective response to emergencies and the immediate/short management of the consequences due to a major accident (TAME).

These actions aim to the protection of the life, health and property of citizens, as well as the protection of the natural environment, wealth-producing sources and infrastructure of the country.

Condition to achieve this goal is the synergy, cooperation and interoperability of the involved Agencies at all levels of Administration.

## 6.4 Objective Objectives

- Defining roles and responsibilities of all involved Agencies at each level of Administration (central, regional, local) in all phases of mobilization of the Civil Protection system.
- Coordinated action of all civil protection agencies involved, based on their institutional framework, to support the work of suppressing incidents/major accidents which is the responsibility of the Fire Brigade.
- Coordinated action of all civil protection agencies involved, based on their institutional framework, to deal with emergencies and the immediate/short-term management of the consequences due to an event, with the ultimate goal of restoring the daily operation of areas that have fallen into a state of emergency.

## 6.5 Risk Analysis

The risk analysis of SEVESO facilities is designed with all the points of interest captured through coordinates and specifically:

- All points with a high concentration of population, such as military installations, other installations that may or may not fall within the scope of KYA 172058/2016, churches, etc.
- The meeting places of vulnerable sections of the population such as schools, hospitals, camps and
- The settlements where

They are:

- For the higher level installations, within a radius equal to that of zone III-Protection Population for the worst case scenario and
- For lower tier facilities, within a radius of 1km from the center of of the facility.

Particularly and with regard to populated areas, the coordinates of the closest to the populated area SEVESO should be recorded.

## 6.6 Concept of Operations

In any incident involving dangerous substances, the demarcation of the protection zones of the incident by the Head Officer at the scene is a prerequisite.

It is pointed out that throughout the development of the incident, the determination of the protection zones is periodically reviewed by the Head Officer at the scene of the incident, after cooperation with the security technician of the facility, and is adjusted according to the prevailing meteorological conditions

It is pointed out that no operator enters zones I, II or III if he does not have the authority, if he does not have the appropriate protective equipment and training and if his safety is not guaranteed by the competent Head Officer of the Fire Brigade at the incident, which also has the coordination.

## 6.7 Memoranda of Actions

Memoranda of Actions are considered as a necessity to be designed by Regions and Municipalities, within the area of responsibility of which there are higher-level SEVESO facilities, under the responsibility of the all involved Ministries and Agencies within the framework of the EMF. In these memoranda, the actions required to be launched by the above bodies in the event of an accident should be described.

The action memorandum is a simple document of a non-confidential nature in which, at the level of Municipality and Region, giving answers to five critical questions (who, what, when, where, why).

In this context, the following should be described in the memorandum of actions:

- Nominal status of those in charge for the implementation of Civil Protection actions at the level of Municipality and Region, related to risk management and the immediate/short-term management of the consequences of a Large-Scale Technological Accident, as well as their deputies, with contact information them (name, title, position, capacity / specialty, telephone numbers, fax numbers),
- List of the operational means directly available to the organization (Municipality, Region) for the implementation of Civil Protection actions (project machinery, extinguishing materials, personnel transport vehicles, collaborating laboratories, etc.) related to risk management and the immediate/short-term management.

Memoranda of actions concerning the immediate mobilization to deal with emergencies and the management of the consequences of an event should also be drawn up by the other organic units of the Municipalities and Regions involved in civil protection actions.

Finally, action memoranda should also be drawn up by all those responsible for the operation of infrastructures that are points of interest that are threatened in the event of an accident (e.g. public transport service providers, water and power supply operators, operators of road networks, managers of schools, hospitals, etc.).

## 6.8 Operational Actions

The announcement (initial notification) of the incident is made by the operator of the facility. In the absence of an operator (company under bankruptcy, abandoned facility, etc.), the call is made by anyone who detects an incident.

The Fire Brigade immediately informs the PDR which immediately the Municipality and the Region.

The person in charge of the facility must obtain full access to the Fire Brigade, while immediately implementing the internal emergency plan of the facility.

The Fire Brigade has the responsibility and operational planning of the suppression of incidents/major accidents and the provision of assistance for the rescue of persons and the protection of civilian life under threat. In this context, the competent Fire Brigade is launching the following actions:

- Sets, after collaboration with the security technician of the facility, the protection zones of the repression groups and the population.
- Cooperates with the security technician of the facility and assesses the incident according to its immediate indications (its intensity and extent, existence of injured/dead, etc.), the points of interest contained within the population protection zones, the prevailing and predicted meteorological conditions, as well as the imminent consequences of the possible development of the incident, and proceeds to classify it as an "incident" or a "major accident". In addition and if there are no measurements of escaping gaseous pollutants, etc., for the assessment of the incident, the Head Officer at the scene of the incident may request through the PDR and of the Municipality or Region the mobilization of the agencies and means that have the authority to carry out sampling and measurements in soil, air and/or waters.
- If necessary, it intervenes accordingly with the instructions and actions to deal with an incident involving hazardous materials.

In the event that there is no security technician in the facility (e.g. case of an incident in a non-operational facility with dangerous materials left inside it and/or unlocked equipment, etc.), then the Head Officer at the scene of the incident, assesses the incident and delimits the area based on what is provided by the operational planning of the Fire Brigade. For a higher level facility, the Head Officer at the point of the incident, it also uses the information contained in the facility's Special EMS, if it exists.

The bodies that, based on the institutional framework, are required to contribute to the suppression, which is responsibility of the Fire Brigade (Regions, Municipalities, Police, etc.) participate under the orders of the Fire Brigade Head Officer of operation, and accordingly scale up the use of their own resources (human resources and means).

It is understood that nobody enters zones I, II or III if he does not have the authority, if he does not have the appropriate protective equipment and training and if his safety is not guaranteed by the competent Head Officer in the incident.



## 6.9 Supportive Actions

The support of the operations of the Fire Brigade for the control and suppression of the incident is mainly focused on the following actions:

- The Municipality, as well as neighboring Municipalities and/or the concerned Region may contribute to the operation, by providing work machinery, tankers, pumps, water trucks, absorbent materials, etc., at the relevant request of the Head Officer at the scene of the incident.
- In the event that any dangerous liquids escape the limits of the facility and pollute the adjacent road network, the operator of the facility must take care and potentially assist to the maintenance of the road network.
- The Police/Port Authorities, take traffic measures to facilitate the movement of firefighting vehicles and the vehicles of other bodies involved in the suppression.
- The Power Supplier may proceed with a preventive interruption of the electricity supply for the safety of the personnel operating at the incident, after relevant request by the Head Officer.
- Ambulances and mobile units may be sent to the scene of the incident, to deal with health incidents of the operating personnel.

## 6.10 Escalation of Operation

The coordination of the routing of the actions between the involved agencies to deal with emergencies and the immediate/short management of the consequences due to the incident, is done by the competent Civil Protection Body [Mayor, Regional Governor/competent Deputy Regional Governor, Secretary General of Civil Protection, Coordinator of Decentralized Administration (if assigned a role by the General Secretary of Civil Protection)], depending on the escalation of the incident.

The level of escalation and mobilization of the personnel and means involved may be modified when this is required based on the evaluation of the latest data concerning the consequences of the catastrophic phenomenon. Escalation criteria are considered:

- The inability to deal with the disaster from the lower administrative level due to insufficient available resources.
- The extent of the disaster.
- The extent of loss or damage (intensity of the disaster).

It is clarified that the escalation of the mobilization of each body should not be confused with the more general escalation of the mobilization of the entire Civil Protection Mechanism and it is possible to take place at a different time.

## 6.11 End of Operation

Once the incident is suppressed and the actions to restore daily life to the previous state - e.g. environmental clean-up of the area, removal of temporary markings, resumption of traffic, etc., is done, it is considered that the incident has ended and a full de-escalation of the available means and potential is carried out to suppress the incident.

The order for the end of the incident is given by the agency which has undertaken the coordination of the allocation of resources.

At this point it is pointed out that the end of the incident presupposes that the delimitation of the protection zones (I, II and III) in the area of the incident will no longer apply and therefore, which happens when the following conditions are met:

- Complete suppression of the incident,
- There is no risk to the health and safety of citizens due to e.g. of emitted toxic pollutants, etc. and
- all short-term consolidation-rehabilitation actions have been completed of the place of the incident

After the suppression of the incident and the complete sanitation-rehabilitation of the area, the danger is removed in terms of the consequences to the life, health and property of citizens, the material and cultural goods and the wealth-producing sources and infrastructure of the country of a fire, explosion and/or dispersion of toxic substances, without this implying that the actions of carrying out sampling and measurements, informing the population, repairing damage to public utility networks have ended.

Furthermore, to bring an end to the incident it is not a prerequisite that the facility in which the incident took place has returned to its normal operation, unless it is an infrastructure with decisive contribution to the economic, social and political situation of the region or the wider region or the country.

The de-escalation of the involved entities that have undertaken actions to support the work of repression, for which the Fire Brigade is responsible, is made after a relevant decision of the Head Officer of the Fire Brigade, who acts as the coordinator in the area of the incident, while the emergency services and other external agencies that may have assisted leave the scene of the incident.

In addition, every agency involved in civil protection actions is responsible for the de-escalation of its human resources and means available or activated.

After the end of the incident and if a case file is filed, a preliminary investigation is carried out, which is assigned, for the cases of fires or explosions as a result of fires (e.g. BLEVE type explosions, cloud gas explosions (VCE) etc.) to the competent Fire Brigade.

In addition, in the case of incident, the licensing authority coordinates the relevant authorities, within the framework of their competences:

- To collect, through inspections, surveys or otherwise, the information necessary to fully analyze the technical, organizational and management aspects of the accident.
- To take the appropriate actions to ensure it that the operator has taken the required remedial measures.
- To formulate recommendations for future preventive measures.

## 7. Final remarks and next steps

The identified and presented EMFs can serve as an approved and mutually agreed “starting point” for emergency operational strategies in terms of actors implementation in each incident.

This deliverable proposes ‘a general view’ of activities to assess the impact of the project on its target communities. This was only possible by close and successful collaboration with all project partners.

## 8. ANNEX 1: EPAYPS’ at North Macedonia – TTXs and Presentations

