

# Advancing Disaster Resilience through Targeted Training: An Interdisciplinary Approach to Developing and Educating Safety and Security Personnel

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**Abstract:-** Responding to the continuing growth of protection complexity and/or private sector issues pertaining to safety and security, continuous training revisions are mandatory. The SETOFF project deals with this need, enhancing the preparedness of the targeted personnel through this particular e-training program. The SETOFF project employs a comprehensive needs analysis, and focuses on the treatment of specific skill gaps so as to create an e-training procedure, transversally designed, and specially oriented to all safety and security personnel involved in natural disaster management. The present study reveals critical aspects of personnel's skills inadequacies and false assessment of the triggering primary causes. Training expectations usually diverge from the actual needs due to inappropriate/misleading analysis of natural and man-made disasters, inefficient assessment of the evolving dynamics, deficit with respect to training tactics, and limited access to actual disaster management drills. The particular transversal approach pursues that training content is adaptive and comprehensive, effectively dealing with issues of varying conditions which Safety and Security personnel are expected to encounter with success, maintaining at the same time the cohesive framework of the SETOFF Project. The findings of the present study/research are expected to provide valuable guidance for policymakers, researchers, and practitioners, establishing a sustainable and resilient operating frame in natural disaster training for the future.

**Key-Words:** - Environmental emergencies, natural disasters, resilience, training, needs analysis, Civil Protection Personnel.

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## 1 Introduction

The responsibilities of those involved in Safety and Security within Civil Protection and the private sector have evolved significantly. This evolution demands continuous improvements in training methodologies and content to keep up with the changing landscape. The SETOFF Project (Smart Education and Training Program For central and local Government servants: Embrace vulnerability as our greatest strength and innovative tools For risk

management title, No 2021-1-EL-KA220-VET-000033026) aims to boost disaster prevention, preparation, and response systems enhancing preparedness and occupational safety for civil protection personnel, as well as individuals in public and private sectors responsible for Safety and Security during crises and national disasters. The project plans to create an innovative e-training program based on a proven simulation model and the latest scientific knowledge. This program addresses specific skill gaps identified through extensive

analyses across partner countries. Various cases/findings stress the need for such initiatives. They point out deficiencies and limitations in understanding the nature and mechanisms of natural and man-made disasters, inefficient assessment of the evolving dynamics, deficit with respect to training tactics, and limited access to actual disaster management drills. Therefore, an in-depth training needs analysis was conducted across partner countries during the project's initial phase. The goal is to understand participants' profiles, task requirements, and areas for skill development and improvement. Despite the fact that SETOFF Project encompasses a comprehensive needs analysis across the four partner countries, the present paper zeroes on Greece, enlightens the trainees, researchers, policymakers, first responders, end-users, etc., on the unique demanding conditions, and «grey» areas within Safety and Security resilience (flexibility).

Focusing firmly on Greece's demands and case studies offers a vital component, forming the structure of the SETOFF e-training program. By inspecting the specific differences either of minor or major importance within Greece's civil protection landscape, the present paper aims to stress the importance of fitting the e-training content within the above-mentioned unique requirements. The findings of the work outlined in this paper reveal valuable insights into Greece's particular training demands and additionally play a pivotal role in developing a transversal training program that considers diverse needs across partner countries allowing at the same time an adaptive training for various categories of personnel involved in Safety and Security operations according to their profile and demands.

The insights derived from the analysis pertained to Greece's case provide a detailed canvas of the country's distinct challenges and also serve as a guiding compass in developing an e-training program that includes and addresses specialized needs. The transversal approach seeks to provide adaptive and comprehensive training content that effectively addresses the diverse needs of Safety and Security personnel and at the same time maintains a cohesive framework that aligns with the overall goals of the SETOFF Project.

## 2 Problem Formulation

Man-made or natural disasters can cause severe damage to individuals, communities, economies,

supply chains, and the environment. Moreover, they may trigger secondary disasters, aggravating initial impacts. Such type incidents in the previous decades, clearly illustrate the urgent need to tackle these hazards within the overall frame of inclusive disaster risk management. Furthermore, the cost of disasters worldwide has risen from previous years and continues to grow due to increasing disaster risk as a result of factors such as climate crisis, rapid urbanization, and industrialization. SETOFF Project will contribute to improving the management of these risks and strengthening resilience. The objective of this effort is to offer a targeted set of both scientific and practical activities for implementation at national and local levels contribution and to support training and capacity building and to raise awareness of the risks and impacts of man-made and natural disasters. Civil Protection Personnel face important challenges due to the complexity and incidents' increased demands, while private sector Safety and Security Personnel face relatively same challenges in protecting the indoor estate. Under these circumstances, both Civil Protection and private sector personnel need to be able to evaluate critical issues under complex conditions and make quick and reasonable judgments based on sound scientific knowledge and former experience in order to reduce possibly occurring errors. Therefore, it is important to provide more and diverse training and seek new and improved ways to train target groups that optimize the actual task performance, while minimizing physical danger and financial cost.

The overarching goals of the SETOFF Project include a sophisticated approach to enhance preparedness and actionability when conducting Safety and Security operations. These goals aim to provide private sector and civil protection personnel with top-class training to support readiness for crises and disasters. In order to achieve goals an exhaustive strategy was developed comprising several key components. Above all the project seeks to identify existing gaps concerning both knowledge and performance based on meticulous needs assessments. The aforementioned assessments were conducted in Greece, the Republic of Northern Macedonia, Belgium, and Spain. The assessments are mandatory for pinpointing the deficiencies in current practices. Based on the insights obtained from the assessments, the project aimed to develop a unified e-training curriculum. This curriculum is formed by the findings of simulation exercises and it is designed to

specifically address the identified knowledge and relevant performance gaps. The curriculum is accessible via an e-platform so as to be rendered available on portable devices encouraging a community of learners to enhance skills in Safety and Security management. In addition, the project imposed a significant emphasis (emphasized) on collaboration and resource optimization.

To facilitate trainees' needs, the SETOFF project aims to flexible training in a familiar and reliable environment, without needing excessive resources. Therefore, the e-platform was based on Google's Moodle platform. No extra security, bandwidth, or reliability issues were assessed as critical to devote further resources. SETOFF project aims to advance the training of a wide range of first responders from various countries. It does not aim to exchange critical information in real-time in remote or disaster-prone areas. Therefore, its resources were focused on identifying the training needs and developing competent material, rather than on high-end technologies in telecommunications.

Therefore, the mainstream platform (Google's Moodle) was used. Issues of bandwidth and reliability were tested in the pilot application without any important findings. Regarding the security measures taken for personal information, the platform uses https protocol, which is used for secure and encrypted communication. The use of Wireless networks, especially public ones, is always a security factor that can lead to information leaks (personal and/or company data), which is beyond the control of the project and the responsibility lies with the institutions applying the training. Being security-critical organizations, they are all aware of these issues and have certain policies.

The knowledge base (fundamental knowledge) is enriched through the creation and improvement of simulation scenarios developed by professionals from different countries. Moreover, resource availability problems and challenges were compensated by sharing existing installations, and on-site and distance learning approaches. A crucial aspect of the project's strategy involved the utilization and further mainstreaming of successfully developed training models. Maximizing the benefits of these models the project aimed to validate field-acquired practices and thus support professionals with respect to their endeavors. In alignment with these overarching objectives, an in-depth assessment and analysis of training needs were meticulously conducted.

This assessment was used as a fundamental element in forming the subsequent training program, ensuring that it was fit to address the specific requirements and challenges identified across the participating countries and sectors involved in Safety and Security operations. The exhaustive analysis includes three phases, involving quantitative data collection, literature review, and detailed qualitative analysis. Target audience analysis was also undertaken to align educational material with individual learner requirements.

## **2.1 Needs Analysis Conduct**

To this purpose, a training needs analysis was performed during the first six months of the project, in three phases, the first targeting quantitative data coupled with literature research and review, and the third using qualitative data that finetuned particular aspects of the findings. A target audience and data collection analysis has also been conducted, since the design and delivery of educational material would be influenced by key characteristics of the learners and their individual requirements, among others, the identification and classification of the training content.

### **2.1.1 Literature Review**

The bibliographic research was carried out by setting the research questions related to the thematic areas and modules that should be included in the training program, the content of each module, the particularities to take into account in order to cover the various training needs, such as different beneficiaries in terms of skills, knowledge, operational input, etc., distance learning methodology parameters and official recognition through the European Credit System for Vocational Education and Training (ECVET system).

Priority was given to the study of research reports from European and international organizations such as the European Union (EU), United Nations (UN), International Labour Organization (ILO), World Health Organization (WHO), European Agency for Health and Safety at Work (EuOSHA), as well as relevant reports from the relevant authorities of America, Australia, etc.

Scientific databases such as Scopus were searched to find articles published after 2012 in scientific journals and conference proceedings. Also, research was carried out on websites of European, international, and national organizations that contain

information for training programs in the field of civil protection.

Natural and man-made disasters can have very serious effects on the lives and health of citizens, the economy, and the environment. Today's hazards such as biological, environmental, geological, hydro-meteorological, and technological processes and phenomena (as mentioned in the Sendai Framework for Disaster Risk Reduction 2015-2030) pose a major threat to humans and the environment, [1]. New risks should be also taken into consideration such as war and threats created by new technologies (e.g. CBRN, cyber, hybrid), [2]. New difficulties due to the use of new equipment are also mentioned in the literature (e.g. difficulties in extinguishing fires in electric vehicles due to lithium batteries), especially if we take into account the interactions between risk factors has been emphasized by introducing the concept of "multi-hazard".

In relation to strengthening resilience against natural and technological disasters and other threats, the need to invest in systems and infrastructures clearly emerges.

The importance of training for civil protection personnel and first responders for disaster risk reduction in relation to natural or man-made origin disasters is underlined by a number of studies and reports, [3], [4], [5]. However, the weaknesses that still exist at the level of training and the large differences between countries are pointed out [4], [6], [7], [8].

In the event of major emergencies, the European Civil Protection Mechanism was established in 2001 to aid in the mobilization of emergency assistance from Participating States, [9]. In order to improve disaster response, preparedness, and prevention by enhancing the expertise of the experts involved and ensuring compatibility and complementarity between intervention teams and other intervention support, a training program has been established for civil protection and emergency management personnel.

A key aspect that emerged from the qualitative field research in our project is the need to train those involved in civil protection on issues related to the protection of their health and safety, and in particular on aspects related to occupational risk assessment, personal protective equipment, medical examinations for health protection, etc. This is a very important issue as those involved in civil protection face serious risks to their health and safety leading to accidents and occupational diseases.

For the integrated construction of the training program that takes into account the particularities of each country and its special needs, research was carried out in bibliographic sources on civil protection priorities and on relevant training programs and awareness-raising actions in the 4 countries participating in the project (Greece, Belgium, Spain, North Macedonia).

Especially in Greece, due to past disasters, special emphasis is placed on wildfires (e.g. Peloponnese in 2007, Mati in Attica region in 2018, Evia in 2021), floods (e.g. central and Evros region in 2015, Mandra region of Attica in 2017) and earthquakes, given that there have been several catastrophic earthquakes in the past.

### **2.1.2 Needs Assessment - Quantitative Phase**

The quantitative phase collected and recorded data via an online survey, obtaining relevant responses from 511 participants across the participant countries. Subsequent qualitative research is oriented to explore critical factors impacting disaster management, including service protocols, personnel characteristics, and diverse disaster environments. The quantitative phase involved in-depth Focus Group interviews in each country, engaging 45 participants in 8 sessions (2 per country, representing public and private sectors). Additionally, a thorough examination of best practices applied to the EU and other countries investigated the impact of training simulations on effectiveness and adaptability concerning disaster situations. The generated robust datasets guided the design of training modules, both in content and methodology.

In order to conduct a field study investigating the training needs, an anonymous online instrument was established, taking into account the objectives of the SETOFF project, the results of the qualitative field research carried out through interviews with stakeholders, and the research tools mentioned in the literature, [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20].

The instrument was initially in English, then it was translated by native speakers into four languages (Greek, Spanish, French, and North Macedonian), and then again it was translated into English to achieve its validation per language. The outcomes we recollected online in Greece, Belgium, Spain, and North Macedonia from June to August 2022. Recipients of the instruments were employees in various services and organizations related to civil

protection, such as Civil protection organizations (municipality, regional unity, central government), Fire service, Police, Emergency medical service, Coast guard, Security service, as well as individuals with Safety Engineer duties, trainers in training programs, civil protection experts, volunteers, etc. The instrument was distributed to more than 100 recipients per participating country using a snowball sampling method [21] due to convenience. Thus, the data collected constitute a quasi-sample mainly representing a random sample in time and not a representative sample to achieve generalization of the outcomes. The response rate varied greatly by country. To use the research tool, all the terms related to the protection of personal data complied with the legislation. Statistical tests were performed on the "sample". The confidence level was  $\alpha=0.05$ .

The quantitative training needs study was carried out based on the following pivotal axes:

Firstly, the survey seeks insights on the thematic modules vital for inclusion in the training program and the specific content necessary within each module to adequately fulfill fundamental training needs. Additionally, it explores the optimal duration for each training module, aiming to strike a balance between depth of learning and practicality.

Moreover, the survey examines the necessary particularities for customizing the program to meet diverse training needs and in the end to take into account the differences among end users and the variations of the specific requirements bound to each country. In accordance with modern evolving educational methodologies, the survey pursues the identification of the most suitable methods, tools, and best practices for distance learning. Simultaneously, the survey examines the primary challenges pertaining to distance learning implementation and strategies to overcome these obstacles effectively. Lastly, the survey deals with the crucial issue of certification. It examines various methods to ensure validation and certification of the obtained knowledge providing evidence about the skills gained through the training program.

### **2.1.3 Needs Assessment - Qualitative Phase**

Moreover, aiming for a better investigation of the needs, qualitative research was conducted by interviewing the potential beneficiaries of the project in the 4 countries. Particularly, in each country, 2 Focus Groups were created, based on the division between private sector and public sector employees.

The aim was to use a participatory-based approach to investigate and describe the needs of target groups (first focus group), as well as online learning best practices, barriers, and recommendations to overcome them (second focus group). Participants included relevant stakeholders and academic faculty from the participating institutions.

A tailored Focus Group Guide was created to facilitate data collection, aspiring to help understand the critical factors that affect disaster management such as service organization and procedures, personnel characteristics (skills, experience, demographics, etc.), as well as disaster environments (different type, complexity, etc.).

The interviews were conducted according to the following principles:

#### **A. Voluntary Participation**

Individuals agreed to participate in the research of their own free will. It was essential for participants to understand that their participation was voluntary and that there would be no consequences for refusing to take part in the study or to answer specific questions. Researchers explained the nature of the study openly and honestly and in a way that was understandable to the participants. The researchers ensured that the participants understood the nature of the research, its purposes, the potential risks and benefits to the participation, and the fact that they could withdraw from participation at any time. It was made sure that there was adequate time to answer any questions that an individual might have before and during the focus group.

#### **B. Confidentiality**

Researchers agreed to keep any personal information that has been revealed to them confidential. This means that no specific contents were shared with anyone except another researcher on the project, nor any that would allow another researcher or outsider to know who participated in the study. Researchers clearly explained how confidentiality would be protected. No information would be publicly reported that would identify them as a participant in the study.

#### **C. Respect for People's Rights, Dignity, and Diversity**

It has been made sure that researchers and their work respected the rights, dignity, and worth of all people, without any discrimination based on gender, religion, or culture. Through the focus group interviews, researchers were respectful of the rights of others to hold values, attitudes, and opinions that differed from their own.

### 3 Needs Analysis Results – Focus on Greece

The survey included participants mostly in their late 40s, with a slightly higher percentage representation of males. There was a significant participation of individuals with advanced educational profiles and remarkable experience, particularly from the public sector. The distribution of participants with degrees pertained to civil protection was relatively balanced, providing diverse perspectives with the survey data. Table 1 shows the summary statistics of the demographics.

Table 1. Demographic information about Greece’s participants (n=347)

Demographics	Percentage
Gender	
Female	40.7%
Male	59.3%
Educational level	
Master's Degree	53.6%
PhD	3.8%
Working position	
Permanent in the Public Sector	50.3%
Contract in Public Sector	7.5%
Self-Employed	20.3%
Private Sector Employment	12.5%
Work experience	
Over 10 Years	51.9%
5-10 Years	19.2%
Relevant University Degree	
Yes	44.2%
No	47.3%

The increased representation of women in roles related to civil protection denotes a welcoming and more inclusive environment promoting gender equality as well as bringing to light diverse perspectives, skills, and expertise to the sector. The observed gender distribution in the civil protection sector, compared to a higher representation of males historically, reflects a positive shift towards greater inclusivity and diversity. The increased percentage of women represented in the survey indicates that the civil protection working environment tends towards more inclusive working practices, promoting gender equality and welcoming new, diverse perspectives, skills, and expertise. Compared to the historical male dominance in the sector, the current increase in female participation, here denoted by 40.7% of the

participants, anticipates an even greater diversity and inclusivity.

The high educational qualifications that emerge from the survey suggest a trend among the participants, that can be linked to an important engagement in e-training programs within their respective centers of interest (Figure 1). Their academic credentials result in important skills and competences relating to the need for training to the use of digital resources. The high educational background suggests that these individuals not only reveal skills of adaptability and comfort in using and interacting with digital resources and content present in e-training educational materials but also indicate a significant ease in navigating through autonomous learning environments and successfully achieving the courses.

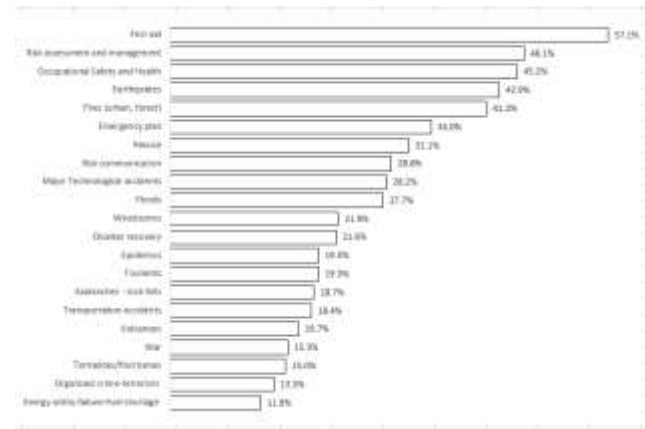


Fig. 1: Formerly attended training programs

Another element that the survey revealed refers to the number of public sector employees with significant -over a decade- work experience, who are still eager to participate in training programs. The stated keenness resonates with a dedication to the civil protection principles and commitment to lifelong learning, especially in a sector that is subject to continuous updating in terms of skills, materials, techniques, and above all, readiness and preparedness. Moreover, the fact that even seasoned professionals affirm their zeal for continuous education, speaks highly of their dedication to service.

The Greek participants focus on training areas "First aid," "Risk assessment and management," "Occupational health and safety," "Earthquakes," "Fires," and "Emergency plans", a trend that is fully aligned with the challenges the country faces in terms

of manmade or natural disasters and consequently reflect the main areas that training should address in order to provide continuous skill development that will strengthen preparedness and resilience. Meeting and responding to the constantly changing needs in the field of disaster management training is one of the core goals of the SETOFF Project. The interdisciplinary approach adopted while creating the e-training resulted in the creation of adaptable, inclusive, personalized training paths that aspire to address the identified gaps in previous training. Thus, the comprehensive training framework established not only addresses the diverse needs of Safety and Security personnel but also reinforces the country’s preparedness and resilience against a wide range of natural disasters.

The survey also reveals low percentages of ECVET credits acquisition across various training areas, despite the extended offer in training initiatives. This deficit reflects the lack of implementing VET policy within civil protection training initiatives (Table 2). The SETOFF training recognizes this need and aims to provide a horizontal, customized training experience tailored to various trainee needs and profiles. Accrediting recognition of their efforts to keep pace with the everchanging needs and challenges of disaster management reflects the importance of lifelong learning and validates the perseverance of the personnel.

Table 2. Training Participation and ECVET Reception Among Participants (N = 347)

Training Areas	Yes (%)	ECVET (%)
Risk Assessment/Management	45.5	3.7
Risk Communication	27.9	1.7
Emergency Planning	33.2	2.3
First Aid	56.2	2.9
Rescue	30.2	1.4
Fires	40.3	2.9
Earthquakes	42.3	2.3
Storms	19.9	2.9
Floods	25.6	2.3
Pandemics	19.3	1.2
Technological Accidents	26.5	2.3
Health and Safety	45.8	2.0

This approach facilitates trainees in acknowledging and validating their acquired knowledge, skills, and competencies in civil

protection within the established ECVET framework. The certification offered by the SETOFF training program enables trainees to gain formal recognition, enhancing their mobility across borders, fostering professional growth, and contributing to the standardization and acknowledgment of training within the civil protection field.

The survey participants reported the degree of their skills in a list of tasks according to a Likert scale of 1: No skill to 4: Fully skilled – no/very little improvement required and 5 was reported as it is not applicable to my job.

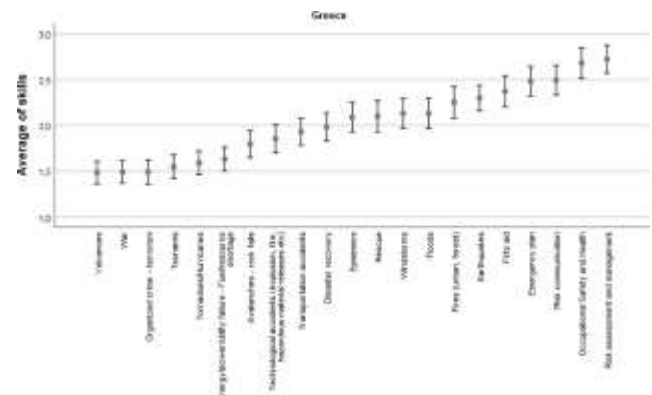


Fig. 2: Degree of skills in relation to tasks

The highest skills degree was reported for “risk assessment and management” and “occupational safety and health” followed by “risk communication” and “emergency plan”. Fires and earthquakes constitute a popular educational topic among the participants from Greece (Figure 2).

The preferences regarding the ideal duration of training courses across various areas within the civil protection domain reflect the perceived importance and complexity of each topic. The participants chose the optimal duration from 1 to more than three hours of attendance. There appears to be an important inclination toward longer-duration courses in crucial areas such as emergency planning, risk assessment, occupational safety and health rescue, disaster recovery, and first aid. A considerable percentage of respondents indicate the desire for in-depth training (more than 3 hours), emphasizing the comprehensive understanding required in these critical domains. This inclination aligns with the areas where a larger number of individuals have undergone training, highlighting a potential correlation between perceived importance and prior training experiences (Figure 3).

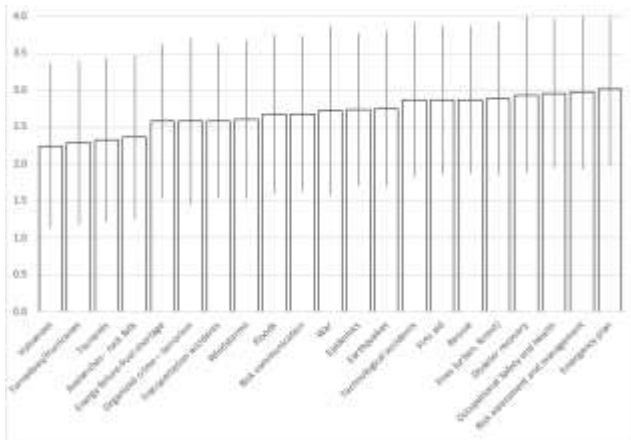


Fig. 3: Optimal duration of an online training program

Correlation has been performed and has been tested for its significance. In order to investigate the association of duration reported due to skills and attendance. Thus, conversely, for subjects like risk communication, earthquakes, floods, and storms, while there's a preference for longer courses, a significant proportion also indicates the suitability of shorter-duration training sessions. The variation might reflect the diverse nature of these topics and differing levels of prior training experiences among respondents. As a matter of fact, there is a negative correlation among duration and attendance ( $r=-0.557$ ,  $p<0.001$ ) as well as among duration and prior skills ( $r=-0.548$ ,  $p<0.01$ ).

These data present a dual focus: the importance of providing extensive training in fundamental areas where participants demand a desire for longer courses, and the need for adaptive training formats for subjects where participants demonstrate mixed preferences with respect to training duration. Such perceptions stress the significance of tailoring training programs to accommodate varying preferences while ensuring comprehensive coverage of critical topics within civil protection.

In the course of the focus group interviews conducted, several crucial areas were investigated, shedding light on crucial issues relevant to disaster management and resilience training. The Focus Group Interviews provided a structured framework of five key area questions that allowed us to collect insights from the participants and thus facilitate profound understanding:

**Key Area Question 1 - Current Work Status and Training Background:** Participants were encouraged

to describe their current professional profile in relation to their former studies or training. The aim of this key area question was to confirm the results of the survey regarding the relevance and applicability of their educational background to their current status and responsibilities in terms of health, protection, and safety in the work environment.

**Key Area Question 2 - Experiences:** Participants were asked to share experiences that were successful and others that were challenging and focus on the significant role of training, or lack of it, in the outcomes of these experiences. The aim of this key area of questions was to link the statements to the survey results and confirm the importance of providing tailored made and individualized learning paths through the e-training.

**Key Area Question 3 - Curriculum Content Preferences:** The list of thematic areas related to disaster risk and resilience training that was presented in the survey was given to the focus Group participants. They were then asked to prioritize these areas on the basis of their perceived needs for further delving. The aim of the key area question 3 was to validate the training priorities that emerged from the survey and possibly incorporate accompanying elements, as well as to understand the stated preferences in regard to the allocated duration of each thematic area.

**Key Area Question 4 - Tabletop Exercises (TTex) and Simulations:** Participants were provided a list of additional tabletop exercises and simulations and were asked to further one of them. Additionally, they were invited to propose specific scenarios based on their experiences and needs. The aim of this key area question was to retrieve participants' input and thus contribute to the design and the improvement of training simulations offered throughout the e-training.

**Key Area Question 5 - Platform Contents:** Participants were invited to suggest two specific contents they wished to see included in the tools section of the e-training platform. This question aimed to identify and gather suggestions for the desired supplementary resources or materials that would be incorporated, as a collective effort and would improve the learning experience and outcome of the training, such as regulations, links to guidelines, international directives, or other pertinent tools.



Table 3. Focus Groups interviews insights

Key Areas	Public Sector Participants	Private Sector Participants
Participant Demographics	9 males and 2 females, average age of 48, roles in civil protection and administrative departments	2 males and 2 females, average age of 50, roles in safety, disaster management, security, and voluntary work
Experiences & Training	Successful experience in handling weather events, blackouts, floods, and forest fires. Lacked training in unsuccessful snowfall management.	Managed forest fires, and utilized fire protection systems effectively. Lacked training in incidents involving electrocution during flooding.
Course Preferences Content	A strong penchant for risk-related areas: risk communication, management processes, perception, weather, industrial accidents, and first responders' health and safety. Emphasis on role identification in incidents.	Emphasized comprehensive training in risk areas: introduction, management processes, perception, communication, health and safety, industrial accidents, fire, security, weather, and epidemics.
Thematic Preferences Area for Simulations	Desired simulations focused on risk communication, volcanos, industrial accidents, fire, and weather phenomena. Emphasized multi-hazard scenarios' importance.	Echoed preferences for simulations in risk areas, including introduction, management processes, perception, communication, health and safety, industrial accidents, fire, security, weather, and epidemics.
Platform Content Requests	Requested exercise videos, a repository of good practices, predictive models, regulations/guidelines, and distance learning tools.	Desired training content on industrial accidents, occupational health and safety, flood management, and prevention strategies.
Other Insights	Underlined challenging points such as understaffing, lack of training, and ineffective emergency mechanisms. Stressed the need for additional resources like drivers, weather stations, and voluntary sector involvement.	Shared experiences of effectively managing forest fires and employing fire protection systems. Highlighted the need for training in handling electrocution incidents during flooding.

Providing a structured approach to the Focus Group Interviews through these 5 key areas allowed a detailed exploration of the participants' experiences, preferences, and requirements concerning disaster,

risk, and resilience, as well as to investigate their experiences, preferences, and needs in regards to training in these areas.

Table 3 presents the key insights that were gathered from participants belonging in the two sectors (public and private). It gives specific information in a comparative perspective about the demographics, the experiences and training needs of the participants, as well as their preferences when it comes to simulation or the desired project platform contents, and any additional perceptions the participants related to challenges and resource requirements.

Participants from both private and public sectors pointed out how important inclusive training can be as it can correspond to various risk areas, as well as it can cover effective communication strategies throughout emergency cases. Participants highlighted the understaffing and lack of training among other challenges, and concluded to the need for immediate improvements in training programs. They also noted the need to allocate resources in order to reinforce emergency response strategies in both sectors as part of the ever-updating training components. As of public sector participants, they insisted on the need to further focus on training areas such as risk communication, risk management, and weather-related disaster scenarios. Lastly, the participants emphasized the need for transversal and tailored training, such as the SETOFF.

Correspondingly, private sector participants also convey the need for specialized training, that covers various areas including risk introduction, health and safety, and epidemic management. Their input reflects the findings of the survey in that they highlight mismatches between training expectations and actual needs.

Overall, the focus Group Interviews highlighted the importance of constant training updates in order to adapt to the evolving challenges posed by natural disasters within the fields of safety and security. They also highlight the various challenges that the personnel of the public and private sector face, including restricted resources, limited training opportunities, and deficiencies in skills and knowledge, with emphasis on the need for innovative training, like the SETOFF. The focus group interviews ultimately propose additional valuable guidance in shaping a more effective, responsive and individualized training program.

The SETOFF training proposes a transversal approach in accordance with the identified needs of Civil Protection, Safety, and Security personnel. While seeking to cover skill gaps, as well as to adapt training content to personalized needs, it maintains a consistent framework that aligns with the project's goal of providing adaptable and comprehensive training. These findings are essential for developing a resilient, updated, and sustainable training landscape for natural disasters, from which policymakers, researchers, and practitioners alike can largely benefit.

#### 4 Conclusions

The preliminary results derived from the SETOFF program so far proved to have a significant impact in developing a reliable training platform for a successful confrontation of manmade and natural disasters, based on a suitable selection of the personnel involved. First, a survey was conducted in four countries in order to reveal and demonstrate practices that are applied to human or natural disaster confrontation depending on the gained experience so far and the educational or other background of the personnel involved. The survey took into account individuals from both the public and private sectors. Then, a study followed revealing common points and diversities that can lead to a safe design and development of an adaptive methodology and e-learning platform, maximizing in this way, the engagement in knowledge and ensuring at the same time the successful involvement of the relevant personnel. By addressing these identified needs and divergences through a transversal training approach, the SETOFF project establishes a training program that not only meets the specific demands of safety and security personnel but also contributes to a resilient and effective disaster management landscape.

There is still an ongoing effort for further improvement and in the future, upon the completion of the program, more detailed and extensive results will be presented, including comparative results from the needs analysis and the trainees' final assessment, in order to check if the initial needs were met. Also, as the SETOFF training is developed in five languages and available to users at an international level, qualitative analysis will be applied of various factors and indicators concerning the differences in

training from the multilingual and multicultural perspectives.

#### References:

- [1] UNDRR. *Sendai framework for disaster risk reduction 2015 – 2030*. United Nations Office for Disaster Risk Reduction (UNDRR), 2015, [Online]. <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030> (Accessed Date: February 2, 2024).
- [2] European Commission. *7th European Civil Protection Forum 2022, Final Report*. Brussels, Belgium, 2022, [Online]. [https://civil-protection-humanitarian-aid.ec.europa.eu/partnerships/civil-protection-partners/7th-european-civil-protection-forum\\_en](https://civil-protection-humanitarian-aid.ec.europa.eu/partnerships/civil-protection-partners/7th-european-civil-protection-forum_en) (Accessed Date: June 3, 2024).
- [3] Casajus Valles, A., Marin Ferrer, M., Poljanšek, K., Clark, I. (eds.). *Science for disaster risk management 2020: acting today, protecting tomorrow*. Publications Office of the European Union, 2020. DOI: 10.2760/571085.
- [4] Bonelli, M.d.G., Damacena, F., Silveira Viana, A., Gambardella, A.D., Marchezini, V. Challenges for professionalism in civil defense and protection. *Disaster Prevention and Management*, 31(5), 2022, pp. 565-580. DOI: 10.1108/DPM-03-2022-0057.
- [5] European Commission. *Evaluation of the European Commission's civil protection prevention and preparedness projects (2014-2020). Final report*. Publications Office of the European Union, 2021, [Online]. <https://data.europa.eu/doi/10.2795/01355> (Accessed Date: February 2, 2024).
- [6] Khorram-Manesh, A., Ashkenazi, M., Djalali, A., Ingrassia, P.L., Friedl, T., Von Armin, G., Lupesco, O., Kaptan, K., Arculeo, C., Hreckovski, B., Komadina, R., Fisher, P., Voigt, S., James, J., Gursky, E. Education in disaster management and emergencies: defining a new European course. *Disaster Medicine and Public Health Preparedness*, 9(3), 2015, pp. 245-255. DOI: 10.1017/dmp.2015.9.
- [7] Koler, A., Ortner, S., Peters, M. Qualities and fields of action of destination resilience: an indicator analysis process. In: *Destination Resilience: challenges and opportunities for*

*destination management and governance*, Routledge, 2018, pp. 98-110.

- [8] Al-Shamsi, M., Moitinho De Almeida, M., Nyanchoka, L., Guha-Sapir, D., Jennes, S., Assessment of the capacity and capability of burn centers to respond to burn disasters in Belgium: a mixed-method study. *Journal of Burn Care and Research*, 40(6), 2019, pp. 869-877. DOI:10.1093/jbcr/irz105.
- [9] European Commission. *The European civil protection training programme*. Publications Office of the European Union, 2012, [Online]. [https://ec.europa.eu/echo/files/media/publications/european\\_civil\\_protection\\_training\\_programme\\_en.pdf](https://ec.europa.eu/echo/files/media/publications/european_civil_protection_training_programme_en.pdf) (Accessed Date: February 2, 2024).
- [10] Davis, A.L., Allen, J., Shepler, L., Resick, C., Lee, J., Marinucci, R., Taylor, J.A. Moving FOCUS – The Fire Service Organizational Culture of Safety survey – From research to practice. *Journal of Safety Research*, 74, 2020, pp. 233-247. DOI: 10.1016/j.jsr.2020.06.011.
- [11] Rose, C., Seater, R., Norige, A. Analysis of decision making skills for large scale disaster response. *Proceedings of the 5th IEEE Global Humanitarian Technology Conference (GHTC 2015)*, Seattle, WA, USA, 2015, pp. 240-247. DOI: 10.1109/GHTC.2015.7343979.
- [12] Plotnick, L., Turoff, M., Hiltz, S.R., Yang, L., Bañuls, V.A. Curriculum guidelines for master's level programs in Information Systems for Emergency Management. *Proceedings of the International ISCRAM Conference*, Rio de Janeiro, Brazil, 2016.
- [13] Fernandez, A.R., Studnek, J.R., Margolis, G.S., Mac Crawford, J., Bentley, M.A., Marcozzi, D. Disaster preparedness of nationally certified emergency medical services professionals. *Academic Emergency Medicine*, 18(4), 2011, pp. 403-412. DOI: 10.1111/j.1553-2712.2011.01030.x.
- [14] Broach, J., Smith, M.E. Emergency preparedness training preferences and perceived barriers to training among various healthcare providers and public health practitioners in Massachusetts. *American Journal of Disaster Medicine*, 12(2), 2017, pp. 85-106.
- [15] Sharma, M., Netherton, A., McLarty K., Petrokofsky C., Chang M. Professional workforce training needs for health impact assessment in spatial planning: a cross-sectional survey. *Public Health in Practice*, 3, 2022,100268. DOI: 10.1016/j.puhip.2022.100268.
- [16] Reese S.M. Journal club: a pilot gap analysis survey of US emergency medical services practitioners to determine training and education needs pertaining to highly infectious disease preparedness and response. *American Journal of Infection Control*, 46(3), 2018, pp. 356-357. DOI: 10.1016/j.ajic.2017.11.029.
- [17] Skryabina, E.A., Betts, N., Reedy, G., Riley, P., Amlôt, R. The role of emergency preparedness exercises in the response to a mass casualty terrorist incident: a mixed methods study. *International Journal of Disaster Risk Reduction (IJDRR)*, 46, 2020, 101503. DOI: 10.1016/j.ijdr.2020.101503.
- [18] Gunay, E., Ersel, M., Yax, J.A., Sheele, J.M., Karakurt, G., Acar, K., Frank, S.H. Disaster training needs and expectations among Turkish emergency medicine physicians - A national survey. *Disaster Medicine and Public Health Preparedness*, 14(2), 2020, pp. 229-235. DOI:10.1017/dmp.2019.50.
- [19] Deitchman, S. Enhancing crisis leadership in public health emergencies. *Disaster Medicine and Public Health Preparedness*, 7(5), 2013, pp. 534-540. DOI: 10.1017/dmp.2013.81.
- [20] Mortelmans, L.J.M., Lievers, J., Dieltiens, G., Sabbe, M.B. Are Belgian military students in medical sciences better educated in disaster medicine than their civilian colleagues? *Journal of the Royal Army Medical Corps*, 162(5), 2016, pp. 383-386. DOI: 10.1136/jramc-2015-000563.
- [21] Leighton, K., Kardong-Edgren, S., Schneidereith, T., & Foisy-Doll, C. Using social media and snowball sampling as an alternative recruitment strategy for research. *Clinical Simulation in Nursing*, 55, 2021, pp. 37-42. DOI: 10.1016/j.ecns.2021.03.006.

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Michail Chalaris was responsible for the supervision. The authors equally contributed to the present research, at all stages from the formulation of the problem to the final findings and solution.

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### **Conflict of Interest**

The authors have no conflicts of interest to declare.

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