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# DAREnet

## D5.2 – RDI Roadmap (V2)

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**Abstract:** Objective of D5.2 is to assess and prioritise the DAREnet Cycle 2 innovation opportunities and to develop the RDI Roadmap version 2.

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## Executive Summary

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General aim of the DAREnet project is to improve flood resilience in the Danube River region. One of the main goals is to collect needs of practitioners, to analyse identified gaps, to specify challenges and prepare initiatives for next steps, everything with focus to innovations and state of the art in particular areas.

The key-document summarising these activities is the present RDI Roadmap, which is filtering most promising opportunities, assessing them from different perspectives and provides a first selection of recommended innovation opportunities.

The second DAREnet cycle followed a scenario-based approach, i.e. a fictive scenario (see D1.5 for more Detail) was chosen as foundation for the Work of the RDI topic working groups.

This document represents the second edition of an RDI roadmap, respectively the second Roadmapping cycle. Based on finding from the first cycle it was decided to modify the overall approach and to focus on specific areas within separate cycles. It means that cycle 2 is **focused on TRAINING aspects**, the third will be on EQUIPMENT & TECHNOLOGY and the fourth will be dedicated to CONCEPTS & METHODS. All with the common aim to improve flood resilience in a sustainable way.

A list of typical tasks and activities was created alongside the **scenario-based approach to relate discussions and distinct ideas better to the subject. As described above during this cycle** the focus was set on training aspects.

# 1. Introduction

Past has shown that in Europe, practitioners interested in the uptake of security research and innovation are dedicated to performing their duty and to focusing on their operation. In general, practitioners' organisations have little means to free workforces from daily operations, and to dedicate time and resources to monitor innovation and research that could be useful to them. They have little opportunities to interact with academia or with industry on such issues.

The DAREnet project reflects these gaps and is meant to support flood management practitioners across the EU Danube River Danube River region and from different disciplines to deepen and broaden their Research, Development and Innovation related collaboration (=RDI).

DAREnet is a multi-disciplinary community of practitioners, operating in a network of civil protection organisations, and supported by a broad range of stakeholders from policy, industry and research. Together they are building a transnational and interdisciplinary ecosystem to foster synergies, innovation, and its uptake.

The overall objective of the H2020 project DAREnet is to analyse future challenges and needs (see Deliverable D1.1). In a next step gaps and innovation opportunities are identified with regards to flood and disaster management in the area of the Danube River basin. Therefore, a cyclic approach was chosen, as visualized in Figure 1.

One of the key-results of DAREnet is a regularly updated RDI Roadmap highlighting promising innovation opportunities to strengthen flood resilience of the region. The Roadmap is the collaborative result of a systematic assessment and prioritisation of identified gaps, innovation opportunities as well as promising innovations, including standardisation.



**Figure 1: The DAREnet Roadmapping cycle**

This is the second edition of the DAREnet RDI Roadmap. This document summarises the innovation opportunities or gaps/needs contained in KB and identified by the topic working groups within the second DAREnet “RDI Monitoring & Knowledge Base” phase.

For the purposes of this DAREnet Roadmap Version 2, findings from previous works mentioned above (D4.4 *Report of Topic Working Groups: Knowledge Base for Assessment and Roadmapping Cycle 2*), identified “innovation opportunities” (IOs) – objectives for assessment from different perspectives and subsequently for prioritization. Selected IOs were divided into groups and further elaborated regarding type of innovation opportunity as well as regional relevance, budget efforts, time constrains, usability and risks, as well as the stakeholder groups are envisioned to address the opportunities.

Directive 2007/60/EC on the assessment and management of flood risks (EU Floods Directive, FD) entered into force on 26 November 2007. This Directive requires Member States to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk. With this Directive also reinforces the rights of the public to access this information and to have a say in the planning process.

Art 7 FD requires member states to prepare flood risk management plans for all areas identified as being at potentially significant flood risk (APSFRR) under article 5 or article 13.1(a), and areas covered by article 13.1(b), on the basis of the maps prepared under article 6. Art 14(1) FD stipulates that the flood risk management plan(s) shall be reviewed, and if necessary updated, including the components set out in part B of the Annex, by 22 December 2021 and every six years thereafter.

Article 7(2) FD stipulates that Member States shall establish appropriate objectives for the management of flood risks for the areas identified under article 5(1), focusing on the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity, and, if considered appropriate, on non-structural initiatives and/or on the reduction of the likelihood of flooding.

The ICPDR agreed upon the following objectives of the Flood Risk Management Plan for the Danube River Basin District:

- Avoidance of new risks
- Reduction of existing risks
- Strengthening resilience
- Raising awareness
- Promoting solidarity principle

These objectives focus on the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity and address all aspects of flood risk management focusing on prevention, protection, preparedness, including flood forecasts and early warning systems and taking into account the characteristics of the DRBD.

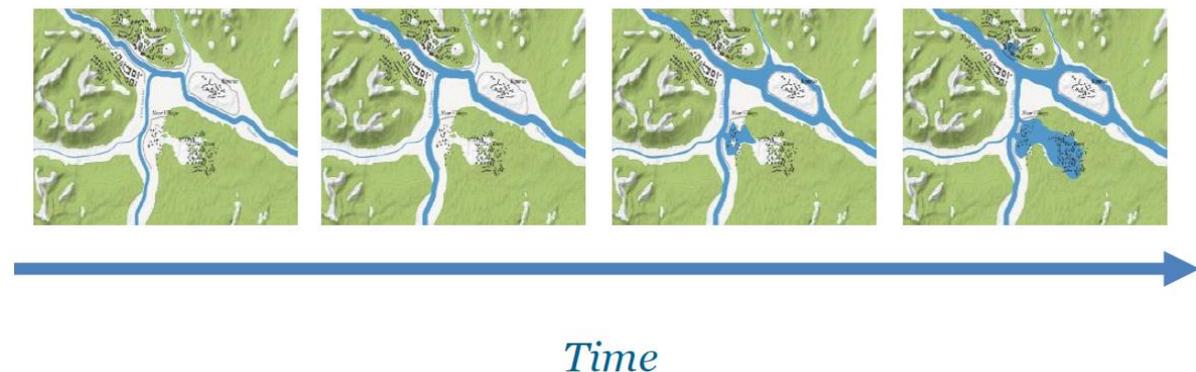
The intention of the objective “Strengthening resilience” is that the society has to have an adequate emergency response during and immediately after flooding to limit adverse effects and it shall recover to regain a standard of living comparable to or better than the pre-flooding status.

The DAREnet mission is to develop joint innovation strategies for enhanced cooperation and flood resilience in the Danube River Basin and this outcome is considered as a significant contribution to the Danube Flood Risk Management Plan Update 2021, which is currently under preparation by the ICPDR.

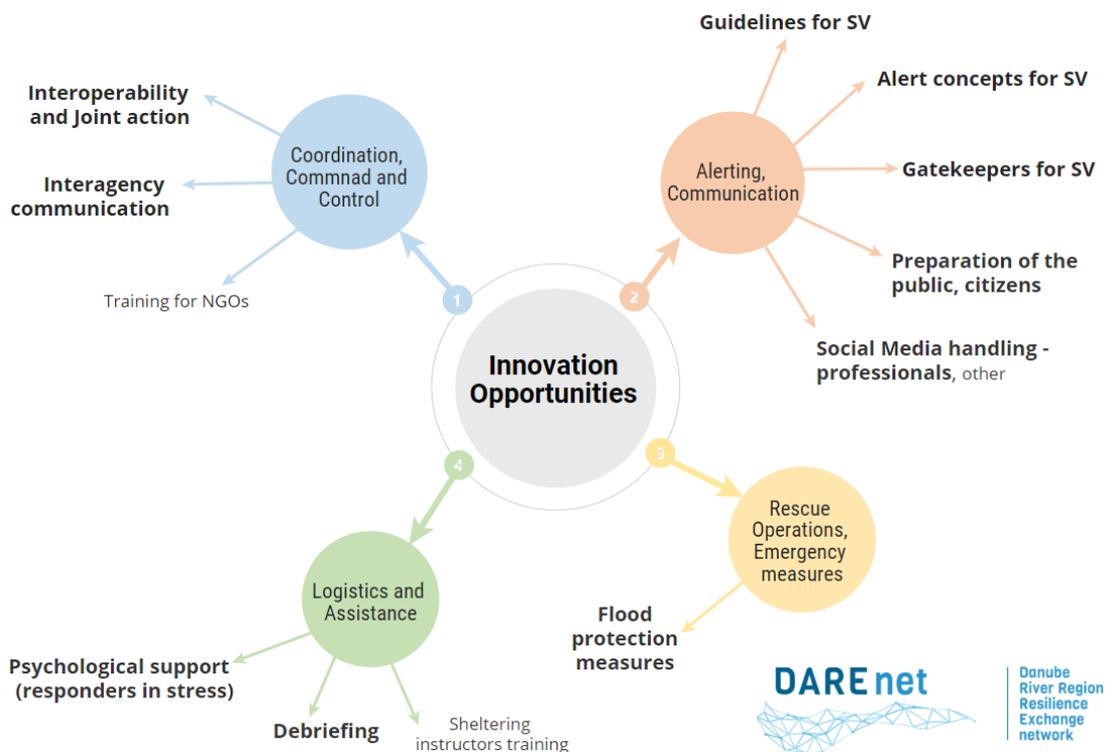
This document represents the second edition of an RDI roadmap, respectively the second Roadmapping cycle. Based on finding from the first cycle it was decided to modify the overall approach and to focus on specific areas within separate cycles. It means that cycle 2 is **focused on TRAINING aspects**, the third will be on **EQUIPMENT & TECHNOLOGY**

and the fourth will be dedicated to CONCEPTS & METHODS. All with common aim to improve flood resilience in a sustainable way.

The second cycle of the DAREnet roadmapping process followed a **scenario-based approach** focussing on training aspects of diverse domains of flood management during the entire disaster management cycle. This document is based on the main findings and outputs from the second RDI Monitoring & Knowledge Base cycle represented by document *Report of Topic Working Groups: Knowledge Base for Assessment and Roadmapping Cycle 2* (Deliverable 4.4), which describes the current status of entries within the DAREnet Knowledge Base as well as results from implemented works within related working groups.



**Figure 2: Phases of escalation in the chosen scenario.**



**Figure 3: Innovation opportunities and their split off**

The Roadmap presented here also builds the base for the “DAREnet’s Call for Practitioner Initiatives”, leading to a portfolio of innovation ideas formulated by practitioners within and beyond DAREnet communities. These practitioner initiatives will be widely disseminated by the DAREnet project, promoting this essential project outcome to

competent policy makers and funding programmes from national to European level, and aiming at their translation into concrete innovation projects.

**Disclaimer:** The opinions stated in this document are the result of the collaborative work within the DAREnet project consortium and are not necessarily in-line with the innovation strategies and aims of the individual organisations involved.

## 2. Methodology behind the Roadmap

Objective of this document are 10 innovative opportunities which have been identified during previous project activities. These opportunities were entered into standardized forms (so called innovation opportunity sheets), described and assessed from many perspectives and prioritized. Finally, based on these activities, version 2 of the Roadmap has been edited summarising the work in the second DAREnet Cycle.

Once more, this cycle was focused on **training** aspects and scenario-based approach has been applied.

Overview of considered innovation opportunities (divided into 4 groups):

No.:	Opportunity
<b>Coordination, Command and Control (CCC)</b>	
1	Interoperability & Joint action
2	Interagency communication
<b>Alerting + Communication</b>	
3	Integration of Spontaneous Volunteers (SV) – GUIDELINES
4	Integration of Spontaneous Volunteers (SV) – ALERT CONCEPTS
5	Integration of Spontaneous Volunteers (SV) – “GATEKEEPERS”
6	Preparation of the public/citizens
7	Social Media (SM) handling – PROFESSIONALS
<b>Rescue Operations + Emergency measures</b>	
8	Flood Protection Measures – EVALUATIONS
<b>Logistics + Assistance</b>	
9	Psychological support – RESPONDERS IN STRESS
10	Debriefing

**Table 1 – Innovation opportunities identified in cycle 2**

Whole process of work within this part of project was divided into several steps:

1. Preparation and coordination of assessment process (Compilation of Opportunity sheets with basic data separately for each IO and management of whole process)
2. Assessment:
  - relevance for practitioners – consultations of stakeholders
  - scope/maturity,
  - compliance with the DAREnet Terms of Reference,
  - external, societal, cultural, or environmental factors
3. Prioritisation and edition of RDI Roadmap.

Within WP5 multiple project partners are responsible for the various tasks. Therefore, a systematic cascaded approach was crucial for all related partners. The former approach based on opportunity sheets from cycle 1 was adopted for this purpose.

The OS are a standardized form, the same for every single innovation opportunity. It follows the logic of the process mentioned above and it contains separate parts associated to different type of assessment. This system of work allows you to perform partial work of various experts, collect all evaluations and contributions and quantify them.

This systematic approach allows smooth continuation of partial works. At the same time, it gives freedom, especially in decision-making, and promotes efficiency. Each task leader carried out related works and all these contributions were, step by step, compiled in one working document. This approach enables DAREnet to collect contributions from many experts and to bring them together in a clear and simple document by systematic work in standardized conditions.

During this process, the innovation opportunities were assessed for

- Classes of innovation types
- Practitioner needs
- Their level of maturity and reliability
- Against the DAREnet terms of reference
- Against other external factors

With aim to collect as many contributions as possible, all identified IOs have been made available to the:

- DAREnet communities
  - DAREnet National Contacts (DNCs)
  - Stakeholder community
- External experts and subjects

Based on the results of these assessment steps, all selected innovation opportunities were finally prioritized within their group (i.e. in the aforementioned table 1 they are ranked with the most important/easiest to achieve being the first one of each group).

## 3. Innovation Opportunities

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In the following, the 10 identified innovation opportunities are listed and described in the context of the corresponding innovation cluster. In the first paragraph of each subchapter “lessons-identified” summarize the stakeholder feedback leading to the identification of innovative potential. In the following section a linkage to relevant EU projects and/or solutions is made, further recommendations for future development in this cluster with regard to maturity are provided, concluding with distinct innovation opportunities.

### 3.1 Coordination, Command and Control (CCC)

#### 3.1.1 Lessons identified

From previous project works it was identified number lessons identified which might be summarized in three main groups:

For joint trainings:

- it was remarked that ready-to-hire/use infrastructure (rooms, training grounds, etc.), or at least a catalogue of such infrastructure would be desirable.
- Also training on how to set-up command posts for each organisation and consistent guidelines (standards) of interagency/international cooperation including standardised terms and definitions (common communication) and common exercises were recommended.
- Moreover, it was desired to establish a law distributing responsibility among organisations on international level and to harmonise training curricula on inter-agency as well as international level.

Situational awareness/ Information sharing:

- A combination of VR/real exercise might be useful since it respects the lower rank operational personnel’s need for hands-on experience.
- Moreover, serious gaming might be suitable as one element for training on psychological support as well as for a better visualisation of cascading effects.

Realistic training:

- A simulation of real objective events (phenomena) and characterisation would be useful.
- Moreover, a simulation of consequences, i.e. real inter-dependencies and sequence of phases would be helpful. In this regard, VR for realistic visualisation as well as serious gaming seem to be key elements for more realism in training.
- Courses with mixed exercises (some real exercise and some table-top) and in-field training (e.g. also with flooded terrain) as well as reasonable scenarios (probable ones and at least one worst-case scenario) were recommended.
- However, there was general consensus that the content of the course is more important than the form.

#### 3.1.2 Innovative potential

Innovative potential has been identified in relation to these points:

- Using of innovative tools and state-of-the-art technologies – VR/AR, software tools
- Using of innovative approaches (pedagogical, also appropriate mix learning methods like e-learning/presentations/class lessons/demonstrations/exercises)

- Using of current/modern equipment (teaching aids, real and up-to-date equipment, avoid using old equipment not used in real events for training purposes)
- Development of new types of trainings, respectively trainings focused on issues, which are not covered by any educational activities (identification of such a points) is innovation itself.

### 3.1.3 Relevant EU projects and solutions

In order to address the innovation opportunities identified in the area of technical and organizational interoperability between different subjects with different responsibilities and tasks in response to flood events number of available solutions have been identified (cf. D4.4).

During the assessment progress, some more solutions have been identified. These solutions are summarized within the Table below. One of the largest European initiatives in this topic is the DRIVER+ project which focused on the development of a Testbed for new solutions trials. Within the project, large-scale trials, also international, involving various practitioners and solutions were conducted. Together with the project deliverables, the most useful product of the DRIVER+ project in this topic is the Trial Guidance Methodology (TGM) which can be used as a basis for guidelines development for training in the area of interoperability and joint action.

Recently in Europe many interagency communication tools and platforms have occurred and joint programs have been conducted. These involved various responsible parties in flood events and other crisis situations. Actions and upgrades have been taken in the area of tailored, useful and effective guidelines development, standardisation of terms and definitions and harmonisation of interagency and international trainings. There is little knowledge on the law and decisions made on national and international level in the area of distributing responsibilities.

Among the identified communication, lessons learned and best practices sharing platforms a community of practice created within the DRIVER+ EU project has been identified. CMINE is a network of stakeholders active in crisis management in general, including flood. Another example of similar platform is the CIT ECHO which focuses on trainings, support and knowledge. However, this example is a solution used in USA, it might be useful to know the approaches and solutions that works well in other environments. Furthermore, it might be beneficial to use the outcomes from the EU – Brazil project RESCUER, which developed an ontology based on Emergency Data Exchange Language whose aim was to provide a conceptual model related to the coordination and exchange of information with legacy systems. Regarding the standardisation of the communication, key terminologies used by actors during crisis and disaster management a set of guidelines (HXL) and a scientific paper published by European Committee for standardisation has been found. Among the solutions for early alerting and effective communication a couple of ready to use solutions have been found. These include Crises Control, Tekmon software solutions and GDSCSmobile and OCHA framework and online trainings. Furthermore a scientific paper about the international, cross border experiment aimed at testing the social media as a tool for improving the effectiveness of search and rescue operations following a regional earthquake. The conclusion from the article was that social media in an emergency situation enables to locate and evacuate casualties more rapidly and effectively.

Type of solution and name	Description	References
<b>EU project:</b> Driver+ Trials and Trial Guidance Methodology	The TGM is designed for crisis management (CM) practitioners who have identified one or more gaps or have in mind solutions that can address these gaps. If you are dealing with research and innovation (e.g. you are working in the innovation	<a href="https://www.driver-project.eu/">https://www.driver-project.eu/</a> <a href="https://tgm.ercis.org/">https://tgm.ercis.org/</a>

	department of a CM organisation) and would like to test some solutions that can bring potential innovation, the Handbook is the right starting point to get a sense of what a Trial entails.	
<b>USA Project:</b> CIT ECHO	The CIT ECHO (CIT Knowledge Network) is a collaboration with the UNM’s Project ECHO, the Albuquerque Police Department, and the Crisis Intervention Team, Inc. to bring specialty training, support, and knowledge in CIT policing and mental health to front line law enforcement and public safety personnel. This is a CIT extension training to supplement previous CIT training. It does this by engaging law enforcement and providers in a continuous case based learning system and partnering them with specialist mentors at an academic medical center or hub.	<a href="http://www.gocit.org/cit-knowledge-network.html">http://www.gocit.org/cit-knowledge-network.html</a>
<b>Guidelines:</b> HXL standard	Standardising humanitarian data for a better response: The Humanitarian eXchange Language.	<a href="https://hxlstandard.org/standard/1-1final/">https://hxlstandard.org/standard/1-1final/</a>
<b>Paper:</b> EUROPEAN COMMITTEE FOR STANDARDIZATION Terminologies in crisis and disaster management	The CWA covers selected key terminologies used by actors during crisis and disaster management for describing needs, actions, situations, tools, missions, resources and any other goods or services needed in large-scale multi-agency and/or transnational disaster risk management.  The intended users of the CWA results are authorities, statutory emergency agencies and other practitioners within the field of disaster risk management, including non-governmental agencies, researchers in disaster and emergency management and the public. Each of these prospective beneficiaries may find some parts more useful than others.	<a href="https://www.iessolutions.eu/terminologies-in-crisis-and-disaster-management/">https://www.iessolutions.eu/terminologies-in-crisis-and-disaster-management/</a>
<b>Project:</b> RESCUER – new communication platform to save lives	RESCUER uses crowdsourcing information for supporting Industrial Parks (InPa) and Security Forces during an emergency situation. EDXL-RESCUER ontology is based on EDXL (Emergency Data Exchange Language), and it aims to be the RESCUER conceptual model related to the coordinating and exchanging of information with legacy systems. The ontology was evaluated with end-users during a workshop and the results show that EDXL-RESCUER is adequate for Emergency and Crisis domain in InPa and Security forces contexts. Specifically, this paper presents an update of EDXL-RESCUER ontology based on a faceted taxonomy approach.	<a href="http://ceur-ws.org/Vol-1442/paper_19.pdf">http://ceur-ws.org/Vol-1442/paper_19.pdf</a>  <a href="https://www.researchgate.net/publication/283535646_EDXL-RESCUER_ontology_An_update_based_on_faceted_taxonomy_approach">https://www.researchgate.net/publication/283535646_EDXL-RESCUER_ontology_An_update_based_on_faceted_taxonomy_approach</a>
<b>Framework:</b> GDACSmobile	GDACS is a cooperation framework between the United Nations and the European Commission. It includes disaster managers and disaster information systems worldwide and aims at filling the information and coordination gaps in the first phase after major disasters. It provides real-time access to web-based disaster information systems	<a href="https://www.gdacs.org/About/app.aspx">https://www.gdacs.org/About/app.aspx</a>

	and related coordination tools.	
<b>Software:</b> Crises Control	Crises Control enables timely alerting on a limitless scale on routine events; as well as deployment of pre-planned responses to emergency events such as an evacuation, terrorist attack alert or severe weather conditions.	<a href="http://www.crisis-control.com/">http://www.crisis-control.com/</a>
<b>Software:</b> Tekmon	A cloud-based system that supports one-way and two-way communication of critical information between both individuals and groups of individuals. The system is designed to convey information over multiple types of devices such as Voice, SMS, WhatsApp, email and Fax, at once. Notification dissemination continues to alternative devices until the contact acknowledges receipt.	<a href="https://tekmon.com/">https://tekmon.com/</a>
<b>Academic paper:</b> Social Media	Description of an experiment designed to leverage social media use in response to an earthquake, and study whether social media can improve joint Israeli-Jordanian search and rescue operations following a regional earthquake. Major conclusion is that utilizing social media in an emergency situation enables to locate and evacuate casualties more rapidly and effectively. Social media can contribute towards saving lives during a disaster, in national and bi-national circumstances.	<a href="http://currents.plos.org/disasters/index.html%3Fp=11297.html">http://currents.plos.org/disasters/index.html%3Fp=11297.html</a>
<b>Online trainings:</b> OCHA	OCHA coordinates the global emergency response to save lives and protect people in humanitarian crises. The headquarters of the organisations are in New York, United States and Geneva, Switzerland. Among other services, OCHA offers wide range of trainings such as Project Management for Development Organizations and NGOs, Sustainable Food Systems and Nutrition: Food post-harvest losses, Hazardous Environment Awareness Training (HEAT).	<a href="https://reliefweb.int/training">https://reliefweb.int/training</a>

**Table 2 – CCC Relevant EU projects and solutions overview**

### 3.1.4 Further recommendations

It is highly recommended to use the existing tools, solutions guidelines in further work and potential use in the Danube region. Regarding the communication, information sharing platforms, the largest challenge is to disseminate and encourage practitioners, decision makers and other crisis management experts to use these tools to make them really useful. Similarly, for the harmonisation of trainings curricula a fully-fledged, tailored set of guidelines should be delivered and the currently available resources are a good basis. Such solutions are valuable only if the users are active and provide quality content. A couple of attempts to create unified, standardised lexicon of terms and definitions for common communication were undertaken. However, such regulations have to be discussed, confirmed and implemented in flood management and responders’ entities. Also, it would be very beneficial to involve various entities so as to have in-depth, holistic view. The most challenging topic enumerated in this section is the establishment of the international law and regulation regarding the responsibilities. This action requires great engagement of many practitioners, responders, decision-makers and governments.

### 3.1.5 RELATED INNOVATIVE OPPORTUNITIES:

#### 3.1.5.1 Interoperability & Joint action

The need of technical and organizational interoperability between different subjects with different responsibilities and tasks in response to flood events have been identified. With regards to the objectives of DAREnet Roadmapping cycle 2 it is the joint trainings/exercises that can have the greatest impact to fix this need. At the same time, there is room for innovations (intensity/frequency or repetition, quality level, etc). This is also confirmed by research of already existing best practices and also some market solutions supporting this approach have been identified. With regards to past or ongoing research it was identified lack of such activities.

Main aspects of this IO are innovation in exercise practices and data and information sharing among cross-border partners. It is the answer to basic issue, which is in this case Innovation for the common protection of the population during floods.

Most important areas:

- Development Guidelines
- Standardisation of terms and definitions (common communication)
- Establishment of a law distributing responsibility among organisations on international level
- Harmonisation of training curricula (inter-agency, international)

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<b>The current situation in this area is that there exists several trainings/exercises (especially on international level – related to EU modules, as well as some projects focused on cross-border cooperation), but it is not enough. New ones covering all the levels should be developed and implemented.</b>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>education and training forms tailored in relation to current trends</b></li> <li>• <b>joint education and training of intervention commanders coming from different countries/agencies</b></li> <li>• <b>joint education centre should be established.</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<b>different procedures across the agencies and states. connecting warning systems.</b>
Do you have some experience or good/bad practice and what?	<b>there is positive experience with common (join) exercises, especially the field ones</b>
What added value can raise from this subject for practitioners from your personal point of view?	<b>networking relationships building preparation of specialized flood modules (Danube river catchment)</b>
What are the risks and/or weaknesses from your personal point of view?	<b>legislation financial coverage different level of country readiness</b>
Other personal comments if any:	<b>in the case of a common approach, there is a much higher probability of successful protection of the Danube basin</b>

### 3.1.5.2 Interagency communication

This opportunity reflects the need to improve communication at the level of different actors (subjects, agencies). It is the part of “interoperability”, but as crucial component, this should be considered separately. The requirement to enhance inter-agency communication have been identified on national as well as on cross-border (regional and international) level. At the same time, there is room for innovations. This is also confirmed by review of already existing best practices and past and/or ongoing research activities. With regards solution available on the market it was identified lack of such products.

Main aspect of this IO is improvement of communication at the level of different actors. It is the answer to basic issues, which are in this case prepared staff to properly use communication tools and ways, make use of all available communication systems and make use of information which different agencies dispose with.

Most important areas:

- Development Guidelines
- Standardisation of terms and definitions (common communication)
- Establishment of a law distributing responsibility among organisations on international level
- Harmonisation of training curricula (inter-agency, international)

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>inconsistent legislation</b></li> <li>• <b>inconsistent procedures</b></li> <li>• <b>non-uniform information systems and communication matrices</b></li> </ul>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>harmonizing and interconnection of systems</b></li> <li>• <b>using cutting edge technologies</b></li> <li>• <b>higher data quality (detailed, higher resolution, accurate localization,</b></li> <li>• <b>involvement of different experts</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>diversity of information</b></li> <li>• <b>level of user readiness (skills, knowledge)</b></li> </ul>
Do you have some experience or good/bad practice and what?	<b>several good experience confirm the urgency of this topic.</b>
What added value can raise from this subject for practitioners from your personal point of view?	<b>speed and quality of strategic information for risk analysis and crisis management</b>
What are the risks and/or weaknesses from personal your point of view?	<b>financial sources legislative</b>

## 3.2 Alerting + Communication

### 3.2.1 Lessons identified

From previous project works it was identified number lessons learned which might be summarized in three main groups:

For joint trainings:

- it was remarked that ready-to-hire/use infrastructure (rooms, training grounds, etc.), or at least a catalogue of such infrastructure would be desirable.

Preparation of the public:

- The participants agreed that the training of younger children needs close exchange with the Ministry of Education in order to reach schools respectively a majority of children and/or a close cooperation with widespread magazines.

Spontaneous volunteers:

- In this regard, there is a lack of generic guidelines. Thus, the creation of training programmes based on findings from concluded projects would be helpful.
- Deemed important is how to bring this to the hands of practitioners.
- Regarding the training of volunteers, important is that they are trained how to react in different situations. However, only a limited scope of trainings (only necessary ones) is sensible. A good way to train volunteers might be to create common training sessions with professionals, that assume mentoring and cooperation rules.
- Moreover, it is important to ensure to train the volunteers how to use the equipment, to train how to self-rescue and to be self-sufficient.
- For the work of professional responders, a volunteer monitoring system (smartphone tracking) including volunteers tasking might be useful. In this regard, the implementation of kind of target groups, i.e. preorganised spontaneous volunteers that assume simple tasks e.g. being „living sensors” was recommended. However, good system (clear policy) for selection of candidates for volunteers for this task would be necessary.

Social media handling:

- Virtual organisational support teams composed of experts with good access to various sources of information and with reliable filtering functions would be desirable.
- Kind of institutionalisation could be envisaged (as next step);
- For flash floods “cloud watchers” could be an idea.
- Regarding the training on social media, the following points seem to be particularly important:
  - train communication officers how to educate using social media and how to analyse social media (big data) with respect to early warning.
  - train citizens how to use social media to detect incidents. This training should also encourage people to use social media.
  - professionals should be trained how to detect fake messages from volunteers.

### 3.2.2 Innovative potential

Innovative potential has been identified in relation to these points

- Involvement of SV is something brand new (e.g. innovative) in some countries/regions (it is necessary to underline that SV are not members of volunteer organizations)

- SV are using modern technologies, and this create conditions for innovations (different persons might be experts in own area of specialization-daily work, they are using and know modern/innovative techniques and technologies. Generally, a lot of (young) people use technologies which are not common in responders structures still (AR/VR/3D/geo etc)
- Importance of “using” of SV could be not in basic works on site (filling sand bags, etc.), but their particular specialization (IT, social media handling, organizational and communication skills, ethical knowledge in case of local conditions, etc.)
- Build-up of flexible, “virtual”, distributed teams of SV (→ “digital volunteers”) depending on concrete tasks and qualification (→ more flexible organisational schemes needed)
- New technologies and approaches in EWS create space for innovations (such as smart phones/tablets and related apps and other up-to-date IT technologies)
- Social media is phenomena of this period with great potential towards future. It contains many opportunities, but also risks/threats. Consequences still need to be examined and carefully considered.

### 3.2.3 Relevant EU projects and solutions

Volunteering delivers a number of key social and economic benefits to a community and increases a community’s resilience and capacity to respond to a disaster. However, a large number of people who come forward to offer their time and skills when there is a disaster can be overwhelming and place an administrative burden on organisations at critical times. That is why trainings and guidelines for both volunteers and the crisis management entities is so important. Furthermore, it is of high importance to have solutions for effective communication, alerting and gatekeeping. Within DAREnet Deliverable D4.4 a number of solutions have been identified. However, during the assessment progress, some more solutions have been identified. These solutions are summarized within the Table below. The USA and Australia provide frameworks, guidelines which are available online. For example, Australian government delivered the Spontaneous Volunteer Management Resource Kit includes a framework and supporting materials that aim to help better manage spontaneous volunteers in an emergency (see the below table). Among the most interesting solutions in the topics of alerting and spontaneous volunteer management, ready-to-use software tools were found. These are the CrowdTasker and Tekmon (see the table below).

Apart from the European software, guidelines and courses there are also examples from the USA, that can be useful for Danube region requirements:

- Points of Light Institute & CNCS (2011). Managing Spontaneous Volunteers in Times of Disaster (eCourse). Available at: <https://www.nationalservice.gov/resources/disaster-services/managing-spontaneous-volunteers-times-disaster-o>
- Points of Light Foundation, NVOAD, and UPS Foundation (2005). Managing Spontaneous Volunteers in Times of Disaster: The Synergy of Structure and Good Intentions. Available at: <https://www.fema.gov/pdf/donations/ManagingSpontaneousVolunteers.pdf>
- Volunteer Florida (2002). Unaffiliated Volunteers in Response and Recovery. Available at: <https://www.volunteerflorida.org/wp-content/uploads/2013/03/UnaffiliatedVolunteers.pdf>
- Western Region Homeland Security (2016). Spontaneous Volunteer Management System Plan Template. Available at: <http://wrhsac.org/wp-content/uploads/2016/07/VMS-Plan-Template-Final-July-2016.pdf>
- Australian Government (2010). Spontaneous Volunteer Management Resource Kit: Helping to Manage Spontaneous Volunteers in Emergencies. Commonwealth of Australia, Canberra. Available at: [https://www.dss.gov.au/sites/default/files/documents/05\\_2012/spontaneous.pdf](https://www.dss.gov.au/sites/default/files/documents/05_2012/spontaneous.pdf)

- Centre for Voluntary Sector Research and Development (Canada) & Public Health Agency of Canada (2007). MAINTAINING THE PASSION – Sustaining the Emergency Response Episodic Volunteer. Available at: [http://www.redcross.ca/cmslib/general/crc\\_disastermanagement\\_maintaining\\_e.pdf](http://www.redcross.ca/cmslib/general/crc_disastermanagement_maintaining_e.pdf)
- Federal Emergency Management Agency & Emergency Management Institute (n.k.). Management of Spontaneous Volunteers in Disasters. Student Manual. Available at: <https://www.volunteerflorida.org/wp-content/uploads/2013/04/G489-Mgt-of-Spontaneous-Volunteers-in-Disaster.pdf>

Type of solution and name	Description	References
<b>Software:</b> Tekmon	A cloud-based system that supports one-way and two-way communication of critical information between both individuals and groups of individuals. The system is designed to convey information over multiple types of devices such as Voice, SMS, WhatsApp, email and Fax, at once. Notification dissemination continues to alternative devices until the contact acknowledges receipt.	<a href="https://tekmon.com/">https://tekmon.com/</a>
<b>Toolkit (USA):</b> Spontaneous Unaffiliated Volunteers Training Series	The Spontaneous and Unaffiliated Volunteer (SUV) Training Toolkit is designed to provide the resources necessary to effectively plan for and safely operate a volunteer management system based on the Incident Command System (ICS). This planning and training series, a project of the Western Region Homeland Security Advisory Council (WRHSAC), was developed by Berkshire Regional Planning Commission under guidance and direction from WRHSAC and local response partners.	<a href="https://wrhsac.org/projects-and-initiatives/spontaneous-unaffiliated-volunteers-training-series/">https://wrhsac.org/projects-and-initiatives/spontaneous-unaffiliated-volunteers-training-series/</a>

**Table 3 – Alerting + Communication relevant EU projects and solutions overview**

### 3.2.4 Further Recommendations

The technological solutions are ready-to-use and it is recommended to exploit the existing tools. However, it might be necessary to tailor the solutions to the specific needs of Danube region flood events responders needs and policies. A training on how to use the solutions might also be necessary. On the other hand, Europe lack frameworks, guidelines or toolkits on how to perform trainings for volunteers. The Spontaneous Unaffiliated Volunteers Training Series could be used as a basis for a customised training toolkit in the Danube region. A joint action in this topic is absolutely necessary.

### 3.2.5 RELATED INNOVATION OPPORTUNITIES

#### 3.2.5.1 Integration of Spontaneous Volunteers (SV) – GUIDELINES

This is one of three needs identified in relation to SV and their capacities which might be used in case of floods or emergency events. This one is focused on development of specific guidelines (like SOPs) devoted to the issue.

Based on undertaken research on available solutions there have been identified existing solutions from the research, on the market as well as best practices.

Main aspect of this IO are joint guidelines as tool also for training of SV, common organizational and tactical procedures and overview of SV for individual countries in dealing with floods on the Danube. It is the answer to basic issues, which are in this case effective involvement of different SV and the third sector organizations into the preparedness, response and subsequent actions in case of flood events as well as make use of SV’s capacities and capabilities.

Most important areas:

- In general, meta research needed for summarizing outcomes for various projects on SV handling
- Better focus on specific target groups: e.g. simple tasks → „living sensors”
- Inclusion of SV (or groups of SVs with respect to their competences/ skills) in guidelines

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<b>Education content and educational needs need to be improved. It is necessary to set up and manage a common education and training centre, especially for the countries in the Danube basin.</b>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>coordination of spontaneous volunteers</b></li> <li>• <b>inclusion of spontaneous volunteers</b></li> <li>• <b>training of spontaneous volunteers</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>insufficient coordination of SV</b></li> <li>• <b>ineffective inclusion of SV</b></li> <li>• <b>non-existent training of SV</b></li> </ul>
Do you have some experience or good/bad practice and what?	<p><b>It depends on the expertise of the SV as well as on country. It can be a doctor, lumberjack, electrician, teacher, etc.</b></p> <p><b>There is also bad experience, when SVs have been absolutely not prepared for action.</b></p>
What added value can raise from this subject for practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>involvement of the public (creates positive feelings)</b></li> <li>• <b>general streamline of response action</b></li> </ul>
What are the risks and/or weaknesses from personal your point of view?	<ul style="list-style-type: none"> <li>• <b>readiness</b></li> <li>• <b>spontaneity</b></li> <li>• <b>deployment coordination</b></li> </ul>

### **3.2.5.2 Integration of Spontaneous Volunteers (SV) – ALERT CONCEPTS**

This is the second need identified in relation to SV and their capacities. (This is focused on alert concept, so mainly how CV could be useful for alerting).

One side is, that SV are on the place of event, so they can provide information about current situation to the professionals/decision making (mission control).

The other side is, that SV could provide concerted information (i.e. checked by mission control) to the people around (based on possibilities of particular SV), it means that SV

might be used for effective distribution of information from professionals to the (affected) public.

Main aspect of this IO is warning + communication; integrating and joint educational program; alert system for SV activation and coordination; integration and common organizational and tactical procedures for SV and integration and overview of SV. It is the answer to basic issue, which is in this case effective participation of the SV on response and follow-up in an emergency (partially also on the preparation for emergency).

Most important areas (similar like in point 4 above, plus):

- Collection of information from SV and validation.
- Distribution of information via SV
- Building of trust and credibility, development of tools
- Preparation and providing of trainings as a main way to ensure above points.

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<b>This idea is not covered by training, neither from any other point of view. even there might be some indicators coming mainly from social media apps, this is brand new from practitioner’s point of view. as idea it is interesting. it should be considered.</b>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>inclusion of sv from different aspects</b></li> <li>• <b>make use of social media</b></li> <li>• <b>make use of available technology</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>to get actual/detailed information from concrete places</b></li> <li>• <b>to provide information to affected people in a proper way</b></li> </ul>
What added value can raise from this subject for practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>acceleration of information flow and related procedures</b></li> <li>• <b>preparation of affected people to arrival of responders</b></li> <li>• <b>general streamline of response action</b></li> <li>• <b>deployment coordination involvement of the public (creates positive feelings)</b></li> </ul>
What are the risks and/or weaknesses from personal your point of view?	<ul style="list-style-type: none"> <li>• <b>validity of information flow and reliability of sv</b></li> <li>• <b>insufficient coordination of sv</b></li> <li>• <b>ineffective inclusion of sv</b></li> <li>• <b>non-existent training of sv readiness</b></li> <li>• <b>spontaneity</b></li> <li>• <b>deployment coordination</b></li> </ul>

### 3.2.5.3 Integration of Spontaneous Volunteers (SV) – “GATEKEEPERS”

This is the third need identified in relation to SV and their capacities. Purpose of this opportunity is to make response action more effectively and guide others with less qualification via identification of persons, who might do this in optimal way (because their education, training, experience, skills, position in society/community, their naturel, etc.).

Based on research on available solutions there have been identified some comes from research as well as from the market. Best practices are lacking.

Main aspects of this IO are fact, that SVs becomes to be “organized volunteers” (some preassessment of related persons have to be done in advance); communication; integrating

of SV into emergency system and joint educational program and integration and overview of SV. It is the answer to basic issues, which is in this case support from local “authorities” (in the meaning of personal status or particular persons in the community) and facilitating the work of professionals.

Most important areas (similar like in points previous two IOs, plus):

- Training on better identification of Gatekeepers (leaders, even if self-appointed, within a group of spontaneous volunteer group who can organize the group).

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<b>This idea is not covered by training. The current situation in this area is not clear. Often, SVs organize themselves via social networks without being asked to do so. Often it is more a curiosity than a desire to help. If process of selecting and preparing of related persons will be done in advance and in a proper way, it can be benefit for practitioners.</b>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>inclusion of sv from different aspects</b></li> <li>• <b>training and preparation of sv in such tasks is innovation itself</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>better interaction with affected people</b></li> <li>• <b>creation of conditions for effective response</b></li> </ul>
Do you have some experience or good/bad practice and what?	<b>There is some good experience of involvement of local leaders (not professionals) during emergencies.</b>
What added value can raise from this subject for practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>avoiding misunderstandings and time saving</b></li> <li>• <b>preparation of affected people to arrival of responders</b></li> <li>• <b>general streamline of response action</b></li> <li>• <b>deployment coordination involvement of the public (creates positive feelings)</b></li> </ul>
What are the risks and/or weaknesses from personal your point of view?	<ul style="list-style-type: none"> <li>• <b>quality level of services provided by sv</b></li> <li>• <b>insufficient training of sv</b></li> <li>• <b>readiness</b></li> <li>• <b>spontaneity</b></li> <li>• <b>deployment coordination</b></li> </ul>

### 3.2.5.4 Preparation of the public/citizens

There are two needs associated with this opportunity. One is in missing of formal DRR education programs to educate citizens from a very young age. This need has not been identified in all countries from Danube region, respectively its importance differs. The second need in relation to preparedness of the public/citizens is connected to Early Warning Systems (EWS) and understanding or interpreting of signals/messages distributed via these systems.

Based on research on available solutions there have been identified best practices, but solutions from research or on the market are only for EWS.

Main aspects of this IO are formal DRR education programs to educate citizens from a very young age and preparedness of the public/citizens in connection to EWS. It is the answer to basic issues, which is in this case general understanding of DDR topic; awareness building

and understanding or interpreting of signals/messages distributed via EWS by affected people and taking proper action.

Most important areas:

- In case of formal DRR education programs – collaboration of stakeholders (ministries of Interior/Education, Schools etc.)
- In case of understanding the EWS - Training on tailoring warning messages taking into consideration sociodemographic variables.

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<b>Public information for local citizens is insufficient. Local - regional education from small children to adults is insufficient (this can differ base on particular country). Better preparation of public to understand ews and take proper action is required.</b>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>development of curriculums in modern way including innovative approaches and tools.</b></li> <li>• <b>using of modern technology for ews including preparation for receiving of messsages</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>the need for a separate subject in primary</b></li> <li>• <b>schools - risk management in emergencies eg. how to behave during floods, continuing to all age group.creation of conditions for effective response</b></li> <li>• <b>the lack of interest of schools, educational establishments and responsible institutions in educating local people/citizens</b></li> <li>• <b>elaboration of freely accessible manuals for citizens, how to proceed in case of eg. natural disaster</b></li> </ul>
Do you have some experience or good/bad practice and what?	<b>There is some good experience which comes from times of “cold war”, even though it was more about war threats, but the principle is the same.</b>
What added value can raise from this subject for practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>better preparation for emergency</b></li> <li>• <b>streamlining of response action</b></li> <li>• <b>general enhancing or preparedness</b></li> <li>• <b>building mutual assistance and responsibility values</b></li> <li>• <b>saving of lives/properties/environment/cultural heritage</b></li> </ul>
What are the risks and/or weaknesses you're your personal point of view?	<ul style="list-style-type: none"> <li>• <b>willingness to accept these roles and values</b></li> <li>• <b>complexity of the topic</b></li> <li>• <b>long term duration</b></li> </ul>

### 3.2.5.5 Social Media (SM) handling – PROFESSIONALS

This opportunity reflects the fact, that Social Media has great influence as well as potential in emergency events also. This should be considered by professionals. In the meaning of this document it is the training for the

- professionals respectively
- personal in charge to handle SM
- including people involved in SM management about social media strategy.

This training should be focused on how to work with data comes and goes through the SM.

Undertaken research on available solutions confirms, that this is new topic. It is possible to find some results in the research area and also in the best practices, but less in the market. **Results rely on target group as well. There are almost no solutions related to people involved in SM management and with regards to SM strategy.**

Main aspects of this IO are smart technologies allowing use of social media (e.g. Facebook, Twitter, Instagram - crowdsourcing) to support the intervention activities in real time and supporting the decision making process of intervention commanders. It is the answer to basic issues, which is in this case lacking of actual information, detailed as possible, accurate in time and place as well as make use of what is already available.

Most important areas:

- Preparation of a code of conduct, clear protocols and a SM strategy plan and related trainings.
- Training in data handling
- Careful considering of all cons and pros, positive and negative points
- Set up a team of different specialist to gather and to filter in real time user generated data (information reliability), to create training data etc.
- Development of guidelines to integrate/ utilize services from VOST (Virtual Organisational Support Teams, kind of specialised digital volunteers) --> indication flash floods by "cloud watchers".

As separate point should be considered also social media handling by others (not professionals, but more by public, volunteers, etc). This was discussed and finally marked as less important.

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<b>Social media are involved in support of intervention activities of rescue services mostly in well-developed EU countries. In Central Europe are used mostly in research.</b>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>Implementation of smart mobile technologies allowing use of SM (crowdsourcing) to support the intervention activities in real time.</b></li> <li>• <b>Development of automatic application for handling with SM data.</b></li> <li>• <b>The tool for handling with SM data – capturing, filtering, validating and providing for integrating into ongoing systems.</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>Easy access to validated (somehow) data</b></li> <li>• <b>Interpreting of these data in user friendly environment (app)</b></li> <li>• <b>Incorporating of data into common (legacy) systems</b></li> </ul>
Do you have some experience or good/bad practice and what?	<b>Only research activities with crowdsourcing – critical points in its implementation into the rescue services have been found.</b>
What added value can raise from this subject for practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>Support of the decision-making process of intervention commanders.</b></li> <li>• <b>More accurate data creates conditions for taking better decisions.</b></li> </ul>
What are the risks and/or weaknesses from personal your point of view?	<ul style="list-style-type: none"> <li>• <b>Problems with education and training related to use of smart technologies in practice of rescue services</b></li> <li>• <b>No real media or social experts in rescue services</b></li> </ul>

## 3.3 Rescue Operations + Emergency measures

### 3.3.1 Lessons identified

From previous project works some lessons identified could be derived which address three main topics:

Flood protection measures:

- Better experience and failure management, including a mandatory debriefing, documentation and identification of lessons learnt were recommended.

Levee defence:

- More universal training needed, e.g. in forms of a strict curriculum (which is to be developed).

Special operations:

- The participants saw a need for more specialised training centres.
- Thus, Public Private Partnerships (PPP) might be a potential solution in order to overcome the financial constraints.

### 3.3.2 Innovative potential

Innovative potential has been identified in relation to the using of up-to-date technologies, techniques and tools for digitized training (modern educational approaches and forms, smart phone/tablets apps, possibly AR/VR and other visualisation capacities, etc.).

### 3.3.3 Relevant EU projects and solutions

With the increasing of crises and disasters in the recent decades, the results of such disasters can severely affect the government's plans, reliability, and economics on various levels. Given the importance and effectiveness of early warning systems in contributing to this, communities on international, national, and regional levels show remarkable interest in the development and implementation of such frameworks, policies and technologies. Again, within DAREnet Deliverable D4.4 a number of solutions have been identified in this context. However, during the assessment progress, some more solutions have been identified. These solutions are summarized within the Table below. For instance, there are several fully-fledged software tools for flood forecasting and risk mapping. These include ProMaIDes, which is a freeware software package. Another example is the AUGGMED which is a VR and MR platform for single or cooperative training. A solution enabling water management, flood forecasting and risk mapping is 3Di. There is also Real Time Flood Risk Assessment tool which provides risk information presented for the actual situation and upcoming day's using forecasts. All the solutions are at TRL 7-9.

Type of solution and name	Description	References
<b>Software:</b> ProMaIDes: Protection Measure against Inundation Decision Support	Development and application of a software tool for flood risk analysis and the evaluation of flood protection measures on a regional scale.  The development of ProMaIDes started 2009 at the Institute of Hydraulic Engineering and Water Resources Management (RWTH Aachen University). Since then it is and has been successfully applied in several flood risk studies for	<a href="https://www.researchgate.net/publication/298214807_The_software_package_ProMaIDes_for_a_risk-based_evaluation_of_flood_protection_measures">https://www.researchgate.net/publication/298214807_The_software_package_ProMaIDes_for_a_risk-based_evaluation_of_flood_protection_measures</a>

	coastal and riverine regions. ProMaIDes is a freeware software package.	<a href="https://plugins.ggis.org/plugins/promaides_demo_export_plugin/">https://plugins.ggis.org/plugins/promaides_demo_export_plugin/</a>
<b>EU Project/ software: AUGGMED</b>	AUGGMED aims to develop a serious game VR and MR platform that can be used for single and cooperative training in different settings offering different levels of realism and engagement. The platform will enable police, security forces and counter-terrorist units as well as first responders to train their staff in different VR environments with different scenarios and apply this training in the real infrastructure environment using mixed reality techniques.	<a href="http://www.auggmed-project.eu/">http://www.auggmed-project.eu/</a>
<b>Software: 3Di</b>	3Di is a cloud-based versatile water management instrument that enables flood forecasting and risk mapping. 3Di models are fast, accurate and visual. 3Di results present flooding locations, water depths, arrival times and damages in high detail. Moreover, flood measures can be modelled for their effectiveness. Experts and decision-makers can interact with the model to simulate dike breaches, rain events and storm surges.	<a href="https://3diwatermanagement.com/">https://3diwatermanagement.com/</a>
<b>Software: Real Time Flood Risk Assessment</b>	In the Real Time Flood Risk Assessment viewer risk information is presented for the actual situation (using measurements) and upcoming day's using forecasts, uses a single point of truth of information for all the daily operational working processes.	<a href="https://www.hkv.nl/en/news/339-real-time-flood-risk-assessment.html">https://www.hkv.nl/en/news/339-real-time-flood-risk-assessment.html</a>

**Table 4 – Rescue Operations + Emergency measures relevant EU projects and solutions overview**

### 3.3.4 Further Recommendations

There is very little knowledge about the mandatory debriefings, documentation and guidelines for their conducting. The standardisation of this process would be of great value as it would contribute to making the lessons learned information sharing process easy and effective.

### 3.3.5 RELATED INNOVATION OPPORTUNITY:

#### 3.3.5.1 Flood Protection Measures – EVALUATIONS

Within the flood protection measures, in the meaning of preinstalled protective measures, there have been identified need in training on evaluation based on debriefing. So, the importance is given on execution of debriefing and on ability to provide evaluation based on outcomes from this activity.

Main aspects of this IO are best practises sharing, exchange of state-of-the-Art- knowledge dealing with Flood Protection Measures (knowledge base building) and implementation of joint debriefings (based on SOP). It is the answer to basic issues, which is in this case need

to share best practices from different countries to develop flood protection measures at national and local level; availability of updated information on flood protection measures at one site (one website providing information or links to relevant webpages, i.e. knowledge base) and joint debriefings in organised way – plan of further training activities should be specified to remove the failings identified during intervention.

Most important areas:

- Better Experience & Failure Management by (mandatory) debriefing, documentation and identification of lessons learned.

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<b>In different countries different flood protection measures implemented. Those should be summarized and publish to potential partners via 1 knowledge base (e.g. webpage).</b> <b>To enhance the cooperation of the practitioners coming from different countries, there is need to organize joint debriefings after the intervention, conclusions of which should be implemented in the training plan of intervening forces for the next period.</b>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>Innovative tool (application) enabling to make debriefings in a proper (standardized) way, to share (including receiving) the information and to work with the data (filtering, displaying, editing, etc.)</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>To have updated information on flood protection measures and best practices at one site (i.e. knowledge base)</b></li> <li>• <b>Joint debriefings</b></li> </ul>
Do you have some experience or good/bad practice and what?	<b>Tactical trainings and joint debriefings – best practice</b>
What added value can raise from this subject for practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>Increased level of preparedness of rescue services and other organisations involved in joint trainings.</b></li> <li>• <b>Learning from the others.</b></li> <li>• <b>Networking potential.</b></li> </ul>
What are the risks and/or weaknesses from personal your point of view?	<ul style="list-style-type: none"> <li>• <b>Political factors to the future</b></li> <li>• <b>Unwillingness to share experience (possibility to show own mistakes)</b></li> </ul>

### 3.4 Logistics + Assistance

#### 3.4.1 Innovative potential

Innovative potential has been identified in relation to these points:

- Using of up-to-date technologies, techniques and tools (modern educational approaches and forms, smart phone/tablets apps, possibly AR/VR and other visualisation capacities, etc.)
- Experience sharing and best/worst practice exchange, mistake prevention
- Train the trainers courses and expanding skills

### 3.4.2 Relevant EU projects and solutions

Within DAREnet Deliverable D4.4 a number of solutions have been identified. Also, in this context, some more solutions have been identified during the assessment progress of WP5. These solutions are summarized within the Table below.

In Europe there are very few organisations specialising in Psychological First Aid (PFA) and psychological support for first responders, especially in comparison to the USA where numerous psychological first aid frameworks have been introduced for use (see: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5314921/table/T1/?report=objectonly>). The largest initiative in this topic is the Psychological First Aid and Psychosocial Support in Complex Emergencies (PFA-CE) project carried out by consortium of Austrian Red Cross, University of Innsbruck, Croatian Red Cross, Italian, Macedonian Red Cross, Red Cross of Serbia and Slovenian Red Cross.

Apart from the European networks, courses and guidelines there are many resources created by worldwide and American institutions that can be useful:

- World Health Organization, War Trauma Foundation and World Vision International. (2013). Psychological first aid: Facilitator’s manual for orienting field workers. WHO: Geneva.: [http://apps.who.int/iris/bitstream/10665/102380/1/9789241548618\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/102380/1/9789241548618_eng.pdf)
- Save the Children. Psychological First Aid training manual for Child practitioners, One day training programme: <https://resourcecentre.savethechildren.net/library/pfa-one-day-programme-manual>
- World Health Organization, War Trauma Foundation and World Vision International. (2011). Psychological first aid: Guide for field workers. WHO: Geneva.: [http://www.searo.who.int/srilanka/documents/psychological\\_first\\_aid\\_guide\\_for\\_field\\_workers.pdf](http://www.searo.who.int/srilanka/documents/psychological_first_aid_guide_for_field_workers.pdf)
- Australian Red Cross & Australian Psychological Society, Psychological First Aid: An Australian guide to supporting people in affected by disaster, 2ndEdition. November, 2013.: [http://www.redcross.org.au/files/Psychological\\_First\\_Aid\\_An\\_Australian\\_Guide.pdf](http://www.redcross.org.au/files/Psychological_First_Aid_An_Australian_Guide.pdf)
- National Child Traumatic Stress Network and National Center for PTSD, Psychological First Aid: Field Operations Guide, 2ndEdition. July, 2006. Available on: <http://www.nctsn.org> and: <http://www.ptsd.va.gov>

The following table presents available solutions, software, frameworks, toolkits, projects etc.

Type of solution and name	Description	References
<b>Course:</b> Psychological First Aid	An online course regarding the psychological first aid to people in an emergency by employing the RAPID model: Reflective listening, Assessment of needs, Prioritization, Intervention, and Disposition. Developed in collaboration with Johns Hopkins Open Education Lab.	<a href="https://www.coursera.org/learn/psychological-first-aid">https://www.coursera.org/learn/psychological-first-aid</a>
<b>EU project:</b> PFA-CE	The Psychological First Aid and Psychosocial Support in Complex Emergencies (PFA-CE) project is a timely and important initiative as it responds to recent global developments with more frequent and long-term disasters and crises. The project aims at improving disaster response capacities of European emergency and volunteer organisations by considering needs and strengthening competencies in psychological first aid psychosocial support of staff and volunteers.	<a href="http://www.pfa-ce.eu/">http://www.pfa-ce.eu/</a>
<b>Guidelines:</b> Psychological first aid: Guide for field workers	The guide covers psychological first aid which involves humane, supportive and practical help to fellow human beings suffering serious crisis events. It is written for people in a position to help others who have experienced an extremely distressing event. It gives a framework for supporting people in ways that respect their dignity, culture and abilities.	<a href="https://www.who.int/mental_health/publications/guide_field_workers/en/">https://www.who.int/mental_health/publications/guide_field_workers/en/</a>
<b>Network:</b> MHPSS.net forum	The MHPSS.net forum is an independently managed, online platform for mental health and psychosocial practitioners. Join the forum’s PFA Training and Adaptation Group to keep up-to-date with the latest developments in PFA and to connect with other PFA providers.	<a href="http://www.mhpss.net/">http://www.mhpss.net/</a>

**Table 5 – Logistic + Assistance relevant EU projects and solutions overview**

### 3.4.3 Further Recommendations

Europe and Danube region lack the competences in the area of Psychological First Aid and Psychological First Responders support. It is highly recommended to develop or tailor the existing training materials to educate more psychologists in the area of Psychological First Aid and psychological support for responders.

### 3.4.4 RELATED INNOVATION OPPORTUNITIES:

#### 3.4.4.1 Psychological support – RESPONDERS IN STRESS

This opportunity reflects the gap in preparation of responders who have to deal in conditions of emergency events, so in conditions which are different from normal situation and where stress plays very important role. Responders have to work under stress and also affected people are very much stressed. Specialized training of responders should improve overall intervention.

Undertaken research on available solutions shows, that there are some in area of research as well as there exists best practice. But market solutions are lacking.

Main aspects of this IO are trainings oriented to psychological support of practitioners using modern approaches and psychological support provided by practitioners in case of emergency and preparation on responders to work specific conditions, like stress, fear a worry, uncertainty and doubts, health problems and property losses. It is the answer to basic issues, which are in this case lack of such skills and trainings and the fact that mostly volunteers in professional rescue services undergo the trainings, which are oriented to psychological support provided by them in case of emergency.

Most important area has been identified VR-/ serious gaming-based exercises for training on psychological support of practitioner → stress/ unplanned situations, cascading effects, information loss, etc.

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<b>There are some activities focusing the trainings on psychological support provided. Those should be enhanced using progressive methods.</b>
What should be the main points of innovation action from your personal point of view?	<b>Progressive psychological methods implementation in practitioners training on psychological support</b>
What are the gaps/needs of practitioners from your personal point of view?	<b>Trainings oriented to psychological support of practitioners using modern approaches and psychological support provided by experts.</b>
Do you have some experience or good/bad practice and what?	<b>There have been identified several good experience confirming validity of this idea.</b>
What added value can raise from this subject for practitioners from your personal point of view?	<b>Increased effectiveness and safety of intervention activities</b>
What are the risks and/or weaknesses from personal your point of view?	<b>• Not identified</b>

### 3.4.4.2 Debriefing

This opportunity has some similarities with IO no. 8 (Flood Protection Measures – Evaluation), but this is more general. The reason is that the findings from all the effort what have been devoted to rescue and response activities should be summarized and processed for further use. It is emphasized that debriefing is very important (but often missing) in order to gain knowledge about the “stress level” and therefore needs for psychological support of the practitioners in the field (but also in more general understanding - an effective (mandatory) debriefing is essential in order to gain first-hand information/knowledge/challenges from practitioners the field. This includes general information and is not restricted only to psychological support). This is the room for improvement and optimization of future interventions. That is why responders should be trained to make debriefing in effective way. Opportunity is to prepare training on how to carry out (mandatory) debriefing and how to share experience (and exploit knowledge from that particular event/flood).

Undertaken research on available solutions shows, that there are some in area of research as well as there exists best practice. But market solutions are lacking.

Main aspects of this IO are joint debriefings organized and standardized as well as analyse of psychological status of responders after action. It is the answer to basic issues, which are in this case call for joint debriefings provided in organised way – plan of further training activities should be specified to remove the failings identified during intervention and fact, that care about psychological health or responders is important (from long term point of view).

As the most important area it has been identified better Experience & Failure Management by (mandatory) debriefing, documentation and identification of lessons learned.

Summary from stakeholder consultations:

What is current situation in this objective from your personal point of view?	<p><b>There are debriefings organised at local level, but there is room for improvements, harmonizing and outcomes exchange.</b></p> <p><b>There is a need to organize joint debriefings at international level and share the information among partners to include the conclusions into the training plans of practitioners at the national level.</b></p> <p><b>Issue related to care of psychological status of responders differs based on the agency/country.</b></p>
What should be the main points of innovation action from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>Joint debriefings</b></li> <li>• <b>Optimized plan of education and trainings considering the conclusions of the debriefings</b></li> <li>• <b>Inclusion of psychological care as obligatory point.</b></li> </ul>
What are the gaps/needs of practitioners from your personal point of view?	<ul style="list-style-type: none"> <li>• <b>Standardized procedures</b></li> <li>• <b>Data exchange</b></li> <li>• <b>Joint debriefings</b></li> <li>• <b>Optimized plan of education and trainings considering the conclusions of the debriefings</b></li> </ul>
Do you have some experience or good/bad practice and what?	<p><b>There have been identified good experience (Joint tactical training – individual debriefing of the intervening rescue services followed by joint debriefing)</b></p> <p><b>Also, testimonies of practitioners who absolved psychologist help after major events.</b></p>

What added value can raise from this subject for practitioners from your personal point of view?	<ul style="list-style-type: none"><li>• <b>Optimization of activities during joint interventions, tactical trainings in the future</b></li><li>• <b>Increased level of effectiveness and safety at work</b></li><li>• <b>Improving the working environment at the workplace</b></li></ul>
What are the risks and/or weaknesses from your personal point of view?	<ul style="list-style-type: none"><li>• <b>Willingness to share data (mainly bad experience)</b></li><li>• <b>Willingness to admit mental problems</b></li></ul>

## 4. Conclusions

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As one major outcome of the DAREnet project, this RDI Roadmap indicates innovation opportunities or innovation topics to strengthen the capabilities in dealing with floods and ultimately enhance the resilience towards floods in the Danube River region.

Within DAREnet more than 100 RDI topics could be identified, and within this second roadmap 10 innovation opportunities could be identified around the core theme of “practitioner training”. As a part of the roadmapping cycle they were checked for relevance, compliance with the DAREnet terms of reference.

A further prioritization is rather difficult, since the innovation opportunities are not addressing a homogenous group and are not universal. Therefore a brief ranking is provided within the logic of the dedicated chapters

Based on the above-mentioned assessment, concrete innovation strands to address the related gaps and requirements have been defined and discussed in the according subchapters. At the same time, these strands shall also serve to project timelines for the uptake, describing the varying levels of maturity, further R&D and the time required for industrialisation, standardisation and market-entry.

The main goal of this document is to draw and highlight the critical pathways for effective innovation in the region. For this reason, links to concrete, existing solutions have been very limited to ensure ease of access for the reader. Further details can be found in the project deliverable report D4.4: Report of Topic Working Groups: Knowledge Base for assessment and roadmapping cycle 2.

The innovation opportunities compiled in the present document are recommendations for concrete innovation initiatives in the future, which will be further promoted by the “DAREnet Call for Practitioner Initiatives”. By this call, practitioners are invited to share their ideas or evolving project concepts with the community to foster exchange or to leverage support for their realisation.

A general remark in the context of a RDI roadmap for the Danube Region is, that it would be a huge support for the civil protection and disaster relief community, if the future programs push practitioner driven initiatives even more than the current ones.

This means technological as well as methodological initiatives, which should be either new ones or rooted in current or recently finished projects. Further, there might be a new form of projects needed between basic R&D projects and PCP projects to bridge the gap between research and operations, especially for non-technical results.

Given the fact that **DAREnet will call for new initiatives**, a stronger linkage to our project (or other CSA network projects) would be extremely beneficial.

Also calls for capacity building programs should be stronger based on the results of closed or running FP7 or H2020 projects. This would also support the transition of R&D results into operation.

## Glossary

<b><u>Abbreviation / acronym</u></b>	<b><u>Description</u></b>
2D	Two-Dimensional
3D	Three-Dimensional
4D	Four-Dimensional
APP	Application
APSFRR	Areas identified as being at potentially significant flood risk
CCC	Coordination, Command and Control
CMT	Community Management Tool
CP	Civil Protection
DNC	DAREnet National Contact
DMC	Dyke Monitoring and Conditioning system
DMR	Digital Mobile Radio
DNC	DAREnet National Contact
DoA	Description of Action (of the DAREnet project)
Dx.y	Deliverable x.y
EUCPM	European Union Civil Protection Mechanism
EMS	Emergency Management Service
FD	Flood Directive
FEMA	Federal Emergency Management Agency [United States]
GIS	Geographic Information System
ISO	International Standardisation Organisation
KB	Knowledge Base
PCP	Pre-commercial procurement
PDF	Portable Document Format
PFA	Psychological First Aid
PFA-CE	Psychological First Aid in Complex Emergencies
PPDR	Public Protection and Disaster Relief
PPP	Public Private Partnership
PSS	Psychological Support Services
RDI	Research, Development, Innovation
SoP	Standard Operating Procedures
SM	Social Media
SV	Spontaneous Volunteers
TWG	Topic Working Group
UAV	Unmanned Aerial Vehicle
WP	Work Package