WILDFIRE RISK AWARENESS AND COMMUNICATION: Analysis of good practices

Union Civil Protection Knowledge Network

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Edition: 2024

DOI: https://doi.org/10.5281/zenodo.10817549

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Suggested citation: Plana, E., Serra, M., Nebot, S., Smeenk, A., Macri, P., Vendrell, J., Pronto, L., Canaleta, G., Gomes, J., Alfonso, L. (2024). Wildfire risk awareness and communication: Analysis of good practices. Union Civil Protection Knowledge Network.

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Foreword by the DG ECHO Director General Maciej Popowski /

Europe's disaster risk landscape is becoming more complex. Climate change and environmental degradation have been increasing the severity and frequency of several hazards, notably wildfires that have impacted different European regions. The future prospects look more alarming than ever.

It is in this context that Europe needs to promote wildfire risk awareness among its citizens and residents. The dissemination of accurate information related to wildfire risks is a key element to empower individuals to make informed decisions and build a more resilient society. For this reason, our goal is to foster and strengthen a culture of prevention and preparedness among Europe's population. Everyone can play a role for one's own safety and the safety of others.

In 2023, the Commission adopted the European Union Disaster Resilience Goals, with the aim to improve the capacity of the EU, its Member States and Participating States to the EU Civil Protection Mechanism to anticipate and withstand the effects of future major disasters and emergencies. Goal no. 2 of this initiative focuses precisely on increasing risk awareness and preparedness of the population. In addition, promotion of wildfire risk awareness and communication is also part of the Wildfire Risk Action Plan initiated by DG ECHO.

With this publication we have the chance to reflect on best practices on wildfire risk awareness and communication drawn from Europe and beyond, as well as on projects that work on the topic. This analysis presents key insights on strengths, opportunities, weaknesses, and threats around wildfire risk awareness and communication. Above all, it highlights the need for a comprehensive wildfire risk awareness strategy that considers the different aspects of disaster risk management and involves every segment and sector of society, including the most vulnerable.

I trust that the insights presented on wildfire risk awareness and communication will contribute to a collaborative effort to mitigate the risks of wildfires and foster a more resilient society. Only by working together across different sectors and governance levels within a whole-of-society approach, we can evolve our current strategies to adequately deal with wildfires and guarantee positive outcomes in the long term.

SUMMARY /

In the context of an evolving wildfire risk landscape progressively escalating into disasters over recent decades, the repercussions on society, economies, and the environment have been intensified. In this regard, strategies and initiatives promoting public education on wildfire, risk awareness and communication become a fundamental pilar of disaster risk reduction, and more specifically to address raising wildfire risk both in traditional and unprecedented fire-prone territories across Europe.

This publication presents the analysis conducted over a sample of wildfire risk awareness and communication initiatives and projects across the EU and beyond. This compilation was assembled through an open call for good practices run by the Directorate-General for European Civil Protection and Humanitarian Aid Operations in early 2023. Some important lessons can be withdrawn from the analysis of wildfire risk awareness projects and initiatives, providing valuable insights into the current landscape of wildfire risk awareness. The collection of initiatives and projects highlights the importance of **targeted public initiatives**, **citizen and stakeholder participation**, **multi-agency collaboration**, **knowledge and lessons learned exchange**, and the need for **sustained funding** to ensure their success and impact in terms of risk culture. It also underscores the importance of **adaptability and constant updating** of messages and communication tools to address the changing wildfire risk landscape in each territory. The initiatives analysed show a mix of one-way, two-way, top-down and bottom-up approaches, which may serve to achieve different risk awareness and communication goals. Four pillars collectively shape the key concluding arguments of this publication. Firstly, it underscores the critical importance of **framing a WFRM communication strategy** to enhance its impact and further motivate the cooperation across all agencies and stakeholders engaged in wildfire risk reduction. Secondly, it accentuates the need to enhance **the understanding of wildfire phenomenon**, approaching the root causes of wildfire (from human behaviour to the influence of land-use or climate change) but also the benefits of prevention for disaster risk reduction. Thirdly, it advocates for the **active engagement and networking of stakeholders** through risk awareness with a holistic and cross-sectoral vision. Lastly, the publication emphasizes the use of stakeholders-oriented **actionable risk reduction tools and resources** when dealing with risk awareness and communication in an effective manner, considering short, medium and long-term perspectives.

Drawing upon this analysis, this document elaborates on how to enhance wildfire risk awareness across Europe, emphasizing the crucial role of citizens in protection, preparedness, and prevention of wildfire risk. This analysis serves as a foundational step towards the establishment of a European-level wildfire risk awareness and communication approach aimed at adding value to national/regional efforts by means of expanding citizens awareness and wildfire risk knowledge across boundaries and fostering the exchange of wildfire risk communication knowledge and networking across agencies, authorities and stakeholders.

The publication is structured in three main chapters. The introduction and methodology chapter delves into the fundamentals of risk communication and its relevance for the reduction of wildfire disasters. It also provides an overview of the methodology that was adopted for the analysis. The second chapter identifies the strengths, weaknesses, opportunities, threats, trends and gaps of the collected wildfire risk awareness initiatives and projects. The last chapter compiles the main conclusions and key points to be drawn from the analysis. This publication is written in a context that underscores the critical importance of comprehensive strategies and collaborative efforts at both national and European levels to address the escalating threat of wildfires.

ACRONYMS /

CP: Civil Protection

DG: Directorate-General

DG ECHO: Directorate-General for European Civil Protection and Humanitarian Aid Operations

DRM: Disaster risk management

DRR: Disaster risk reduction

DSS: Decision support system

E-STAG: European Science & Technology Advisory Group

EU: European Union

EC: European Commission

EWE: Extreme wildfire event

EWS: Early warning systems

GAR2022: Global Assessment Report on Disaster Risk Reduction 2022

IFM: Integrated fire management

IWFC: International Wildland Fire Conference

MS: Member States

NbS: Nature-based solutions

NGO: Non-governmental organisation

OECD: Organisation for Economic Co-operation and Development

(Wildfire PRAF): (Wildfire) Peer Review Assessment Framework

PS: Participating States

RA&C: Risk awareness and communication

SWOT: Strengths, weaknesses, opportunities and threats

UCPM: Union Civil Protection Mechanism

UNEP: United Nations Environment Programme

UNDRR: United Nations Office for Disaster Risk Reduction

WFRM: Wildfire risk management

WUI: Wildland-urban interface

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1 / INTRODUCTION AND METHODOLOGY

1.1 The relevance of risk awareness and communication in disaster risk reduction

Risk awareness and communication as a pillar of disaster reduction

Naturally evolving into disasters, mitigating the impact of natural hazards on vulnerable areas is a cornerstone of Civil Protection (CP) mandates. The evidence from past decades shows how anthropogenic climate change may intensify extreme events, worsening their effects on society, economies, and the environment (UNDRR 2022). This magnifies the consequences of preexisting human-influenced hazards, exposures, and vulnerabilities on the territory and overwhelms the capacities of disaster risk management (DRM) systems.

> *According to the Global Assessment Report on Disaster Risk Reduction 2022, the number of extreme temperature events per year is increasing, and based on current trends will almost triple between 2001 and 2030, which is strongly related to the increase of fire-prone conditions and wildfire severity.*

In this context, public authorities, private actors, and citizens could assume crucial roles in decreasing risk factors, when prioritizing risk and crisis communication (see definitions in Box 1). Priority 1 - Understanding disaster risk from the **United Nations' Sendai Framework for Disaster Risk Reduction 2015-2030** (UNDRR, 2015) states the need to "Promote national strategies to strengthen public education and awareness in disaster risk reduction, including disaster risk information and knowledge" by means of campaigns, social media, and community mobilization, all while considering the needs of specific audiences. The main objective is the promotion of "a culture of disaster prevention, resilience and responsible citizenship" generating better understanding of disaster risk and encouraging public and private stakeholders' engagement in risk awareness and communication (RA&C) initiatives. Priority 4 highlights the need to enhance disaster preparedness for effective response emphasizing on the need to support and enhance people-centred, multi-hazard forecasting, early warning, and emergency communication systems.

> *"It should increase public knowledge of disaster risks and prevention measures; improve individuals' and communities' self-protection, behaviour and preparedness to respond to disasters and foster a culture of risk prevention and trust in civil protection authorities." Union disaster resilience goal No. 2: Prepare - Increasing risk awareness and preparedness of the population.*

At European level, the **Council conclusions on an integrated approach to more effective risk, emergency and crisis communication**[1] (European Union, 2011) point out that "risk, emergency and crisis communication is essential in the field of civil protection in order to make citizens safer and more secure, by enabling them to recognise risks, to take precautionary measures to avoid risks, and to react swiftly to minimise risks; and limiting the consequences of emergencies". The more recent **European Union Disaster Resilience Goals**[2] aim to improve the capacity of the EU, its Member States and Participating States to the EU Civil Protection Mechanism to anticipate and withstand the effects of future major disasters and emergencies. Goals 2 and 3 are related to risk awareness and communication:

1.- ***Anticipate*** - Improving risk assessment, anticipation and disaster risk management planning;

2.- ***Prepare*** - Increasing risk awareness and preparedness of the population;

3.- ***Alert*** - Enhancing early warning;

4.- ***Respond*** - Enhancing the Union Civil Protection Mechanism response capacity;

5.- ***Secure*** - Ensuring a robust civil protection system.

[1] https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/jha/126887.pdf
[2] https://ec.europa.eu/commission/presscorner/detail/en/ip_23_599

The European Commission is launching five flagship initiatives, one under each goal. Goal 2 includes the flagship "***preparEU***", a pan-European awareness raising programme for disaster resilience targeting European citizens. Goal 3 flagship aims at Linking global early warning to local action in Europe.

More specifically related to wildfire risk management (WFRM), The **Wildfire Risk Action Plan**[3] establishes ten actions organized under three core themes: i) improved **capacity** to prevent wildfires, ii) improved **knowledge** on wildfires for prevention, and iii) increased **financing** for wildfire prevention actions. Under theme i) the following actions 4 and 5 aim at promoting **risk awareness and communication**:

- Action 4. Good practices on raising wildfire risk awareness to enhance prevention, followed by development of a good practice guide further development of disaster risk awareness, public information and education with the aim to further enhance citizen protection, preparedness and prevention (UCPM Article 5.1.i)
- Action 5. Development of new wildfire risk awareness and communication actions at EU level (UCPM Article 3.1.d).

In terms of WFRM, RA&C initiatives may contribute in different ways to decreasing risk factors embedding them at operational level along the DRM phases, from prevention to recovery (Figure 1). This is crucial when addressing WFRM since the hazard factor of wildfires is highly human-influenced in comparison to other natural hazards, as it significantly affects human-caused ignitions and wildfire severity through fuel distribution, unlike windstorms, rainfall, or earthquakes' intensity which may not be influenced. RA&C can also be seen as a valuable instrument to support the implementation of policy and technical recommendations towards integrated WFRM (Figure 2).

> *"(...) Risk communication may still be viewed traditionally, as a way to inform people about imminent threats and responses, rather than also being a holistic, long-term process which grounds risk communication more firmly in education and as a tool to promote acceptance of risk management measures, for example". Trends in Risk Communication Policies and Practices (OECD, 2013).*

[3] https://civil-protection-knowledge-network.europa.eu/system/files/2022-12/Wildfire%20Prevention%20Action%20Plan.pdf

Box 1. Concepts around risk awareness and communication

Although there is not a unique definition around risk awareness and communication, the OECD (2013) report on Trends in Risk Communication Policies and Practices distinguishes "(...) the traditional focus of emergency or crisis communication" which "(...) needs to inform people once the event is imminent, has already begun or has just occurred", from the "(...) more comprehensive risk communication approach, which uses risk communication before an event to strengthen prevention and mitigation efforts", informing "citizens and businesses about their potential exposure to encourage them to invest in precautionary measures to avoid, reduce or transfer these risks". On the other hand, emergency and crisis communication "can be defined broadly as the collection, processing, and dissemination of information required to address a crisis situation" (Coombs et al., 2010) and "needs to inform people once the event is imminent, has already begun or has just occurred" (OECD, 2016).

Accordingly, **risk communication** may be understood as the acknowledgement of risk (including the inherent risk building process resulting from the interaction of evolving hazards, exposures, and vulnerabilities) and the transmission of information during risk situations, enabling an active process of reducing or eliminating this risk.

In terms of wildfire knowledge, for instance, risk communication may target a better societal understanding of the ecological role of fire in the ecosystems, how sustainable forest management may restore a balanced fire ecology or the benefits of cultural and prescribed burns as a tool for land and ecosystem management (including nature conservation objectives, for instance). This type of communication is often linked to the prevention phase of DRM.

At risk-scenario operational level, risk communication may focus on informing when risk situations arise such as to prevent ignitions in wildfire risk season, reduce exposures (e.g., protocols limiting the access to high-risk areas) or having a "ready to act" alert. This type of communication is often linked to the preparedness phase of DRM.

Wildfire **crisis communication** can be information addressed to exposed population in the event of a wildfire, aimed at managing all the emergency and safety requirements. This is typically associated with the response phase of DRM.

The combination of risk and crisis communication lays the foundation of a comprehensive wildfire **risk culture and awareness** in terms or risk perception, attitudes and behaviours. This culture not only should seek to minimize the damaging side of wildfires but also recognizes the beneficial use of fire as a risk and land management tool. This aligns with the principles of integrated fire management as stated by the European project FIRE PARADOX (Silva et al. 2010).

Wildfire RA&C can, therefore, be deployed across the entire DRM cycle, addressing the overall objectives of reducing risk factors such as hazard, exposures and, vulnerabilities and related coping capacity. The greater the acquired fire and wildfire risk knowledge, the easier risk-scenario communication and the more effective crisis communication can be.

This publication primarily focuses on wildfire risk awareness and communication.

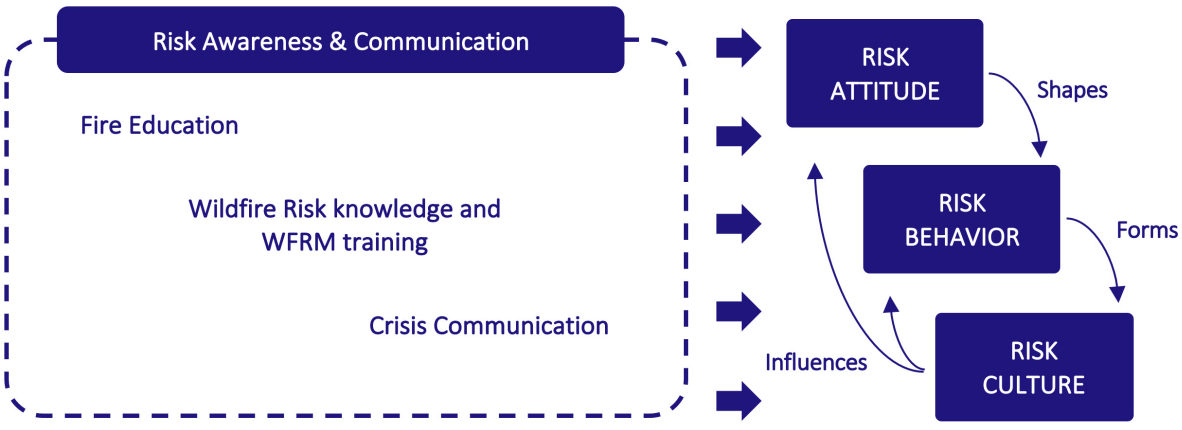


Figure 1. Essential components to enhance wildfire risk awareness and culture

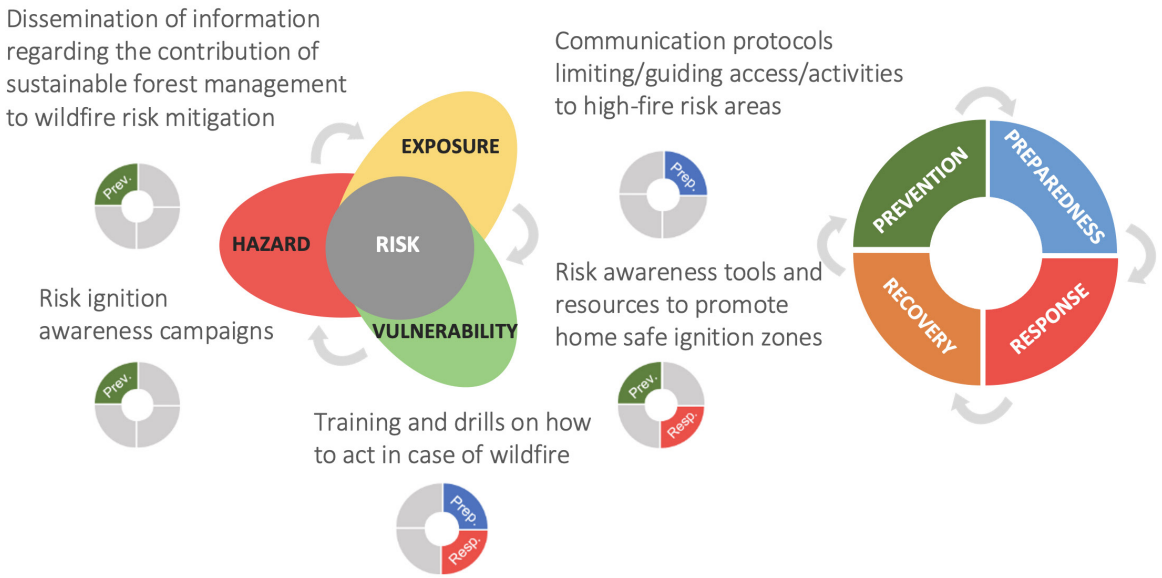


Figure 2. Examples of risk awareness and communication initiatives and their contribution to wildfire disaster risk management

Figure 3. Recommendations for wildfire risk management from UNEP (2022, left) **and OECD** (2023, right) **and examples of cross links with risk awareness and communication targets and challenges**

Beyond enhanced risk awareness to exposed citizens and private sector, RA&C targets may be expanded to all stakeholders (Table 1) who contribute to or influence DRM policies and plans. This involves tailoring awareness campaigns and communication tools and objectives to the different target audiences. The World Bank report (2021) on opportunities for scaling up DRM investments, highlights that the challenge noted by CP agencies stays "in convincing key decision-makers to allocate budget for investments that lead to less tangible or visible results" and the key opportunity stands in "to continue to raise institutional and public awareness of the importance and benefits of investing in risk reduction". DRM can be seen "as a vehicle also to engage other line ministries" informing about the benefits of investing in prevention rather than focussing most of the resources on response planning and readiness.

> *"The pivotal role of appropriate forest management and agriculture as primary tools for fuel management should be highlighted in the overall governance structure for wildfire risk management." (Wildfire PRAF).*

The EC's report on Forest Fires — Sparking fire smart policies in the EU (European Commission, 2018) advocates for the development of extensive awareness campaigns for the public and tailored communication for specific stakeholders, considering the interplay between society, traditions, and forests and integrating "fire safety education but also the physical, emotional and monetary dimensions associated with fire risk". Additionally, the Landscape Fire Governance Framework: Guiding Principles for Adjusting Strategies, Policies, and Management, to Global Change[4] presented during the 8IWFC in Porto (May 2023) advocates for a Systemic and Public communication by mentioning that "Clear communication of what the challenges are and what deliberations are asked for and what their expected outcomes should be envisaged for all stages of the landscape fire processes".

> *"People need to be informed and educated about wildfires so that through their actions they do not increase fire risks but, on the contrary, actively support the mitigation of wildfires." (European Commission, 2021).*

[4] https://www.wildfire2023.pt/conference/framework

Table 1. Map of stakeholders related to wildfire risk awareness and communication targets and challenges

Stakeholder group	Example of RA&C targets and challenges
Exposed population	Beyond addressing civil society at large, specific distinctions are needed for the following target audiences: Children and youth; Women; Individuals with disabilities and vulnerable groups; Older individuals; Indigenous peoples; Migrants (see more specifications in the Sendai Framework). In touristic areas, it´s equally crucial to design distinct strategies for the various groups, including local populations, residents, permanent and seasonal foreign residents, and visitors.
Forest owners, farmers, land managers	"Nature-based solutions, such as traditional grazing, forestry practices and crop mosaic should be encouraged"; "The community should understand the concept and the importance of fuel management and should be actively engaged in reducing fuel load."; "Training programmes and rural campaigns for prescribed burning should be implemented on a regular basis." (Wildfire PRAF).
Forest and Agriculture extension services, and Land use planning Ministries	"Regional planning of better landscape vegetation pattern (forestry, agriculture), and for adapting to changing bioclimatic conditions and regime of the potential fire frequency and severity (planning for the future landscape) should be encouraged."; "Land-use planning should be considered as a preventive measure and should regulate where to build in the landscape (...)." (Wildfire PRAF).
Emergency bodies	"Integrated wildfire risk management should be addressed as a topic of paramount importance."; "Targeted awareness campaigns to prepare communities for a wildfire event should be implemented (...) through specific protocols and different channels."; "Campaigns and training programmes should be organized on a regular basis to improve communication between populations and rescue services. In addition, training programmes to educate the population on evacuation procedures and/or "(...) stay-in-shelter" practices should be implemented on a regular basis."; "Wildfire risk management responsible authorities should collaborate to raise awareness and build trust and consensus among the general public." (Wildfire PRAF).
Other policy makers, ministries (including finance/ economy/EU funds ministries)	"The pivotal role of appropriate forest management and agriculture as primary tools for fuel management should be highlighted in the overall governance structure for wildfire risk management." (Wildfire PRAF); "While there is a growing awareness and interest in disaster risk prevention and preparedness, CP agencies noted a low political buy-in for investments in prevention, which is exacerbated by lack of evidence of their benefits." (World Bank, 2021).
Sub-national authorities	"Roles and responsibilities at the sub-national levels must be clearly identified, and there should be no significant overlaps or gaps exist between key institutions involved in wildfire risk management." (Wildfire PRAF).
Business, professional associations and private sector	To "integrate disaster risk management, including business continuity, into business models and practices through disaster-risk-informed investments, (...); engage in awareness-raising and training for their employees and customers, (...); share and disseminate knowledge, practices and non-sensitive data; and actively participate, as appropriate and under the guidance of the public sector, in the development of normative frameworks and technical standards that incorporate disaster risk management" (Sendai Framework).
Financial institutions, philanthropic foundations	Same as above, adding "Adjusting how marketed insurance products can have a transformative impact on ensuring risk-resilient investment (...). Improving codes and standards, and the communication around why they are necessary, is key." (GAR2022, Summary for Policymakers).
Civil Society organization, NGO or non-profit organization	"Effective engagement, collaboration and coordination with civil society organisations and local communities should be in place, particularly those living in areas prone to wildfire." (Wildfire PRAF).
Media	"To take an active and inclusive role at the local, national, regional and global levels in contributing to the raising of public awareness and understanding and disseminate accurate and non-sensitive disaster risk, hazard and disaster information (...) in a simple, transparent, easy-to-understand and accessible manner, in close cooperation with national authorities" (Sendai Framework); "Campaigns should be in place to increase the awareness of decision-makers and the media about the complexity of fire risk and to avoid oversimplified messaging to the population."; "Training courses should be implemented for the media, given their role in communication during emergencies." (Wildfire PRAF).
Education, academia, scientific and research entities and networks	To "(...) support action by local communities and authorities; and support the interface between policy and science for decision-making" (Sendai Framework); "(...) the Ministry of Education can provide support by disseminating information to communities about wildfire risk (...) including wildfire-related topics in school and university curricula."; "Education programmes on risk awareness should be implemented and wildfire risk awareness topic should be included in school curricula." (Wildfire PRAF).
Other opinion formers (influencers, celebrities, etc.	"Innovative collaborations are needed more than ever to support media contents" (GAR2022, Summary for Policymakers). "Social media can also create new risk, by spreading incorrect information about threats, undermining the efforts of official risk management and emergency preparedness authorities" (OECD, 2016).

The OECD report (2023) Taming Wildfires in the context of Climate Change, highlights that "Particularly extreme wildfires in recent years have raised policy makers' awareness on the existing gaps in wildfire risk communication", showing the various forms RA&C can take from educational to training programs. In Figure 4, an adaptation of these functions for the wildfire RA&C is indicated. In this regard, the promotion of stakeholders' engagement in risk assessment and planning by consultation and active participation, as stated in the recently published Wildfire PRAF (Casartelli and Mysiak, 2023), offers an excellent chance to raise awareness, making risk assessment outcomes "comprehensive and ready to use for operational purposes (such as land use, urban planning and contingency planning)" and making stakeholders "fully aware of their roles and responsibilities". Moreover, to involve key stakeholders in WFRM, "An information/ communication flow across different public and private stakeholders and between different levels of administrations should be defined to ensure that key stakeholders are informed of the wildfire risk management planning process and can contribute to it". Consequently, RA&C may play a pivotal role within integrated WFRM.

"A process of co-creating wildfire risk knowledge with the population should be promoted. Action should be taken against misinformation." (Wildfire PRAF).

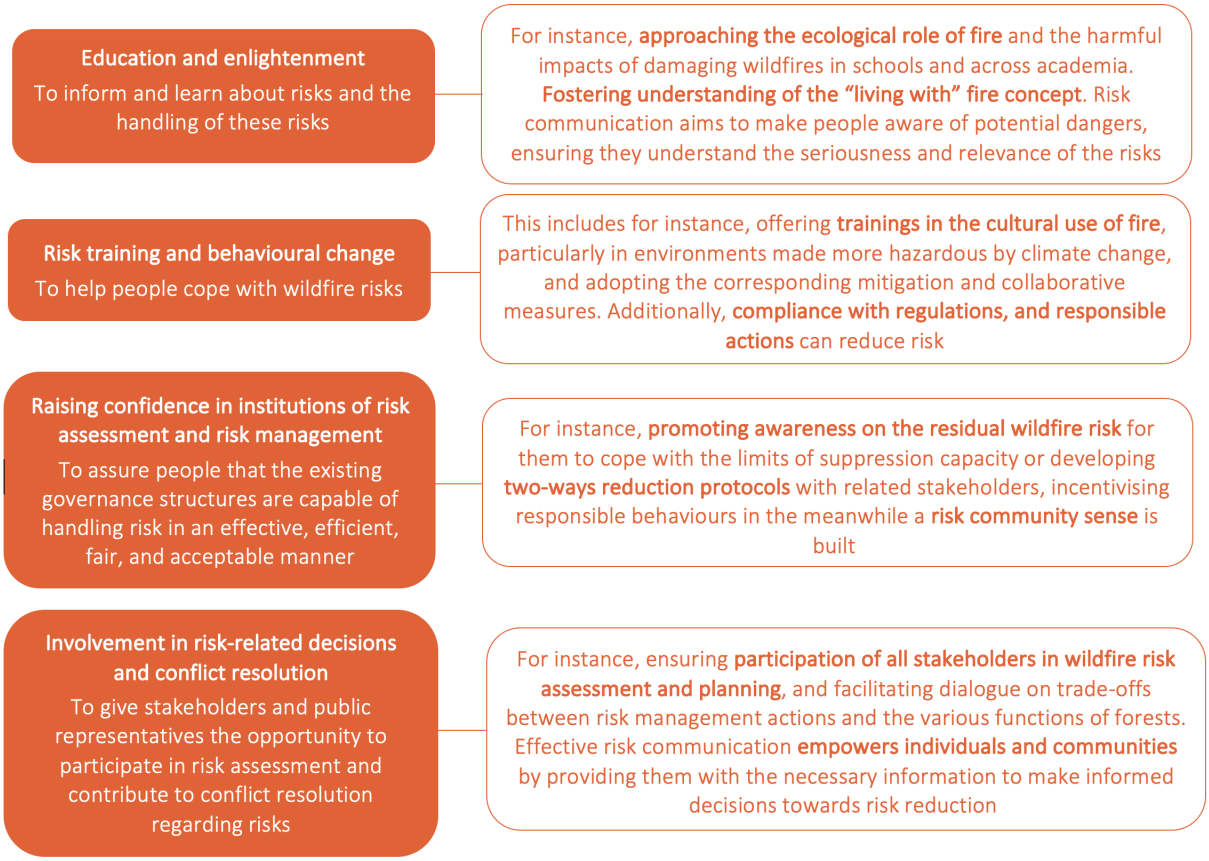


Figure 4. Purposes and functions of risk communication (left, OECD, 2002) **and examples of related wildfire RA&C aspects** (right)

The OECD (2016) report Trends in Risk Communication Policies and Practices, states that a comprehensive risk communication policy should consider all of the following objectives: "i) Informing the public about the different hazards and threats they may face and the related vulnerabilities; ii) Facilitating collective choices by informing public debate and collective discussion about risk management policies and iii) Educating the public about risk reduction and preparedness measures for specific emergencies by recommending precise and dedicated approaches".

"Areas with low levels of awareness about existing hazards and whose responsibility it is to take protective measures lead to endemic low levels of resilience (...)". Trends in Risk Communication Policies and Practices (OECD, 2016).

Framing risk awareness and communication strategically

The EU Council Conclusion (European Union, 2011) states the importance of an integrated approach to risk, emergency and crisis communication, aimed at promoting the interaction between risk management actors and authorities, citizens, businesses or NGOs among others. In this regard, principles of strategic communication may serve to deploy RA&C into DRR policies in a systematic way, which involves a comprehensive analysis, clear communication objectives, tailored messaging, resource allocation, strategic partnerships, and ongoing strategy evaluation and updates (Figure 5) and treating awareness raising and risk communication as a cultural process (UNDRR, 2022).

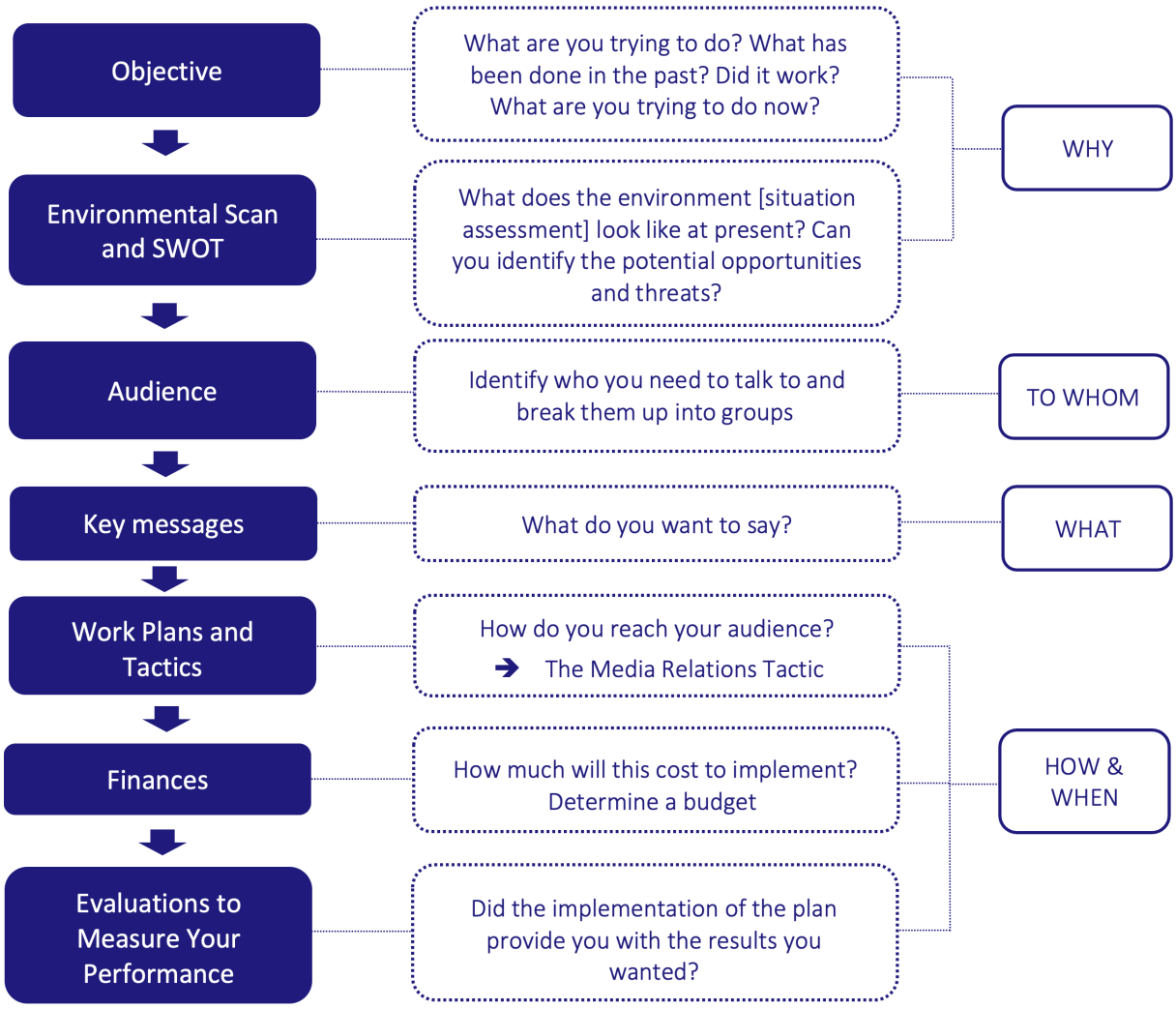


Figure 5. Roadmap towards building an effective communication strategy (adapted from Miner et al. 2014)

"An effective communication strategy can be as comprehensive or as brief as you make it. The end goal is the same, simply by focusing on which outcomes you hope to achieve". Communicating Forest Science report (Miner et al. 2014).

A strategic framework for wildfire risk awareness and communication could improve decision-making and public engagement by bridging perception gaps, building trust and confidence in CP agencies while enhancing risk awareness. As stated in the European Commission DG Environment report (2021) "(...) increasing Europe-wide awareness and creating a common understanding on this topic is necessary, especially because part of the wildfire season overlaps with the main holiday period during which people travel around the continent" and "Tourists are often less well informed about local risks (...)".

"People are often a cause and sometimes are victims of wildfires. As such, it is important to increase European-wide awareness and a common understanding of forest fires that is adapted to the reality of each region." Recommendation #6. DG Environment report on Land-based wildfire prevention (European Commission, 2021).

WFRM communication strategies could be embedded in a broader wildfire DRR strategy, as the Cohesive Wildland Fire Management Strategy[5] in the United States of America shows in which Communication and Collaborative Engagement encompassing "governance, shared information, resources, communications, and monitoring and accountability", constitutes one of the three core elements of the national strategy. At the operational level, existing examples, like the Delta Program´s Guide on communicating flood risks outside dikes in the Netherlands (de Graaff and van de Veerdonk, 2012), provide guidance on key questions (Why, What, How, Who, to Whom) and emphasize the tools for effective communication to citizens. The project Piloting a Communication Strategy on Wildfire Management in Tanzania (Food and Agriculture Organization, 2013) exemplifies a process-based methodology for assessing a nationwide communication strategy for wildfire risk mitigation.

"The perception of the likelihood of low probability / high impact events poses an additional challenge to adequate fire risk perception and should therefore be addressed as highly important in the communication strategy." The Landscape Fire Governance Framework (8IWFC, May 2023).

Moreover, a communication strategy may include RA&C cooperation and collaborations with stakeholders playing a strategic role in disseminating the message or targeting the audience. The report titled From protection to prevention: The role of cooperative and mutual insurance in disaster risk reduction (Tarbuck and Zodrow, 2021) illustrates how insurers can raise awareness and offer practical advice to their customers on reducing disaster risks, with initiatives like The Co-operators in Canada, in collaboration with FireSmart® Canada, that support Wildfire Community Preparedness Day events to promote wildfire resilience through actions like vegetation clearance and fire-resistant landscaping. Furthermore, guidelines have been developed to aid journalists and media outlets in reporting on wildfires (Ingalsbee 2007, see Annex II about eFIRECOM DG ECHO project, Clarke and Otto, 2022). In Spain, notable environmental NGOs like WWF/Adena and Greenpeace release annual RA&C reports on wildfires that align with key insights and recommendations from leading practitioners and academia, fostering a productive exchange of knowledge and cooperation that has advanced social understanding of wildfire phenomena over several years.

"When reporting on the causes of impactful wildfires, it is important to report on these factors, as well as the level of exposure and vulnerability of the affected people and structures." Reporting extreme weather and climate change. A guide for journalists (Clarke and Otto, 2022).

[5] https://www.forestsandrangelands.gov/strategy/index.shtml

Dealing with uncertainty and unprecedented wildfire changing risk landscapes

Risk communication needs to be flexible enough to properly cope with the uncertainties posed by a changing risk context. As stated in the report Managing the risks of extreme events and disasters to advance climate change adaptation (IPCC, 2012), "A changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events". These changes are of major importance in terms of risk perception, attitudes and practices since exposure and vulnerability are key determinants of disaster risk and "Explicit characterization of uncertainty and complexity strengthens risk communication". Timely risk communication is vital for effective adaptation and disaster risk management, as it involves sharing climate-related risk knowledge among all stakeholders, with individual and group risk perceptions influenced by psychological, cultural factors, values, and beliefs.

The E-STAG report Evolving Risk of Wildfires in Europe (UNDRR, 2020) reviews the "changing risk landscape" context, considering the influence of climate change but also resulting from the expansion of WUIs into fire-prone areas exacerbating exposures and vulnerabilities. Accordingly, improving awareness and risk information becomes one of the four recommendations to enhance risk reduction, aimed, among others to "Increase government knowledge on how extreme wildfires require different resources, skills, appropriate regulations and prevention policies, in addition to emergency management".

> *"Public communication must evolve to adequately reflect the evolving nature of wildfires in Europe. Populations must learn how to live with fire risk, as with other hazards such as storm surges or floods". Evolving Risk of Wildfires in Europe (UNDRR, 2020).*

Accordingly, RA&C strategies can serve as a powerful tool to enhance wildfire risk disaster adaptation in both traditional fire-prone areas experiencing more intense and extreme wildfires and in non-traditional fire-prone countries. A report on Forest Fires in the Alps – White paper for policy makers (Müller et al., 2020) recommends fostering awareness-raising activities to establish a fire awareness culture, especially considering the likelihood of rapid and disruptive changes in fire seasons. RA&C can also support key recommendations, such as promoting suitable tree species, fuel management, fire-aware forest planning, WUI protection, and experience sharing.

> *"A rapid and disruptive change is more likely than a steady one, which means that some low fire seasons will be followed by a very intense one". Forest Fires in the Alps – White paper for policy makers (Müller et al., 2020).*

Nevertheless, as the OECD (2016) report on Trends in Risk Communication Policies and Practices shows, "Countries' risk communication strategies are not as forward looking, taking future risk patterns into account, as they could be, suggesting possible difficulties in identifying future risks or in communicating them".

Resources and facilitators for effective risk awareness and communication

The report on Principles of Risk Communication (Campbell et al., 2020) identified three overarching principles for effectively communicating risk across the disaster lifecycle: Communicate through familiar and trusted messengers; Provide clear, actionable information, and; Tailor messages and information pathways for target audiences. The report offers practical examples and evidence-based recommendations, emphasizing the importance of trust in partnerships and relationships, the need for actionable guidance linked to risk information, and the alignment of communication strategies with specific goals ensuring that "the message resonates with the responsibilities and needs of the audience".

> *"Knowledge alone is insufficient for prompting action. Instead, information about risk must be linked to actionable guidance so that people know how to respond appropriately." Principles of Risk Communication (Campbell et al., 2020).*

Pillar 3 of the OECD report (2014) outlines guidance for risk awareness raising such as the promotion of two-way communication between the government and stakeholders, the combination of targeted communication with incentives and tools for end-users to engage stakeholders to "work together and take responsibility" and the importance of mobilizing the public education system to promote a culture of resilience. The report also defines criteria for effective risk communication (Figure 6).

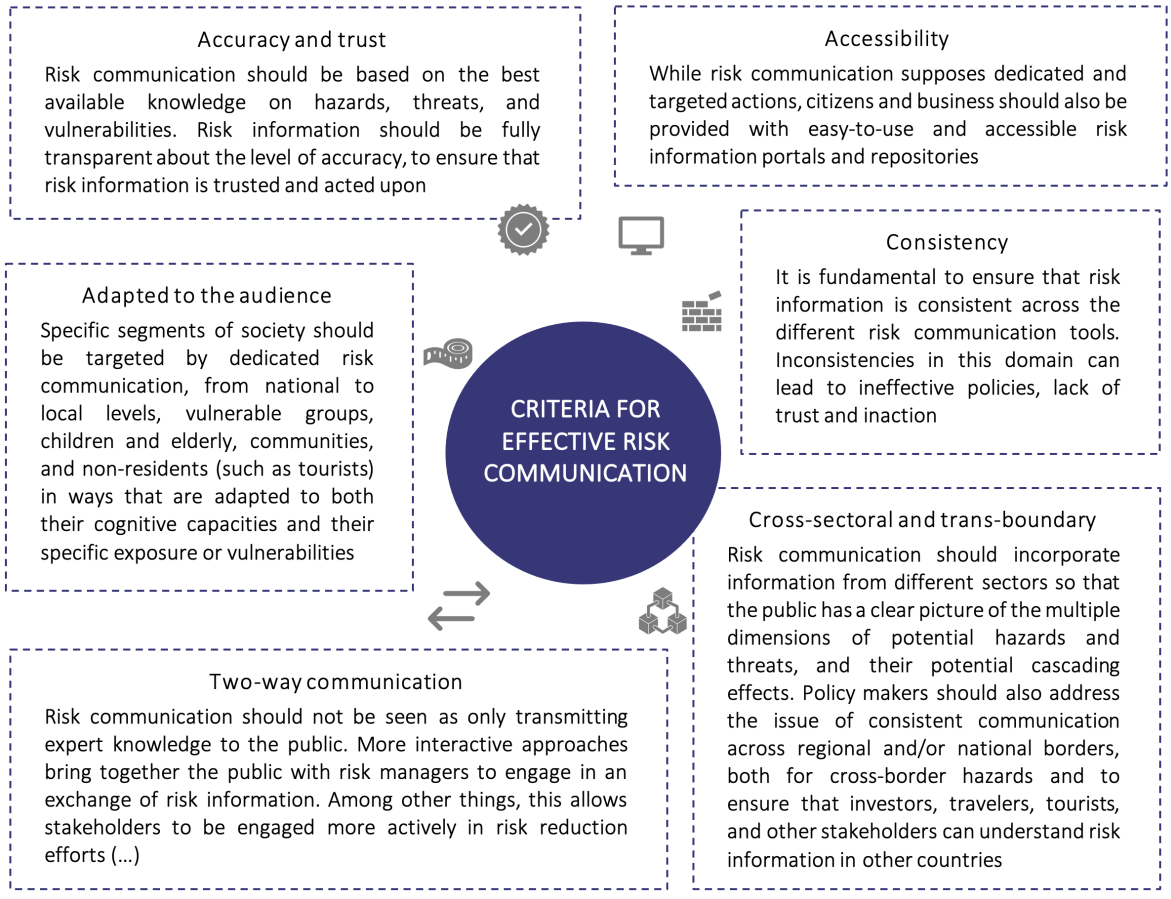


Figure 6. Criteria for effective risk communication (OECD, 2014)

In the field of crisis communication, the ENGAGE project (see Annex II) recognizes that "that there is a tension between the legacy model of emergency communications and future requirements, creating a gap between what is required and what is provided" and suggest a set of recommendations (Box 2) to "enhance capacity and capability by creating an [communications] environment that is accessible, equitable and anticipates change as a constant state".

Box 2. Recommendations for Communicating with Citizens in a Crisis (ENGAGE Policy Brief)

1.1 Bridge the communication gaps between professionals and citizens. For example, in relation to language (terminology), content, risk tolerance, stereotypes, desired outcomes/priorities, and assumptions.

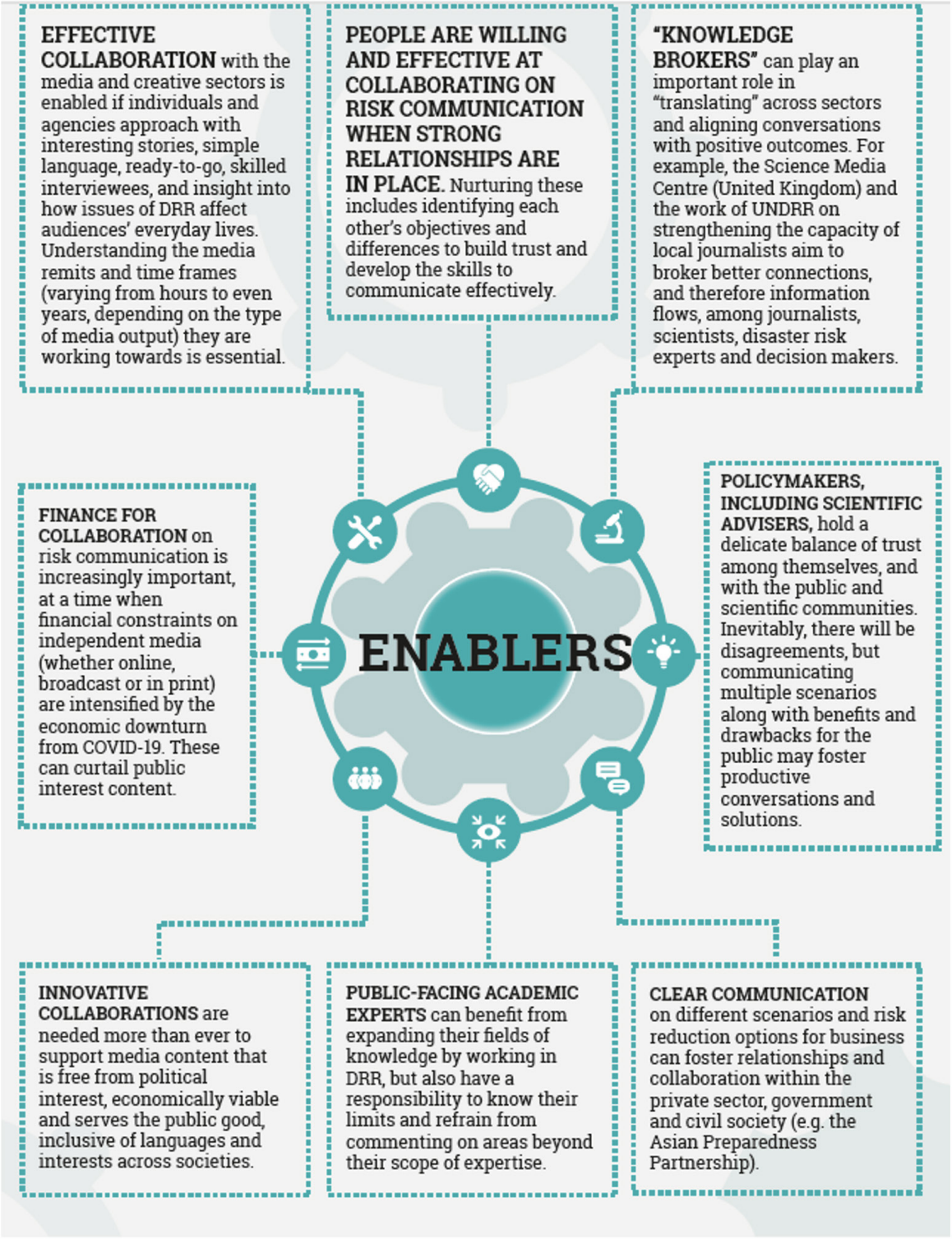
1.2. Recognise that communication is a continuous activity that is reliant on creating the right conditions for it to be effective.

1.3. Design consistent messaging and communication that is inclusive and adaptable to specific needs.

1.4. Recognise communication as a learning opportunity and actively design in opportunities to exploit this throughout the cycle.

1.5. Communication strategies should recognize and positively support the opportunities that emergencies provide for citizens, communities, and formal agencies to enhance integration and resilience.

Additionally, Figure 7 provides an overview of the key facilitators of good risk communication, as outlined by GAR2022, and indicates the systemic and transversal dimension of RA&C.



Note: DRR = disaster risk reduction.

Sources: McManus and Tennyson (2008); Gluckman (2014); Ink and Thurmaier (2018); ADPC (2019); Luminate (2020); Quigley et al. (2020); Gluckman et al. (2021)

Figure 7. Enablers of good risk communication (GAR2022, UNDRR)

Insights for a communication strategy on fire education and wildfire risk management

As we have seen in the previous chapters, wildfires are a complex phenomenon, and raising awareness and effectively communicating about the risks associated with them entails addressing various aspects that collectively aim for a divers set of practical outcomes. These include improving understanding of the fire´s natural role in ecosystems, enhancing public support for long-term landscape-level policies by highlighting the contribution of sustainable forest management as a tool for wildfire risk reduction, building trust in public institutions amidst changing risk landscapes and uncertainties, and fostering awareness among citizens and private sectors about the importance of wildfire prevention and preparedness.

To compile this diverse array of aspects related to wildfire RA&C under the principles of strategic communication, Figure 8 below offers some insights to approach and define a communication strategy on fire education and wildfire risk awareness and communication. This common framework should be tailored to suit the particularities of EU territories and align with the main objectives and communication requirements of Civil Protection and wildfire risk management authorities.

Figure 8. Insights for a communication strategy on wildfire risk

1.2 Methodology

This analysis draws its foundation from a review of various RA&C initiatives and projects. These initiatives and projects were gathered in response to a call for good practices initiated by DG ECHO in early 2023. Respondents from Member States, Participating States and Non- Union Civil Protection Mechanism (UCPM) countries filled out surveys to identify and compile good practices in this domain. Due to some variations in the survey structure and inherent differences between initiatives and projects, the results from the survey were analysed separately. The insights from both analyses are jointly integrated into the main conclusions and key points chapter.

The dataset originating from the call for good practices comprises 53 collected RA&C initiatives, listed in Table 2. Each entry includes the name of the initiative, a brief description, and the country it pertains to, organized according to the respective phase within the risk management cycle. From this list of initiatives, although they cannot always be attached to a unique DRM stage, 39 are overall related to Prevention, 9 to Preparedness (although many also relate to Response), 4 to Response, and 1 to Recovery. The initiatives that are included in this analysis are displayed on a map in Figure 9.

On the other hand, results from the set of 9 EU funded projects collected through the same call were also analysed (Table 3). Projects often involve a multitude of partners from various countries, rendering them challenging to represent on a geographical map. Additionally, other relevant EU funded projects related to RA&C on wildfires and DRR have been identified. A short description of the project and the end-user-oriented outputs delivered can be found in Annex II.

RA&C initiatives and EU funded projects originating from the call for good practices were analysed as distinct entities since project information includes overarching objectives and outcomes, while initiatives centre around RA&C tools or outputs that have specific goals, directly addressing particular issues. Additionally, the templates used for projects contained slightly different information fields. In both cases, a characterisation and a strengths, weaknesses, opportunities, and threats analysis have been carried out based on the information from the survey and expert view.

Table 2. List of risk awareness and communication initiatives originating from the call for good practices*

Nº	Title	Short description	Country
		Prevention	
1	Florentina Fuchs	It is a mascot used for forest fire prevention and awareness raising.	Austria
2	Forest fire risk awareness campaign	Campaign disseminating information on fire prevention in forest territories.	Bulgaria
3	Forest fire communication kit (Le kit de communication «Feu de forêt»)	National tool kit for a communication campaign on wildfire risk among other risks, to be implemented at local level.	France
4	Awareness raising and education to communities by NGO F2wald	It promotes wildfire prevention as an essential component of wildfire hazard mitigation through awareness raising and education directed to local communities.	Germany
5	Innovative Action for the prevention of fires on Kythira Island	Innovative action for forest fire prevention is a local initiative on the Kythira Island promoting wildfire prevention and volunteer mobilization.	Greece
6	Informative and educational campaign	Informative and educational campaign focusing in specific areas, according to relative risk assessment. The campaign includes lectures to schools and social clubs, messages through social media and training programs to the general population.	Greece
7	Local disaster prevention campaign (Campaña para la prevención local de desastres)	Prevention guideline communication to national and local authorities and media	Honduras, Costa Rica, Guatemala
8	Fire ban campaign (Tűzgyújtási tilalom)	National fire prevention and fire ban campaign during high-risk seasons.	Hungary
9	Firewise communities in Tuscany	It promotes community involvement in fire prevention activities to increase risk awareness with respect to fire ignition and propagation of forest fires.	Italy
10	Educational fire prevention initiative to school children	Initiative emphasizing on understanding forest fires and their consequences.	Italy
11	Specific prevention plans (Piani specifici di prevenzione)	Tool to reduce the risk of large wildfires through planning silvicultural works in strategic points.	Italy
12	I Do Not Risk (Io Non Rischio)	National communication campaign on good civil protection practices. Civil protection volunteers are trained on specific natural risks to inform citizens in the streets.	Italy
13	Awareness raising - social dialogue	Knowledge sharing initiative between scientists and citizens on wildfire suppression.	Japan
14	Campaigns of State Forest Service and State Fire and Rescue Service	National information campaign about wildfires in agricultural lands and wildfires during high fire risk season.	Latvia
15	High risk information	Announcement of high fire risk season on mass media.	Latvia
16	National fire emergency plan for fire preparedness, risk reduction and awareness	It aims to coordinate national and local efforts in readiness to address wildfires, reduce fire risk and create awareness about fire risks.	Lebanon
17	Wildfire risk awareness campaign	Campaign informing citizens of possible negligence causing wildfires and how to act in case of one.	Malta
18	Wildfire risk map (Natuurbrandrisico)	National safety strategy and risk communication through risk map.	Netherlands
19	Best practice and knowledge sharing report (Brandrapport)	Report highlighting best practice examples and knowledge sharing among fire management actors in Nordic countries.	Norway
20	Stop the grass fires, there is only one earth (Stop pozarom traw, Ziemia jest tylko jedna)	Risk awareness campaign during spring to inform on the dangers and harms of burning grass.	Poland
21	Forest defence (Defesa da floresta)	Public awareness campaign aiming at promoting safety fringes through biomass management around infrastructure and buildings.	Portugal
22	Safe village, safe people (Aldeia segura pessoas seguras)	Wildfire specific preparedness and awareness programme establishing structural measures to protect people and property; and triggering awareness on risky behaviour and self-protection.	Portugal
23	Disasters Avoided	Initiative sharing good-news examples of avoided disasters through intelligent actions.	Portugal and Spain

24	Save the Forests Week	Wildfire risk awareness initiative aiming at sensitizing the society of Cyprus for the need to protect the forests from forest fires.	Rep. of Cyprus
25	Activities for awareness raising among residents	Awareness raising among residents to promote mutual protection and appropriate handling of disasters like wildfires.	Slovenia
26	Educational program MeFiTu	Educational program for school children raising awareness about fire ecology.	Spain
27	FireFlocks Program (Ramats de Foc)	Program promoting the consumption of products involved in wildfire prevention through the use of a label.	Spain
28	Art&Fire Initiative	Initiative using art to reach the general public to raise social awareness on wildfire risk.	Spain
29	Firewise in EU	It provides education material for communities to understand risk and organize risk reduction actions.	Spain
30	Plan 42: Forest Fire Prevention	Plan carried out through social interventions on environmental education in rural areas to collectively design new solutions addressing fire and forest management, including forest fire prevention measures.	Spain
31	Against fire; yesterday, today... always; For biodiversity with life... against fire (Contra el fuego; ayer, hoy... siempre; Por la biodiversidadl con la vida... contra el fuego)	School environmental education campaign of the Spanish Forest Fire Services of the Central Government Administration at from local to national competition level (2000 schools) playing a game (competition) for firefighting and introducing prevention messages together with dissemination material.	Spain
32	Integral Wildfire Prevention Teams - EPRIF	Staff from the Ministry of Environment who in collaboration with the autonomous communities forest services develop activities focused on planning, implementing and monitoring prescribed burns, reconciliation of interests with farmers and ranchers (causes of fires), training, public awareness and environmental education actions.	Spain
33	Forest of Forests; Aunt Filipa... and Life; Don't Burn Life (Bosque de bosques; La tía Filipa... y la vida; No quemes la vida)	Theatre plays as fire prevention and awareness campaigns in fire-prone rural areas to promote the correct use of fire in agriculture.	Spain
34	Heating everyman's (Eldning allemansr)	Campaign informing on the risks and responsibilities associated with the lighting of a campfire or barbecue outdoors.	Sweden
35	Fire risk forecasting system (Brandriskprognossystemet)	Initiative informing on current and forecasted fire danger, also supporting decision making with weather information.	Sweden
36	Fire fuel classification web-based map service	Web-based map service on fire fuels to provide information to municipal rescue services and county administrations about the fire propensity of forest vegetation, aimed at risk awareness on fire-prone conditions, decision-making in case of emergency and fire behaviour analysis.	Sweden
37	Handbook on Municipal Preparedness - Risk Catalogue 2022	It includes a risk catalogue containing chapters on different risks, one being wildfires to support the municipalities in executing their risk and vulnerability assessments (RVA) and to inform all related stakeholders (e.g., regional administrations, national level agencies or public and private sector). The main purpose is to give a brief introduction to the different risks (including among other uncertainties, developments and trends) and then refer the reader to further in-depth material.	Sweden
38	Forestry guidelines (Skogsbruket)	Guidelines for risk management regarding fire are to reduce the risk of unwanted forest fires as a result of forestry work. Based on the guidelines, it is forestry's responsibility to produce instructions and training.	Sweden
39	Tourist information on fire (Dalsland Nordmarken)	Local initiative informing non-residents and tourists about fire prevention good practices for the use of fire in nature.	Sweden
		Preparedness	
40	Interactive training session	Sessions organised frequently by non-governmental organisations & civil society. The project has the aim of improving wildfire preparedness and awareness of wildfire prevention methods, with the action being defined and implemented by the National Civil Protection (CP) Authority.	Bangladesh
41	Yearly national campaign for fire-protection	Campaign disseminated through several information channels.	Croatia

42	Wildfire Risk Monitoring - Fire Danger Notices	Calculation and dissemination of dynamic Wildfire Risk and Fire Danger (indexes on maps) in cooperation between Departments and addressed to stakeholders.	Ireland
43	Daily wildfire risk information	Daily information and measures as well as burning safety workshops directed to the population.	Portugal
44	Wildfire risk management training and preparation	Risk awareness through preparation of regional fire and rescue service engaging mayors, National Park authorities and forestry institutions.	Slovakia
45	112 Aragón	Self-protection measures disseminated through several media channels in times of high wildfire risk.	Spain
46	Fire danger forecast and warning	Information on fire danger forecast and warning to the public disseminated through several media channels.	Sweden
47	Fire Ban information (Eldningsf rbud)	Guide for local implementation of fire bans or other regulations related to fire, supported by several types of information material.	Sweden
48	Fire Danger Outdoors smartphone app (Brandrisk Ute)	Smartphone app providing extensive and regular fire danger forecast specific to any chosen location; and providing information on safety measures in relation to fire.	Sweden
		Response	
49	The "Safe borderlands" project and "Joint management of specific risks in the Jesenik – Nysa region" project	Two initiatives on the Czech-Polish border improve cooperation to ensure crisis preparedness and improve wildfire risk awareness among national bodies responsible for disaster response.	Czech Rep.
50	Knowledge Exchange	Initiative promoting wildfire behaviour analysis and raising awareness around the topic of wildfires, setting up a two-way knowledge and experience exchange between southern and northern countries.	Norway
51	Fire safety lectures	UL FSRI Fire Safety Academy follows a program of 46.5 hours of fire safety lectures.	The Philippines
52	Firefighting hoses (Hozesolutions)	Preparedness and defence product through the installation of a semi-autonomous firefighting hose system.	Germany
		Recovery	
53	Paint it back (Boranka)	Forest fire awareness and reforestation initiative engaging children in educational and creative workshops to restore burnt areas.	Croatia

* Ordered by the publication authors and main related DRM phase.

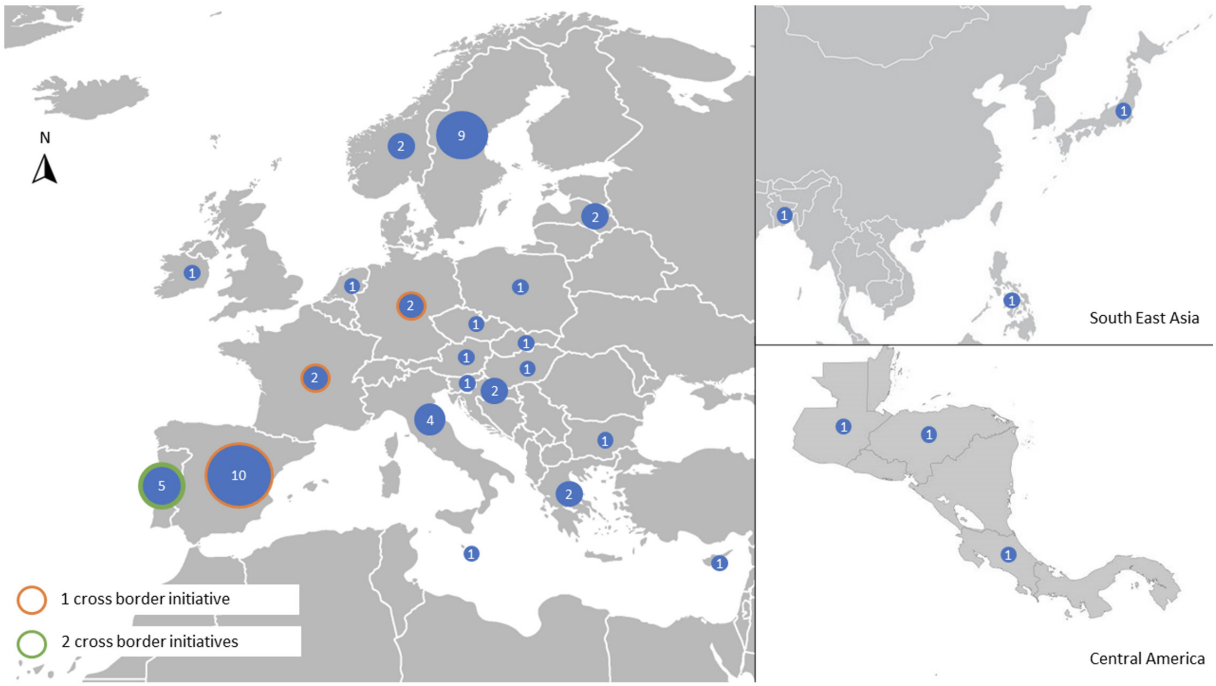


Figure 9. Map displaying initiatives collected through the call for good practices

Table 3. List of wildfire and disaster risk reduction projects under the risk awareness and communication scope originating from the call for good practices

Acronym	Name	Calendar	Program
AFAN	Advanced Fire Analysis Network	2021 - 2022	DG ECHO
ArcFUEL	Mediterranean Fuel-Type Maps Geodatabase for Wild-land & Forest Fire Safety	2011 - 2013	LIFE+
Firelogue	Cross-sector dialogue for Wildfire Risk Management	2021 - 2025	HORIZON 2020
FirEUrisk	Developing a holistic, risk-wise strategy for European Wildfire Management	2021 - 2025	HORIZON 2020
Pyrolife	Training the next generation of integrated fire manage-ment experts	2019 - 2025	HORIZON 2020
RECIPE	Reinforcing civil protection capabilities into multi-hazard risk assessment under climate change	2020 - 2021	DG ECHO
RESISTANT	Training and Knowledge Sharing Platform for First Res-ponders and Educational Tools for students' and citi-zens' awareness and preparedness against Natural and Manmade Disasters and Risks	2021 - 2022	DG ECHO
Roadmap	European observatory on disaster risk and crisis mana-gement best practices	2021 - 2022	DG ECHO
WUIVIEW	Wildland-Urban Interface Virtual Essays Workbench	2019 - 2021	DG ECHO

The multiple-choice questions from the survey distributed by DG ECHO during the call for good practices (Annex III) include quantitative and qualitative fields of information (Figure 10) that have been organised in a database to conduct the assessment (Chapter 2). For the quantitative ones, figures with the results have been edited, both for the initiatives and the projects.

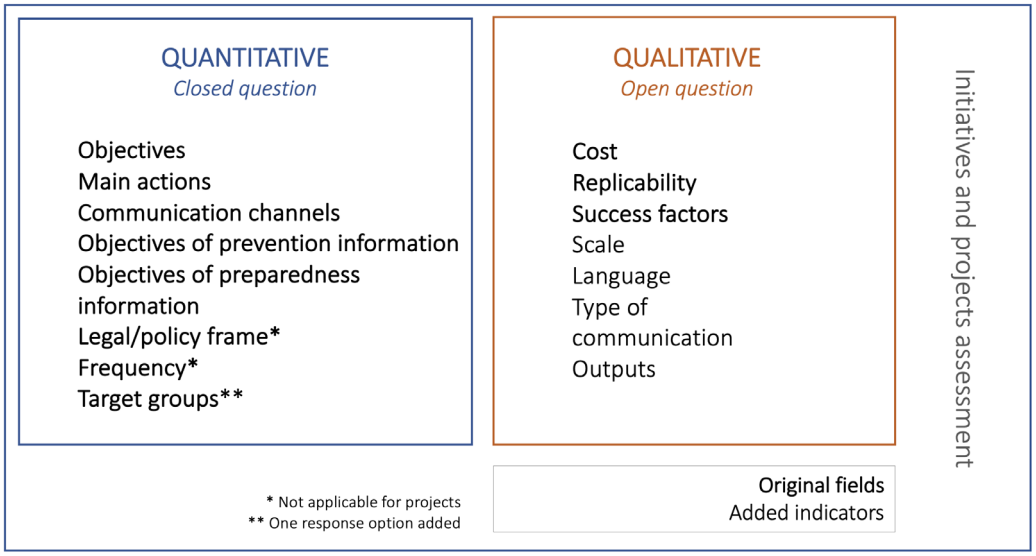


Figure 10. Fields of information from the survey describing the risk awareness and communication initiatives and projects

2 /
STRENGHTS, WEAKNESSES, OPPORTUNITIES, THREATS, TRENDS AND GAPS OF RISK AWARENESS AND COMMUNICATION INITIATIVES AND PROJECTS AT EU AND INTERNATIONAL LEVEL

2 / STRENGHTS, WEAKNESSES, OPPORTUNITIES, THREATS, TRENDS AND GAPS OF RISK AWARENESS AND COMMUNICATION INITIATIVES AND PROJECTS AT EU AND INTERNATIONAL LEVEL

2.1 Wildfire risk awareness and communication initiatives

A) Characterisation of the RA&C initiatives from the call

This chapter describes the main characteristics of the sample of 53 RA&C initiatives collected through the call. Figure 9 shows that the sample is mainly based on UCPM Member States (MS), where half of the initiatives (27) are applied in the south of Europe, while the other half are in central (11) and north (13) Europe. The rest of the initiatives (4) are located in central America (1) and in southeast of Asia (3). It is important to take into account that three initiatives are doubled since they are present in more than one country. This is the case of an initiative applied in Spain and Portugal, one applied in Portugal, France, and Germany, and one applied in Honduras, Costa Rica, and Guatemala.

Graphics 1 features a selection of graphics illustrating the results of the quantitative analysis carried out on RA&C initiatives, derived from responses to multiple-choice questions from the survey provided in the context of the call for good practices by DG ECHO. In Graphic A, the overarching **objectives** of the analysed initiatives are explored. Among the 53 initiatives studied, the majority (33%) prioritize raising awareness about wildfire risks.

Graphic B shows the **primary actions undertaken** by these initiatives. Notably, risk awareness campaigns (28%) and the dissemination of online information (29%) emerge as the two most prominent actions.

Graphic C portrays a fairly balanced distribution of **communication channels** employed. Within other channels (16%), official channels from public institutions, online maps or websites were specified.

Regarding **prevention-related information**, Graphic D shows that 30% of the initiatives provide information concerning wildfire risk exposure, overshadowing information concerning fire propagation and vegetation waste treatment, guidance on safeguarding properties, vegetation management and land-use planning.

Graphic E regarding **preparedness-related information**, the identification of alerts and instructions for appropriate behaviour during dangerous situations are the most frequently selected options. This suggests that the broader identification of authorities' general warnings and behavioural guidance takes precedence over more specific dimensions of danger situations directed towards vulnerable groups such as children, the elderly, disabled individuals, or others.

Graphic F reveals that the general public is the primary **target audience** for these initiatives, which indicates a focus on disseminating information at a general level rather than targeting specific key groups. The focus thus lays on reaching as much people as possible through awareness campaigns and the dissemination of online information using different channels, mainly providing information on what to do in case of emergency and on exposure to wildfire risk. Within "other target groups" (19%), first responders, residents, or machine operators were included.

Graphic G illustrates that the most common **frequency** of application is on an annual basis, occurring mostly during the wildfire season or in proximity to it (27%). In smaller proportions, there are one-time initiatives (11%) and monthly available ones (8%) which are typically linked to risk data and monitoring. Within the category Other (54%), permanently available initiatives (including plans or the dissemination of informative material) were often mentioned, but also other frequencies were mentioned relating to each initiative´s lifetime and timelines.

In the last graphic (H) regarding the **legal** or **policy frame** in which the initiatives are developed, most of the sample (27%) is based on a specific measure defined or implemented at regional or local level (such as self-protection guidelines or fire-prevention good practices for tourists) or in a national legal framework (24%) or communication strategy (18%) (such as daily wildfire risk information through risk mapping or yearly campaigns

for fire-protection). It is important to highlight that one initiative can fall under different frames at the same time. For example, it can be part of a regional or local action responding to a national strategy, or based on a research project which is solving a regional need.

Regarding the **language**, usually the initiatives are developed at national or regional level, using the local language as the main one. Thus, the variety of languages used in the initiatives is directly related to the official languages recognised in the countries of the sample. In parallel, almost half of the initiatives assessed are available in English and other languages (usually linked to the border countries´ language or to typical tourist communities). This illustrates the objective of reaching as many people as possible, addressing national/ regional awareness towards all people staying in the territory, regardless of whether they are local population, foreign residents or visitors.

Typically, when material is translated into English or other languages, it addresses the public with "basic messages". This information is often globally applicable and easy to understand, such as what to do in case of emergency, the best practices to adopt relating to campfires and barbecues, or how to reduce one´s own exposure and vulnerability. The initiatives which aim to increase wildfire risk awareness through knowledge and understanding of risk factors, the evolution of risk linked to land use changes, the available tools to assess risk levels, etc., are usually targeted to the local population or public bodies (e.g., civil protection volunteers, local decision-makers, etc.).

The **type of communication** used in the sample is diverse, and it is also linked to the target audience, highlighting the ones focused on:

- Individual responsibility, generally linked to a top-down communication showing how to develop specific actions or how to proceed in specific situations.
- Community engagement, linked to specific territories (WUI for instance) or communities (scholars, tourists, etc.).
- Technical information such as mapping or risk indicators, are usually addressed to authorities.

Graphics 1. Features of risk awareness and communication initiatives collected by the call employing a survey with multiple-choice questions (n=53)

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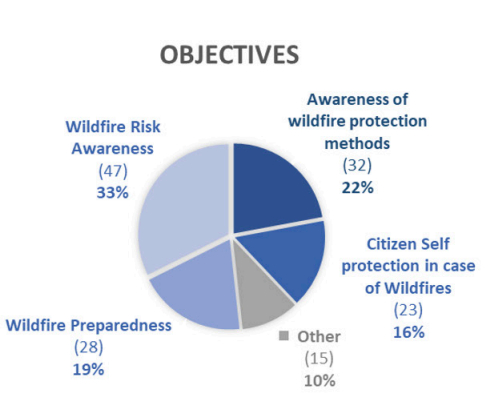

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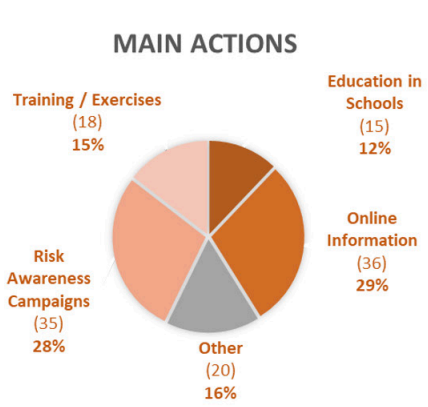

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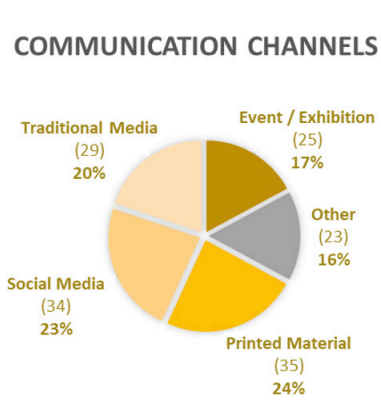

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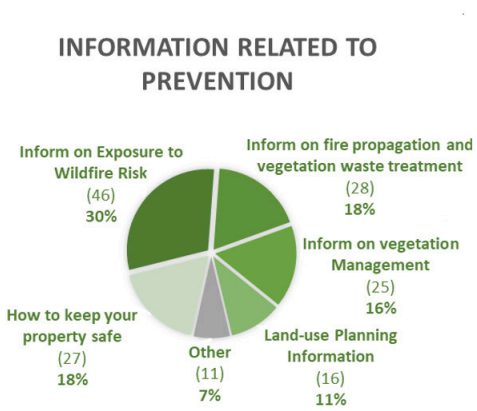

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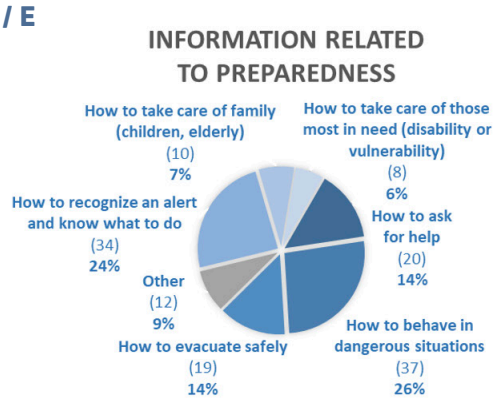

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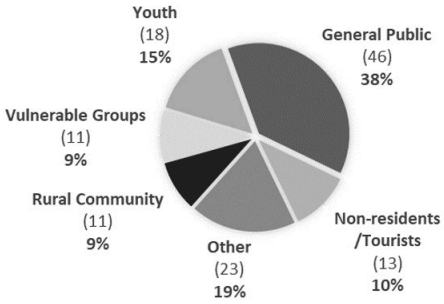

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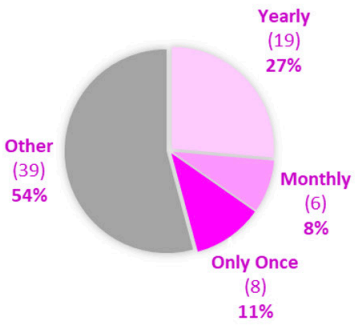

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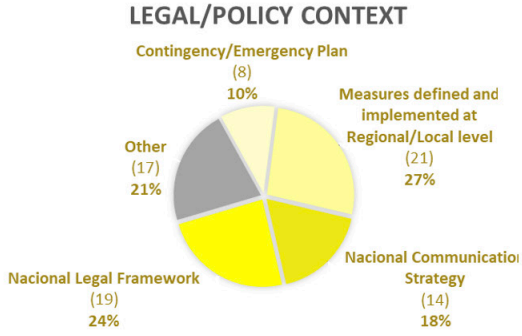


The highlighted **success factors** are mainly related to:

- **Language and narrative**: The use of technical language or approaches should be avoided in terms of comprehension and care should be given to the selection of available languages. Both are considered success factors to reach as many people as possible and guarantee the understanding of the information that is facilitated.
- **User-friendly interface**: To ensure that the message arouses interest and is integrated.
- **Stakeholder involvement**: Including and integrating the key stakeholders (authorities, landowners, tourism actors, environmental associations, etc.) in defining and spreading the message.
- **Trust**: Trust in the promoter is a key aspect in engaging with the audience and ensuring the message´s impact reaches its full potential.
- **Empower**: Recognizing the message receiver as an active actor encourages a dynamic learning process and fosters a curious attitude.
- **Funding**: Implementation becomes easier when no additional budget is required.

Regarding RA&C **replicability**, several aspects have been highlighted:

- Many technological RA&C (such as fire danger index, fuel maps, smartphones, etc.) have the potential to be replicated, but **adaptations** will be necessary according to the different legislations, responsible authorities or ecosystem characteristics (e.g., vegetation and fuel classification).
- A **contextualization** to local conditions (e.g., history of the fire in the area, local conditions and resources, etc.) is often needed for replicability.
- The existence of **easy-to-use materials** facilitates replicability.
- **Robust experience** on conducting the initiative and having a set of well-developed and contrasted **RA&C resources** facilitates the capacity to adapt and replicate the initiative to other contexts.
- At cross-border level, similar environmental and cultural conditions or **shared risk management challenges** (e.g., common hazard, tourist flow, etc.) facilitate the cooperation and implementation of RA&C tools. Nevertheless, local language is a predominant issue for stakeholders' engagement.

The **cost** of the initiatives varies significantly based on several factors, including their dimension, frequency, replicability, format (material or online), need for updates, etc.

B) Strengths, opportunities, weaknesses, threats, trends and gaps of the wildfire RA&C initiatives

After the revision of the initiatives and based on main statements described in chapter 1, main strengths (S), opportunities (O) weaknesses (W) and threats (T) identified are described below grouped in some relevant topics. Based on the SWOT, some trends and gaps are outlined at the end. The number indicates the referred initiative (Table 3).

Embedding RA&C from national to local levels: Most of the RA&C initiatives from the sample are deployed at national level offering a consistent nation-wide approach driven by national authority(ies) and often downscaled "in cooperation with local authorities" (37) (S, O). This national authority approach is guaranteeing a permanent (e.g., in terms of funding) and long-term impact (S). Moreover, several national RA&C initiatives considered in the survey-responses collected through the call involve collaborative efforts among various risk management related agencies and stakeholders (S).

> *"A success factor is the involvement of all the important local stakeholders - landowners, tourism actors, and local authorities of the area." (39)*

Although many initiatives rely on top-down and one-way communication strategies ("The more the public is informed about wildland fire issues, the better we can expect the results to be" (14)), other initiatives include a two-way communication frame, integrating lessons learned, inputs and engagement from end-users and/or different stakeholders (S). Moreover, initiatives operating on national level are often complemented with materials and guides to support local authorities in conducting the campaigns and implementing fire bans which "provides the opportunity for a more uniform application" (47) (S). However, there is the risk that messages become too broad or static, thus failing to resonate with citizens or specific cultural groups (W). This results in the ineffective downscaling of the initiatives since local authorities are lacking clear guidance for implementing local actions. (T). Additionally, lack of cooperation between agencies or not having a common communication strategy may deal with contradictory messages (T). In the same line, lack of credibility on authorities may lead to unsuccessful risk communication and facilitates the influence of non-official channels for risk communication (T).

Collaborative partnerships and stakeholder engagement within RA&C initiatives: Several initiatives identify consistent and trustworthy cooperation with stakeholders (S) as an important success factor, for example "good cooperation between authorities and media" (46). Those collaborative frameworks help to increase the "community spirit and the engagement of citizens, something that has been lost over the years- and let citizens adapt their behaviour to existing risks (22)" as well as to review and fine-tune the contents of the RA&C initiatives "involving experts and academia (...)." (37) (O).

> *"(...) awareness meeting with the entities responsible for the upkeep of wooded sites have understood the importance to maintain (house keep) and to create access for fire response in such locations. Through such awareness meetings, signs informing the public of the actions that one should take and how to report such incidents have been set up in locations prone to wildfires." (17)*

One notable example of success is the broad and extensive cooperation among multiple central authorities, which can include [fire propensity of forest vegetation] data "as a basis for land use and buildings" (36) (S, O). Such collaboration shows the capacity of risk assessment tools to communicate risk and to enlarge the WFRM community (urban planners) in risk reduction. Although risk communication based on risk mapping often needs to be supported by a norm to be followed ("legal obligation of its implementation, and the urgency of action in the face of extreme events that have occurred (...) are important factors" (21)) (T), the power of addressing a common goal has been indicated as a successful factor ("the prerequisite is that there is voluntariness and mutual responsibility between the parties to follow the [forestry's] guidelines [for risk management]" (38)) (S). Moreover, pre-existing successful collaboration may be the basis to enlarge stakeholders' engagement in additional risk reduction efforts (O).

> *"The joint strong desire of the actors concerned not to start unnecessary fires in the forest motivates both parties to jointly assume their responsibility to take the necessary fire protection measures in forestry works." (38)*

Some initiatives address environmental education to rural population in a participatory way, highlighting as a success "the established methodology by social participation technicians and the welcoming acceptances of the population" (S) allowing for a "collective design of new solutions addressing fire and forest management" (30). When actions are conducted by official bodies, the advantage of fostering a "shift in the mindset of rural populations through the established trust" was highlighted. This transformation occurs when the staff becomes "part of their neighbourhood, environment, familiarity, spontaneity and even friendship." (32). This underscores the importance of trust and confidence with the participants on the initiative (S). Moreover, in some initiatives, the acceptance and social recognition of the official body (e.g., the Red Cross) is highlighted as a success factor.

Community engagement through participatory risk assessment and planning process proves to be a valuable approach for gaining in-depth understanding of local risks and facilitating contributions to risk reduction measures. In those cases, "the involvement of both the city council and some neighbours who are able to stretch the community" (S, O) (29) is recognized as a success factor. Furthermore, some cases demonstrate the potential of exporting the model to address other risk situations "that may require evacuation or shelter-in-place" (22) (O). Offering branding and visibility to those communities engaged in Firewise programs gives recognition to the collective efforts conducted and may motivate others to follow their example ("it provides the competent body with the Firewise logo which is customised, affixed in the Community area and used in communication tools" (9)) (S). Due to the relevance of community engagement in risk

mitigation, Annex IV includes a specific analysis of similar initiatives from the USA (Firewise), Australia (Safer Together), South Africa (Firewise) and Canada (FireSmart), considering its replicability in Europe.

Funding emerges as an important factor to ensure the continuity, replicability and the adaptation and update of the RA&C initiatives. Some specific cases (e.g., educational activities for school children) rely heavily on grants (T), although in other occasions these initiatives become components of official RA&C programs, thereby ensuring their professionalization and replicability across the territory (S) and securing the necessary funding to "increase the quality and number of actions" (T) (31).

> *"Decisive factors for these campaigns´ success were the solid support and financing by the Ministry, as well as the components, equipment and personnel professionalism." (33)*

Regarding **bottom-up RA&C approaches**, they generally offer a cost-effective way of empowering local communities (S). Nevertheless, when it comes to volunteers, they must be correctly informed, trained and educated, even with the risk of losing their support (W). Even with small funding, the sustained presence of an initiative may ensure its effective spread ("for long-term results there has to be long-term presence" (S)) (O). However, sustainability of the action may be a problem since it requires the long-term engagement of local stakeholders and the securement of funding (even of a small budget) (T). While top-down communication facilitates one-way risk information, bottom-up initiatives may serve as a tool to proactively engage people in risk management (O). Therefore, the choice of communication approach should be balanced according to the main objectives, also considering whether the target audience should play a more active or passive role.

Regarding **communication channels, accessibility and messages**, some initiatives combine different communication channels, including in-person information provision ("Using both written, online and in-person information from nature wardens is key to making sure that the information reaches the visitors camping in the area" (39) (O)) offering actionable and positive messages on how to handle and manage risks (O). In another example "Civil protection volunteers are trained on specific natural risks to inform citizens in the street" (12) (O).

> *"The use of fire to cook is an important part of the visitor experience in this kind of wilderness area, and learning to do it in a responsible manner is key to preventing unnecessary fires." (39)*

In some cases, by means of "easily available" smartphone apps, "user-friendly interfaces" and the use of "accessible language" (S), risk information is addressed to any chosen region "providing information on safety measure in relation to fire" or any other information on fire bans and fire danger "provided from different sources/authorities" (48) (S).

> *"Using the same smartphone app in all EU countries for all users would be a cost-efficient solution that increases the likelihood of reaching visitors traveling between EU countries". (48)*

In terms of fire danger notice, initiatives show how the availability of public data and standardized methodology facilitates the implementation and credibility of the risk index (S). Nevertheless, without the introduction of new information or appealing actions, the general public might lose interest, considering an initiative as yet another "TV advert" (T).

Some initiatives are showing innovative communication methods, such as utilizing theatre plays ("promote the warning message directly to the audience, provide information and direct awareness in the target audience, along with reflection and analysis" (33) (S)) or art expositions ("bringing together artists, scientists, cultural managers, firefighters and [technical] staff" (28)), offering a different communication strategy based on emotions (O) and effectively reaching a broad audience through social media (O).

Another innovative approach to wildfire RA&C involves labelling food products derived from pastoralism for wildfire prevention, which directly engages society in risk reduction through their consumption choices(O). At the same time, it allows to support and give visibility to professional sectors that contribute to wildfire prevention as an ecosystem service, connecting "beneficiaries" with "providers" (O) (27). Such initiatives offer a ground for positive storytelling around wildfire prevention (O). However, it is crucial to ensure the traceability of the label as a fundamental element guaranteeing trust in the system (T).

"(...) pastoralism is increasingly being considered a Nature-based solution." (27)

On the contrary, many RA&C campaigns and initiatives focus on raising awareness about forest protection but fall short in promoting forest resilience to forest fires (W). Nevertheless, the conceptual framework can be easily adapted to the "fire-resilient landscapes" concept and the need to integrate the mindset of "living with fire" into society (O), going beyond the idea of framing fire as a negative impact only, which could create reluctance to future policies aimed at fire resilient landscape management (T).

In this context, some initiatives aim at sharing positive examples of avoided disasters, motivating action towards resilience by providing end-user oriented and applicable information supporting "the collection of good practices on wildfire risk awareness in Europe" (23) (O).

"This project will show a narrative that, whilst we appreciate many geographies are vulnerable in various ways, they can (and are) achieve a good state of resilience in clever ways, and there are valuable lessons and knowledge to be gained from those that are achieving this." (23)

In some cases, knowledge sharing initiatives are conducted through social dialogue, using an online format which can be adapted to "any age group" (13) (O), offering a high degree of applicability.

"(...) experts related to large-scale fires are not simply experts who conduct scientific research on wildfires, but dealing with fire-related topics described in history, culture, and literature can similarly raise awareness of disaster prevention with the public, and can be implemented in a flexible structure that allows more scientists and experts to participate." (13)

Regarding the **strategic communication framework**, while none of the initiatives formally describe its engagement into a national RA&C strategy, most of them adhere to at least some of the systemic communication principles (e.g., targeted audience) (W). In other initiatives, the same agency may be involved in publishing guidelines, organizing special activities, participating in events, conducting educational programs, or developing mobile phone applications (S). Additionally, certain initiatives employ a hybrid approach, combining general campaigns with specific targeted public campaigns, and foster the exchange of ideas and practices across stakeholders.

"Through pre-emptive collaboration, initiatives also create awareness between the fire sector, the forest sector, and the public. In turn, this encourages regular updates between actors as well as exchanges of ideas and practices." (19)

The diversity of initiatives collected through the call shows the potential that RA&C holds for WFRM, both across all risk factors (reducing the hazard and exposure and increasing the coping capacity) and at operational level, within the RMC (from prevention to recovery). Table 4 shows some examples of the survey-responses collected through the call that illustrate the comprehensive contribution of RA&C to risk reduction. A WFRM communication strategy may offer the chance to establish a common framework to embed the RA&C initiatives into the corresponding short, medium, and long-term objectives, thereby strengthening the cooperation across agencies and with relevant stakeholders and optimizing the use of available resources.

Table 4. Examples of wildfire risk reduction actions addressed by risk awareness and communication initiatives from the call, across risk factors within the disaster risk management cycle

Risk factor	RA&C objective	DRM phase	Example
Hazard	Public campaign to prevent fire ignitions	Prevention	Wildfire risk awareness campaign in Malta
	Forest stand management guidelines to reduce the potential of wildfire spread	Prevention	Forestry's guidelines for wildfire risk management in Sweden
	Collaboration with farmers to prevent fire ignitions and proper use of cultural fires	Prevention / Preparedness	Plan 42: Forest Fire Prevention in Spain
Exposure	Information limiting access to high wildfire risk areas (at pre-paredness level or during emergency management)	Preparedness / Response	Daily wildfire risk information (safety burning, wild tracks...) in Portugal
	Risk information to facilitate fire-smart urban developments in high wildfire risk areas	Prevention	Handbook on Municipal Preparedness - Risk Catalogue 2022 in Sweden
	Evacuation planning, protocols and drills	Prevention / Preparedness / Response	Brandrisk Ute (Fire Danger Outdoors) smartphone app in Sweden
Vulnerability	Risk information and communication protocols in collaboration with the touristic sector	Prevention / Preparedness	Tourist information Dalsland Nordmarken wilderness area in Sweden
	Fire adapted communities in wildland urban interfaces	Prevention / Preparedness	Safer Together Victoria State in Australia
	Early warning systems (EWS)	Preparedness/ Response	Forest fire warning services in Finland
	Review on lessons learned after a wildfire	Recovery	Boranka (Paint it back) in Croatia

Some RA&C initiatives have a **cross-border dimension** "establishing common information" and improving the conditions for joint intervention "especially communication and information systems used by rescue (..) and crisis management units" (S) (49). In other cases, it is emphasized that "The initiative can be used by other countries" (1) by translating the available materials. Some initiatives show their potential for replication at both cross-border and EU level but acknowledge the need for adaptation to accommodate different legal frameworks, responsible authorities, or ecosystem characteristics among other factors (O). In newly fire-prone contexts, it is especially valuable to leverage established expertise and knowledge in awareness and communication to avoid repeating the mistakes made in other contexts and countries (O).

Regarding the **targeted audience**, some initiatives have recognized specific groups with specific risk communication requirements, such as non-resident visitors and tourist, often providing specific messages (O) or making materials available in different languages (S). Some initiatives show the capacity to directly involve tourists who spend the summer in the area (O).

Various educational initiatives are addressed to school children, taking advantage of the "curiosity of the students" (26) with their active participation in visual and practical activities (S). Nevertheless, the more complex the activity, the greater the implementation challenge, necessitating training of technical staff (W) although with proper training the activity could be expanded (O). Being embedded into official campaigns allows the "creation of environmental education teams specialized in forest fires" together with a "strong development of didactic material" offering "assistance to schoolteachers and management teams", integrating "lessons learned over the years" based on experience (31) (S). In other cases, initiatives emphasize their replicability since "there is a detailed programme according to the age of the students" (10) (O). Specific RA&C initiatives targeted to different audiences can respond to a variety of objectives aiming at reducing wildfire risk, with an impact in all DRM phases (O).

In terms of **RA&C adaptation and evaluation**, in some cases "The theme of this campaign is reviewed periodically, which makes it possible to revitalise the measures" (3) (O), the functioning of the initiatives is then reviewed by external experts or a "specific methodology for monitoring and evaluating the actions" is implemented (S) (30). On the contrary, in other initiatives the difficulties to measure the effectiveness of RA&C (W) is mentioned. In some cases, practitioner views are integrated into the initiative ("we were able to exchange information with many experts and experienced firefighters and use this knowledge in our project" (4)) (S).

Regarding the **multi-hazard approach**, some RA&C initiatives are embedded into multi-risk tools (Such as a handbook that includes "a risk catalogue containing chapters on different risks, one being wildfires to support the municipalities in executing their risk and vulnerability assessments (RVA) and to inform all related stakeholders" (37)) which might enable the extraction of cross-sectoral lessons from other risks and addressing multi-risk cascading effects (S, O). In other cases, the cross-links with other natural hazards are explicitly emphasized ("as well as to respond to other types of disaster risks (which can sometimes be connected to wildfires - e.g., wildfires, land erosion and flooding.") (23) (O).

Along the SWOT analysis, we have identified the following **trends** in RA&C:

- The adoption of two-way communication frameworks that integrate end-users´ and stakeholders' participation into the communication process (e.g., apps allowing citizens to inform authorities, agreements with private businesses, etc.).
- Incorporating lessons learned from RA&C experiences related to wildfires (in similar or other territories) and other natural hazards.
- Fostering consistent and trustworthy collaborative RA&C schemes, such as partnerships between authorities and media, environmental NGOs, or the education community.
- Facilitating cooperation among various central authorities and transferring risk information to other sectoral policies (such as land use and urban development).
- Building a sense of risk community by emphasizing common goals and mutual responsibility between parties throughout RA&C efforts.
- Formally labelling and giving visibility to the benefits of prevention and efforts done in risk reduction, both at the community and societal levels (including policymakers).
- Coordinating and adapting risk knowledge and information to the particularities of territories, making them more responsive to local conditions and appealing for local use.
- Developing communication initiatives based on emotions.
- Seeking win-win strategies, such as promoting sustainable forest management and the contribution of bioeconomy (grazing, forestry, crop mosaic, etc.) to wildfire risk reduction through proper fuel and biomass management at the landscape level. Emphasizing the valorization of the land management sector in disaster risk reduction under the narrative of NbS.
- Articulating cross-border RA&C initiatives in prevention, as well as preparedness and response.
- Targeting specific social groups and tailoring messages and communication tools and channels to meet the corresponding RA&C requirements.
- Integrating the views of experts and practitioners in the design and updating of RA&C initiatives.
- Considering multi-risk cascading or cumulative effects, such as wildfires, loss of protective forests, and/or an increase in flood risk thereby expanding the risk community to include other natural hazards managers.

From the analysis, two important **gaps** in terms of wildfire RA&C can be highlighted:

- Most of the initiatives focus on communicating the negative effects of wildfires, potentially limiting the social understanding of the "positive side" of fire as a tool for land management (e.g., prescribed fire for habitats and nature conservation) and wildfire risk reduction (e.g., prescribed burns to reduce fuels for wildfire prevention). This may also lead to difficulties in understanding the ecological role of fire in the ecosystem and how forest management contributes to the development of resilient landscapes, protecting civilians, infrastructure, and ecosystem services, even in fire-prone territories, extending beyond the necessary technological response in suppression.
- While many RA&C initiatives adhere to systematic communication principles (e.g., targeting specific audiences), there is a general lack of a standardized strategy for wildfire risk education and communication. Such a strategy could help establish operational objectives, coordinate efforts across various agencies and collaborative frameworks with stakeholders and optimize the use of available budgets.

Table 5. Summary of SWOT analysis for the wildfire risk awareness and communication initiatives

STRENGTHS
Consistent nation-wide approach based on national authority(ies), often downscaled in cooperation with local authorities, **facilitating funding support and permanent long-term impact**.
Existence of **materials and guides** to support local authorities on conducting the campaigns provides the opportunity **for more uniform application**.
Collaborative approach between different risk management related agencies and beyond (e.g., urban planners), and in cooperation with stakeholders based on trust, making them more robust and easily accessible.
Including **two-way communication** approaches, integrating lessons learned, inputs and engagement from end-users and/or different stakeholders, providing actionable resources.
Addressing a **common goal** and **participatory RA&C approaches**, including RA&C through participatory risk assessment and planning process.
Permanent and **well-funded RA&C programs** ensure the **professionalization of the staff and replicability** across the territory.
Bottom-up RA&C approaches offering a low cost of implementation empowering local society.
Easily available communication tools (e.g., smartphone apps in user-friendly interface) and **accessible language**.
Availability of **public data and standardized methodology** facilitating the implementation and credibility (e.g., risk index).
Multi RA&C tools and measures under the same agencies.
Cross-border common risk information and communications **protocols**.
Designed to **reach specific target groups** like tourists, farmers, homeowners, etc., promoting warning message along with reflection and analysis, and actionable measures and consolidated messages sustained over time.
Take advantage of the public interest on wildfires, as well as the "curiosity of the students". Schoolchildren programs and educational campaigns directed at youth can have an important positive impact on curbing negligent behaviour and generate more risk awareness in society over time.
Revision (e.g., by external experts) and including methodologies for **monitoring and evaluating the actions**.
Integration of practitioners' views in the RA&C design and implementation.
Numerous campaigns/initiatives acknowledge and emphasis the **multidisciplinary and cross-sectoral** nature of WFRM.
WEAKNESSES
Risk of **too wide or static messages** that do not impact citizens and/or specific cultural groups.
Volunteers must be **correctly informed, trained and educated, with the risk of losing volunteer support** at any moment.
Many RA&C campaigns and initiatives raise **awareness towards protection of forests but not towards forest fire resilience** and deep understanding of wildfire phenomena.
The **more complex the RA&C activity, the more the technical staff needs to be well trained** for its implementation.
Difficulties in **measuring the effectiveness** of RA&C.
Some initiatives focus on high fire danger awareness and not on **careless behaviour with fire use**. Arsonists or other people who behave carelessly with fire, are **not likely to respond to information campaigns.**
Risk awareness campaigns targeting wildfire ignitions associated with traditional, cultural or vocational activities (e.g., burning crop residue) may have **limited impact unless economically neutral** or other alternative incentives are provided.
Experts agree on the use of prescribed fire to reduce wildfire risk. In that sense, "stop fire" slogans or campaigns can send a **contradictory message** to society.
Most initiatives focus on **addressing undesirable behaviour instead of positive engagement** in activities contributing to landscape and infrastructure resilience.
Some initiatives are **not easily accessible** (vulnerable groups), diminishing its impact.
OPPORTUNITIES
Involving experts and academia to review and fine-tune the contents of the RA&C initiatives.
Pre-existing successful collaboration may be the basis to **enlarge stakeholders' engagement** in additional DRR efforts.
RA&C initiatives can suppose a tool or baseline for **dialogue among stakeholders** and engagement under a **shared vision of risk responsibility.**
Potential of **exporting the model to other risks situations**, including other natural hazards, and vice-versa.
Promotion of recognised branding and visibility of adopted risk mitigation measures, motivating others to follow the example. Risk communication which has a very localized component can incentive stakeholder to act positively in their own interest. An example is publicising extreme fire risk profiles to evaluated communities, motivating more proactive engagement.
Bottom-up initiative with small but sufficient funding and **long-term presence** so that the spread of the initiative can be easily accomplished.
Increase **bottom-up initiatives** aimed at engaging people in risk management more **proactively**.

Including in-person training about **how to inform**.

Offering actionable and positive messages about how to deal and manage the risk.

Develop novel communication **strategy based on emotions**.

Create **easy to reach** many people RA&C through social media.

Promote **geolocated information provision**, from different sources/authorities.

Labelling food and forest products contributing to wildfire prevention **allowing consumers to contribute to** DRR.

Give **visibility to professional sectors that contributes to wildfire prevention** as an ecosystem service, **connecting the benefits of the prevention to** those **related professional sectors** who may contribute to fund it from a cost-benefit perspective and/or by law.

Positive storytelling about wildfire prevention, **embedding sustainable forest and land management into NbS narratives**.

Although none of the initiatives formally describes its **engagement into a national RA&C strategy**, in most cases they follow and/or can integrated into strategic communication principles.

In most cases, the conceptual framework can be easily adapted to the **"fire-resilient landscapes"** concept and the need to integrate **"living with fire"** in society.

Motivating actions by providing **end-user oriented applicable information**, supporting the collection of good practices on wildfire risk awareness towards better resilience.

Through the **adaptation of the measure** to the corresponding legal frame, responsible authorities, or ecosystem characteristics among others, **replicability** may be ensured.

Directly **involve tourists** who spend the summer in high-risk areas and the **touristic sector**.

The more **detailed** the (educational) programs, the easier is its **adaptation and replicability**.

Periodic revision facilitates the **updating and revitalisation of the campaign.**

Explore **cross-links with other natural hazards**.

Especially in newly fire-prone contexts, can use hands-on expertise and established knowledge on awareness and communication to **circumvent mistakes of other contexts and countries**.

Specific RA&C initiatives targeted to different audiences can respond to a **variety of objectives** aiming at reducing wildfire risk, with an **impact in all DRM phases**.

Like there are many exchanges between practitioners on good practices for the response phase, other initiatives could be supported (e.g., exchange of experts) to **address good practices on WFRM communication**.

Many information campaigns could **evolve over time to be less simplistic** especially as societies become more accustomed to wildfires (avoid self-limiting scope/impact).

THREATS

Overall, a **general approach** might lead to local authorities **not having guidance** to implement local actions.

Risk communication based on risk mapping often **needs to be supported by a norm** to be followed.

Being **grant dependent or lacking funding** is a limitation to increase the quality and number of actions.

Without introducing new information or appealing actions, an initiative might **become uninteresting** for the general public, perceiving it as "yet another TV advert".

The idea of fire having only negative impact can create **reluctance for resilient landscape management policies**.

Sustainability of the action may be difficult, since long-term engagement of local stakeholders and funding (although small budget) is needed.

Ensuring the **traceability of the label** becomes fundamental to guarantee the **trust in the system**.

'Demonize' fire through risk awareness campaigns, can have **negative consequences in the public acceptance** of some risk reduction actions such as prescribed burns, or fire suppression decisions.

A culture of **dependency on first responders** (i.e., calling 112) in Europe **undermines taking personal responsibility**, especially in terms of fire-hardening one's home and property.

The type, content, detail, timing or frequency of WRM information may limit the capacity to produce serious changes in this respect. **Financial or other concrete incentive structures are likely required** to address this level of behaviour change.

Contradictory messages can create negative cross-links in terms of narrative coherence.

In this regards, **lack of cooperation between agencies** or not having a common communication strategy may deal with contradictory messages.

Lack of credibility on authorities may lead to unsuccessful risk communication and facilitates the influence of non-official channels for risk communication.

2.2 Wildfire risk awareness and communication projects

A) Characterisation of the RA&C projects from the call

Graphics 2 features a selection of graphics illustrating the results of the quantitative analysis carried out on 9 wildfire RA&C related projects, derived from responses to multiple-choice questions in the survey provided by DG ECHO for the call for good practices.

Graphic A exposes the overarching **objectives** of the analysed projects, of which the majority included awareness of wildfire protection methods (33%) and enhancing wildfire preparedness (33%).

Graphic B shows that providing online information is the predominant **main action** achieved by the projects (41%), 18% of the projects included main actions that were not mentioned among the results, such as workshops, webinars, events or real fire experiments.

The projects included in the selection largely communicate through other **channels** (38%), mainly through online information such as websites, platforms, blogs, etc.. Nonetheless, as shown in graphic C, printed materials (29%) as well as events and exhibitions (24%) appear as frequently utilized communication channels. Social media on the other hand is less frequently utilized (9%), contrasting with the 23% of the initiatives that do communicate through social media.

Regarding **prevention-related information** in graphic D, the tendencies of the projects are similar to the ones of the initiatives, with 27% of them providing information on fire propagation, 23% on vegetation management and vegetation waste treatment, and 20% provide information concerning wildfire risk exposure.

Regarding **preparedness-related information** in graphic E, "how to recognise an alert and know what to do" and "know how to behave in dangerous situations" are predominant communication objectives. This is similar to the results found for the initiatives, suggesting that general warnings and behavioural guidance are prioritized over more location specific preparedness information.

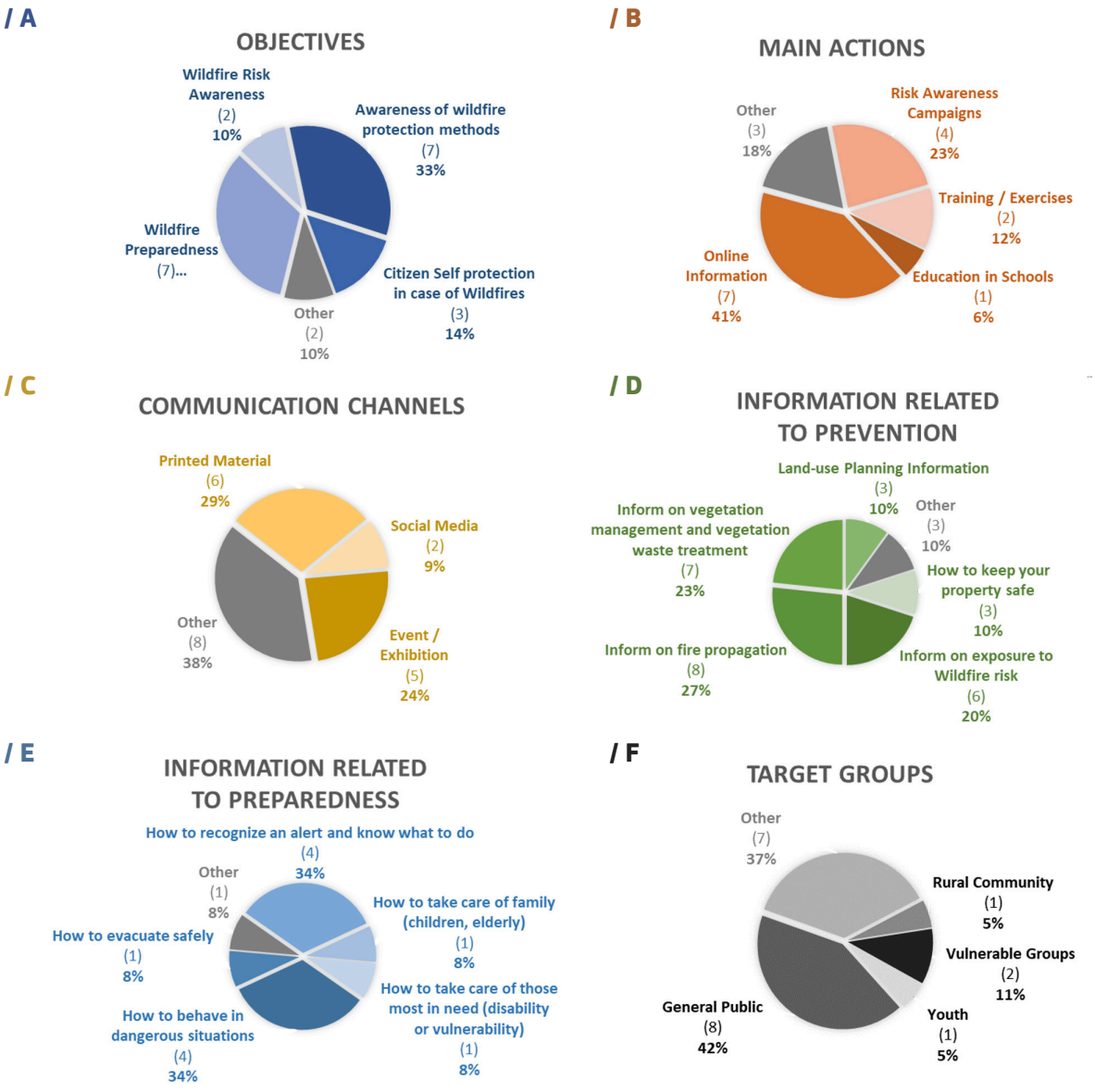
Graphic F highlights that the foremost **target audience** for these projects, similar to the initiatives, is the "general public", constituting 42% of the responses. Vulnerable groups (11%), rural communities (5%) and youth (5%) are not consistently singled out as explicit targeted groups by these projects. A large proportion of the projects appear to be directed towards groups that were not included within the provided categories, such as first responders, students, or risk managers.

Given most of the projects in the sample are European projects with an international application scale, the main **language** used is English. In few cases, other languages are available, usually linked to the partners' countries and their associated languages.

As mentioned, the **scale** is mostly international, thus different bioregions are represented in the sample. In general terms, the **aim** of the projects is related to fuel mapping, wildfire risk assessment and management, networking, training and supporting first responders, reinforce risk reduction strategies, wildfire understanding, cross-border cooperation and communities awareness improvement, among other. Usually, they bring together scientific and practitioners' expertise to co-create proposals and solutions to move forward into wildfire risk management considering the global change.

The **replicability** of the projects depends on different circumstances, but it is highlighted that in most cases the methodology is defined and can be replicated (such as mapping and risk assessment). In other cases, the project itself is designed to be easily adapted and replicated (such as educational toolkit or awareness guidelines).

Graphics 2. Features of risk awareness and communication projects collected by the call, employing a survey with multiple-choice questions (n=9)



The highlighted **success factors** are mainly related to:

- **Case studies**: Using pilot regions to put the theory in practice and test the method and results.
- **Knowledge exchange**: Facilitating the exchange and aggregation of experiences and best practices among stakeholders in the field.
- **Transferable results**: Maximizing the replicability and the usefulness of the results even after the project´s lifespan.
- **Precedent**: Acting as a catalyst by facilitating the initial processes and giving guidelines for the independent adoption of the model. For instance, providing initial educational material to schools through the implementation of the project, whereafter the school has the capacity to autonomously continue and expand the model.
- **Cross-sector**: Involving different stakeholders (from academia to practitioners) with different profiles and expertise to reach a holistic perspective.

Typically, the overall project implementation cost is substantial, falling within a wide range of 150.000€ to 10 million euros, based on the survey data from the call. A significant portion of these projects relies on public funding support, often receiving substantial financial backing from the EU. However, it is important to note that the total project costs do not offer a clear breakdown of expenses associated with outputs related to wildfire RA&C.

Finally, the main **outputs** of the projects linked to risk assessment and communication were identified (see Annex II):

- **Dissemination material**: Leaflets, banners, triptychs, factsheets, posters, etc., including different kinds of content such as communication recommendations, information about fire resilient landscape, resilience in territories, wildfire and more.
- **Guidelines**: Informative documents addressing specific topics. This includes guidelines on the use of tools, science, and best practices for analysing wildfire scenarios in light of projected climate change impacts with the goal of integrating this data into DSS and platforms. They also delve into strategies for civil protection planning, emphasizing a participatory approach. Additionally, they may provide teaching resources to support the student's learning process, wildfire risk assessment at local level, information on wildfire risk to enhance social understanding and resilience, wildfire risk assessment in municipalities, and more.
- **Trainings**: Instructive sessions about different topics and tailored to specific audiences. These sessions may include demonstrations showing risk reduction strategies in practice to land managers, lectures on tactical response actions to first responders, trainings to teachers on how to educate about wildfire risk, guides and videos on how to react in the event of a natural hazard, fire scenarios in WUI areas for fire safety practitioners, online courses and games to increase understanding of various aspects of fire, risk communication, and more.
- **Reports and other documents**: A variety of documents serve to address specific topics. They may include toolkits designed to engage with vulnerable communities, policy briefs, recommendations on communication actions to engage media and communities in wildfire risk management, etc.
- **Platforms**: Two examples of information exchange and knowledge sharing platforms are provided. The first is a geographic information-based platform that facilitates the exchange of data and information, and the second is a knowledge exchange platform compiling a repository of initiatives related to fires and forests.
- **Workshops and webinars**: Interactive sessions covering different discussions and topics, for instance, stakeholder and citizen engagement, risk communication, policy briefs, integrated fire management, etc.
- **Audiovisual material**: Resources were produced such as a documentary about fire-smart practices, short videos related to wildfires and especially directed to children and youth, TV segments, informative podcasts, and more.
- **Books**: Educational material about fire and forest fires in the Mediterranean region in the format of a storybook for children, or in the format of handbooks teaching about forestry resilience, directed to schoolteachers, also providing information about children's security in relation to disasters.
- **Scientific papers and publications** on topics related to RA&C.

B) Strengths, opportunities, weaknesses, threats, trends and gaps of the wildfire RA&C projects

The following chapter describes some RA&C strengths (S), opportunities (O) weaknesses (W) and threats (T) highlighted by the projects. The replicability and upscale possibility of the results as well as the successful factors identified from the call-collected survey data are combined with the expert view on conducting and implementing EU funded projects. The project team proceeded in a qualitative analysis, assessing the project outputs in terms of SWOT elements to complement the already identified elements by the survey respondents for their own projects. Based on this SWOT, some trends and gaps are outlined at the end.

Tackling stakeholders' engagement and shared-risk responsibility approach: As has been stated in chapter 1, a shared responsibility frame allows civil society and authorities to work together in risk reduction. In that sense, many EU projects have worked on communication and awareness recommendations to improve the

way society deals with risk (S). Since wildfires can affect all stakeholders, measures should be taken by all to prevent forest fires. Some of the analysed projects consider developing stakeholder maps as a methodological tool (e.g., within communication plans or when motivating networking and cross-dialogue), and tailored RA&C results to target audiences following the strategic communication principles have also been delivered (S). In that sense, projects targeted at teachers, children and young individuals have the potential for long-term impact (O). Moreover, in many cases, practitioners and Civil Protection authorities and other risk management practitioners are included in the project partnerships (S) or within the targeted audience.

> *"Communication efforts can be bolstered to ensure the Agora reaches more first responders/general civilians that can benefit from best practices and trainings." RESISTANT*

Many other projects find common points when discussing the risk communication approach, suggesting that more stakeholders should be engaged in undertaking risk reduction measures, particularly in the private sector (for instance, tourism) (O). Projects offer a productive format to engage with the private sector and various solution providers to co-develop beneficial products, innovations, and initiatives, and often also the space to field test or work directly with end-users on solutions.

> *"Training and Education: Developing training programs to WUI stakeholders. Two different programs were established: 1) training program on PBD WUI analysis offered to fire safety engineers and architects, and 2) education program on vulnerabilities and risk prevention offered to communities and local authorities. Target funders/clients could be fire engineering companies and associations of fire practitioners for the first program and municipalities for the second program." WUIVIEW*

Motivating networking and lessons learned: Some projects have actively participated in building collaborative frameworks to exchange knowledge and information (S). In that sense, the identification of key stakeholders involved in fire risk management is needed at different scales (national, regional and local) in order to facilitate interaction, discussion and to set roles and responsibilities (O). In the frame of the project activities, the exchange of knowledge between administrations and private stakeholders has been motivated (S), although its continuity and promotion are normally not achieved once the project ends (W). This is especially critical when projects are designed to support stakeholders like foresters and farmers, or other community groups and when the project ends, project-finance-supported activities or initiatives cease, leaving project beneficiaries feeling unsupported.

Often projects serve as a "neutral umbrella/brand", successfully engaging diverse wildfire management stakeholders with a common objective (O). Participation of practitioners also help to break administrative boundaries (both national and international) which tend to generate isolated frameworks for dealing with common problems (O). In this sense, along project implementation it is shown how promoting the exchange of knowledge between administrations, unifying communication patterns whenever possible helps to increase communication effectiveness (O). Obviously respecting the singularities and contexts of the territories. There are good examples of that with projects working in cross-border scenarios, that show how a collaborative approach may result in a better risk understanding and management and mutual trust. Nevertheless, the risk of the promotion of each one's national model exists, not being able to achieve an EU shared vision in terms of WFRM and RA&C (T). Globally, projects can serve as a platform, mechanism or tool to improve and move forward with wildfire RA&C (O). Moreover, some projects have a multi-risk approach and/or proactively motivate lessons learned exchange across natural hazards from different sides, including RA&C, and may serve to accelerate cross-boundary learning at EU level (O).

> *"(...) project's workshops and the participation of external experts will promote knowledge exchange in the existing networks (e.g., the European Forest Risk Facility initiative) to reinforce European landscapes' resilience to natural hazards." RECIPE*

Some projects address prevention and preparedness awareness as a key factor to empower citizens, exploring novel bottom-up community engagement participatory approaches, covering RA&C needs in an innovative way (O). The genuine nature of research facilitates the integration of lessons learned from other natural hazards

(S). Many easy-to-use tools have been developed to communicate risk, together with specific actions that stakeholders can undertake for risk reduction (normally at case study or living lab level) (S).

In terms of **knowledge mobilization (from theory to practice) and flexibility**, projects are often carried out in collaboration with universities and therefore are influenced by state-of-the-art innovations and relevant recent research (S). Emphasis on changing landscape risk is commonly considered. Moreover, specific individuals and experts are well connected to practitioner groups which enhances the acceptability of project outputs and play a role in project design execution to better bridge theory and practice (S). Globally, projects can reach risk awareness where public authorities cannot by having additional funds (S).

> *"Adaptation: We create scenarios of how changes in climate, population and land uses affect fire risk conditions. We aim to improve the prevention of and preparedness for fires, especially in areas where fires will become more regular in the future." FirEUrisk*

Unfortunately, few calls for projects are specifically related to wildfire risk awareness and communication (W). Moreover, disciplines such as sociology, anthropology, or communication are still under-represented in the so-called expert wildfire "community". Therefore, specific calls on these fields of expertise often escape from the radar to submit RA&C specific proposals. In that sense, some projects invest in building future competence in individuals which is sustainably invested to achieve more progress in future project designs and analytical frameworks (O).

In addition, the lack of 'novelty' can result in lost opportunities to instead continue funding very successful/ impactful projects which have already built a huge repository of expertise, thematic knowledge, networks, trust between external stakeholders or beneficiaries etc. (W). Potential overlaps between project results and the lack of repository platforms add difficulties to find all of them (W).

Moreover, many projects, including those evaluated, belong to an ecosystem of expertise where many individuals and institutions collaborate on more than one project simultaneously providing mutually beneficial processes and outputs serving to strengthen and build off current and previous projects (S).

Project results sustainability, capitalization and dissemination: Sustainability of outputs are threatened by limited project durations and non-continuation of funding for dissemination activities of project outputs (repository platforms with end-users targeted results could help) (T), although some projects include knowledge capitalization and proactive dissemination (S).

> *"List the most relevant websites that refer to the original documents and information - Documents highly relevant (...) - Reports of communication materials providing more detailed information on the case studies." Roadmap*

The nature of the project-based ecosystem threatens continuity among already successful initiatives, leading to a loss of 'institutional' knowledge, high turnover of experts and personnel, duplication of similar projects and initiatives (as opposed to further development and refinement), and uncertainty for staff in organizations dependent on project funding (T). In terms of dissemination, active work with the media has been undertaken in some projects, enabling for instance through policy brief edition, the policy-science interface in the social dialogue (O).

> *"A solid dissemination package, that involves production of dissemination material, geoportal dissemination, participation at workshops and conferences world-wide (Europe, USA, Australia), these good practices can be shared to other geographical regions in Europe and beyond", including "a broad level of dissemination via more than 40 articles being published in daily newspapers and the web, which considerably exceeded the anticipated media coverage." ArcFUEL*

Moreover, some projects include as a dissemination/communication tool the training and output transferability (and replicability) involving private companies (O). Nevertheless, gaps on proper capitalisation and dissemination of results may reduce the impact of projects to end-users and promote the risk of "re-inventing the wheel" in next calls (T).

In terms of **trends** around wildfire and DRR RA&C projects, the SWOT analysis has revealed the following:

- Risk communication and awareness are solid topics being explored and developed in more and more EU projects, recognizing the importance of risk culture within civil protection and disaster risk reduction strategies.
- The inclusion of Civil Protection authorities and other risk management practitioners in project partnerships facilitates the science-practitioners-policy interface.
- Related to this, projects can accelerate the adoption of innovations and novel knowledge within public systems and authorities in charge of risk management.
- A common conclusion from EU projects is the need to expand the risk reduction community to include all stakeholders directly or indirectly related to the risk building and deconstruction process. For instance, private businesses benefiting from wildfire prevention actions.

Some of the identified **gaps** pertain to the following aspects:

- In some cases, the results and innovation solutions of R+D projects are not reaching practitioners on a global scale, nor are being integrated into the public risk management system. This is sometimes due to a lack of proper identification of key stakeholders in wildfire risk management (at different scales, from European to national and local levels) in order to facilitate interaction. The decoupling between the R+D project lifetime and the decision-making in public institutions may also constrain institutional innovation and the effective mainstreaming of the project outcomes.
- Although RA&C is more and more present in EU projects, there is still room for strengthening the topic in the arena of social science research projects and there is a need for transdisciplinary research focussing on the social dimension of risk management in terms of perceptions and attitudes.

Table 6. Summary of SWOT analysis for the wildfire risk awareness and communication projects

STRENGTHS
Map of stakeholders is considered as a **methodological tool**, both for project results dissemination as well to conduct networking and cross-dialogue.
Tailored RA&C results to **target audiences** (including vulnerable groups) are commonly considered.
Civil Protection authorities and other risk management practitioners are **included in the project partnerships**.
Projects support **lasting relationships and networks, building trust and facilitating knowledge exchange** between regions and countries.
Projects promote an ecosystem of expertise where many individuals and institutions collaborate on more than one project simultaneously providing mutually beneficial processes and outputs serving to **strengthen and build on current and previous projects**.
Collaboration with universities allows to consider **state-of-the-art innovations and relevant recent research**.
Specific individuals and experts are well connected to practitioner groups, **enhancing the acceptability of project outputs**, contributing to project design, and executing better bridge theory and practice.
Projects can **foster risk awareness where public authorities cannot** through their access to additional funds.
Explicit or underlying target of **building a common EU shared vision in terms of wildfire risk and emergency management**.
Many **easy-to-use tools** have been developed to communicate risk, together with **specific actions** that stakeholders can undertake **for risk reduction** (normally at case study or living lab level).
Proactive **inclusion of knowledge capitalization and dissemination**.
WEAKNESSES
Successful projects are funded for **limited duration and often lack continuity**, **narrowing their long-term impact**.
The exchange of knowledge between administrations and private stakeholders has been motivated, although its **continuity and promotion are normally not achieved once the project ends**.
Some projects are designed to support stakeholders like foresters and farmers, or other community groups – **when the project ends, project-finance-supported activities or initiatives cease, leaving project beneficiaries feeling unsupported**.
Few calls for projects are specifically **related to wildfire RA&C**.

Moreover, disciplines such as **sociology or communication are still under-represented** in the so-called expert wildfire "community". Therefore, specific calls on these fields of expertise often scape from the radar to submit RA&C specific proposals.

The **lack of 'novelty' can result in lost opportunities** to continue funding very successful/impactful projects which have already built a huge repository of expertise, thematic knowledge, networks, trust between external stakeholders or beneficiaries, and more.

Many project **results are overlapping**, and the **lack of repository platforms** adds difficulty on finding them.

OPPORTUNITIES

Strategic **stakeholders related to risk reduction measures**, particularly in the private sector (for instance, tourism) could be engaged into project partnerships.

Often **projects serve as a "neutral umbrella/brand"**, successfully engaging diverse wildfire management stakeholders with a common objective.

Participation of practitioners also help to **break administrative boundaries** (both national and international) which tend to generate isolated frameworks for dealing with common problems.

Projects can **cover RA&C needs in an innovative and cooperative way**.

Some projects address **prevention and preparedness awareness as a key factor to empower citizens**, exploring novel bottom-up community engagement participatory approaches.

Active work with the media has been undertaken in some projects, enabling the policy-science interface in the social dialogue.

Projects targeted to **teachers, children and young** individuals have a **potential long-term impact**.

Projects can **serve as a platform, mechanism or tool** to improve and move forward on wildfire risk RA&C.

Some projects actively invest in **building future competence in individuals** which is considered a sustainable investment to achieve progress in future project designs and analytical frameworks.

Projects have **multi-risk approach and/or proactively motivating lessons learned exchange** across natural hazards from different sides, including RA&C, may serve to **accelerate cross-boundary learning at EU level**.

Projects offer a productive format to **engage with the private sector and provide various solutions** to co-develop beneficial products, innovations and initiatives, and often also provide the space to field test or work directly with end-users on solutions.

Including a **tool for dissemination/communication** facilitates the transferability (and replicability) of training and outputs involving private companies.

THREATS

Sustainability of outputs are threatened by **limited project durations and non-continuation of funding for dissemination activities** of project outputs (repository platforms with end-users targeted results could help on this).

The nature of the **project-based ecosystem** threatens continuity among already successful initiatives, leading to a loss of 'institutional' knowledge, high turnover of experts and personnel, **duplication of similar projects and initiatives** (as opposed to further development and refinement), and uncertainty for staff in organizations dependent on the project funding.

Each one national model is promoted, not being able to achieve an EU shared vision in terms of WFRM and RA&C.

In terms of funding, gaps on **proper capitalisation and dissemination of results** may limit the impact of projects at end-users ´ level and promote the risk of "re-inventing the wheel".


May

3 /
FINAL REMARKS: TOWARDS A COMPREHENSIVE APPROACH ON WILDFIRE RISK AWARENESS AND COMMUNICATION

3 / FINAL REMARKS: TOWARDS A COMPREHENSIVE APPROACH ON WILDFIRE RISK AWARENESS AND COMMUNICATION

From a Civil Protection perspective, risk and crisis communication have long been integral pillars of disaster risk management, as the variety of risk awareness and communication initatives and projectes analysed indicates, together with its flexibility in terms of goals, target audiences and means. This becomes especially relevant within wildfire risk management due to the human influence on reducing hazard (most fire ignitions are caused by human activity and fire severity is heavily influenced by biomass distribution), exposure (limiting or adapting human activities in high fire prone risk areas) and vulnerability (adopting prevention measures or guidance in case of emergency). More recently, the expansion of wildfire risk in unprecedented territories as well as the extreme wildfire events in traditional fire-prone areas show the limitations of fire suppression centred strategies in protecting citizens, businesses, and ecosystem services and, highlights the imperative need to foster risk awareness and culture across agencies, sectors, and citizens.

On this regard, while there is no singular definition of risk and crisis communication, both are essential components to enhance wildfire risk awareness and culture around the common goal "to make citizens safer and more secure" (European Union, 2011), to foster a culture of risk prevention (Union disaster resilient goal #2) and enhance prevention (Wildfire Risk Action Plan). Some RA&C initiatives analysed, for instance, are linked to the promotion of **risk knowledge and education,** primarily aimed to foster mid-to-long term behavioural changes based on an in-depth understanding of the risk process. Others are closer to **risk-scenario information**, intended for short-term information provision and alerting exposed citizens to risky situations. Additionally, different EU projects are developing tools and resources to enhance **crisis communication** and support emergency management during the crisis.

Within these concepts, although most of RA&C initiatives are often conducted by individual agencies, it is important to highlight the inter-connectiveness of risk and crisis communication. The greater the acquired risk knowledge, the more effectively risk-scenario information can be implemented, and the more impactful crisis communication becomes. In that sense numerous reports emphasize the recommendation to promote cooperation across agencies and encourage partnerships with businesses, civil society, NGOs, and other stakeholders. This approach frames RA&C into an inclusive and participatory communication strategy, applicable in the short, medium and long term. Strategic communication not only bridges the gap between risk awareness and crisis communication, but also ensures a collective and coordinated effort to navigate the complex and evolving risk landscape.

This systematic view around RA&C becomes fundamental since not all risk situations provide an equal opportunity to ground a similar risk culture. For instance, long-term risk educational initiatives for schools and residents may not reach occasional visitors during touristic season, who are targeted in a specific way in some of the analysed initiatives. Authorities' general warnings and behavioural guidance directed to the public might not reach vulnerable groups if they are not specifically targeted. Additionally, crisis communication must be tailored to the diversity of the exposed population, ranging from locals who are more or less familiar with wildfires to individuals travelling with language constraints as well as refugees or cultural groups with their own communication channels. The above-mentioned expansion of fire-prone conditions to novel territories and the increasing wildfire severity in traditional ones pose a dual challenge to the European dimension of an enhanced and effective wildfire risk culture.

Based on the above, a comprehensive approach for enhanced wildfire risk awareness and culture is imperative. Based on the analysis of the initiatives and projects, the following considerations have been identified along four main aspects to enhance WFRM RA&C.

Framing a wildfire risk management communication strategy

The analysed RA&C initiatives and projects display a **diversity of communication tools and purposes** (from education to risk training and inducement of behavioural changes), tackling the diversity of factors influencing WFRM. **Communication from authorities** may come from different agencies according to each one´s competences or from a multi-agency cooperation. Those efforts are **complemented by bottom-up initiatives**, usually in a voluntary way and on a local level. Although most of the RA&C initiatives analysed share the principles of **systematic communication** (goals and context definition; targeted audience; tailored key messages; implementation plan; funding and evaluation) no formal WFRM communication strategy has been identified within the collected initiatives. Such a strategic frame could serve to promote some of the promising values identified such as the above-mentioned **cooperation between agencies** (e.g., with the Ministry of Education, between national to regional authorities, as well as across public authorities and sectors under a multi-hazard approach) and **collaborative partnerships and communication alliances with strategic stakeholders** (e.g., with environmental NGOs, private businesses, and land management professional associations). Moreover, EU-funded projects offer a space where to **connect science with practitioners**, mobilise **knowledge on lessons learned** and **facilitate international and cross-border cooperation, fostering an EU shared vision of WFRM**. In this regard, **proactive communication and dissemination of results and best cases** should be promoted beyond project lifespans.

Promoting the understanding of the wildfire phenomena

RA&C, crisis communication and lessons learned offer a great opportunity in **approaching the root causes of wildfires** (including the beneficial side of fire as a land and risk management tool), as some of the initiatives show, usually within regular educational programs. RA&C can also serve in **advancing the understanding of the risk building process and each ones' role** (from the risk creation and reduction perspective) and responsibility (balancing the available resources to conduct risk management actions). Given human´s capacity to influence hazard (fire ignition and spread capacity related to fuel distribution), different initiatives seek to **address and shape wildfire hazard reduction** promoting for instance responsible behaviours and tailored risk-scenario information. Other initiatives show the **contribution of sustainable forest and land management to wildfire prevention**, going deep into the corresponding benefits and trade-offs in terms of risk management (since hazard is reduced, less efforts are needed in vulnerability and exposures reduction, and the same applies along the DRM cycle from prevention to recovery). Those initiatives **disseminating the benefits of prevention** may interplay with the **private sector**, highlighting the contribution of land management as a tool for citizens' and businesses' protection. In this regard, **opportunities arise under NbS narratives** to adapt business to climate risks.

Engaging stakeholders through RA&C

Some of the analysed initiatives are built on **effective collaboration across agencies and among stakeholders**. In some cases, they are properly designed and implemented to engage policymakers, public agencies, local authorities, professional land management sector, private business (e.g., touristic sector), visitors or society in general. Furthermore, **bottom-up approaches** have been mentioned as an advantage in terms of risk awareness, however their **sustainability over the long term** is compromised due to a lack of support from the higher authorities. Consequently, there is a need for **budget allocation** to ensure these bottom-up efforts endure. Moreover, some initiatives show the specific need of targeting **transboundary audience** since wildfires are impacting more and more during the summer season and related economic activities. In some cases, cross-sectoral dimension of WFRM is inherently inserted into the RA&C initiatives when they are conducted by means of multi-agencies and actors' collaboration (e.g., **integrating WFRM into spatial planning**).

Aligned with risk understanding, some of the analysed initiatives were able to **connect the benefits of prevention with the public.** For example, through the labelling of forest management derived products contributing to wildfire prevention or creating **multi-stakeholders' meetings and forums** dedicated to working together towards common goals. These approaches serve as a solid foundation for engaging stakeholders in

the pursuit of risk reduction. In some cases, mainly in rural areas, WFRM needs are contrasted with local needs. In this regard, specific groups are identified and approached in a particular way and RA&C serve to **deal with existing perceptions, attitudes, and practices**. Lessons learned conducted by some of the EU funded projects analysed serve to share knowledge across traditional fire-prone areas and novel territories exposed to wildfire, **promoting networking across authorities, practitioners, and academia**.

Effective tools and resources when dealing with fire and wildfire related RA&C

At operational level, the analyzed RA&C initiatives use different **practical tools and resources**, ranging from education in schools, guidelines for planner, to mobile applications designed for tourists and visitors. Importantly, these resources have the potential **to be adapted and replicated to other territories**. Throughout the survey responses collected through the call, a combination of **traditional top-down and one-way general risk awareness campaigns** and **bottom-up two-ways approaches** emerge. For instance, some approaches establish communication channels and procedures and risk management resources with forest managers, touristic sector, protected area managers or urban planners among others. In terms of risk knowledge and education, the initiatives recognize the need for **investing in the cultural "process",** given that behavioral changes take time and need to be fostered in a trusting way. **Permanent programs and sufficient funding**, as well as **coherence and constant review and updates of messages** are highlighted as key factors to support these medium to long term achievements. **Technologies and data** also offer the possibility of addressing the evolving risk landscape, by means of **cooperation with academia** and **integrating expert knowledge** into RA&C initiatives. Altogether, this supports the **credibility** of risk communication. In some cases, **wildfire cascading effects** and a **multi-hazard approach** are considered. Additionally, the **establishment of positive storylines** about risk management is mentioned as a way to support the acceptance of shared risk responsibility, especially when accompanied by **actionable risk reduction measures** and resources.

Globally, this analysis shows the potential of **fully embedding RA&C as a fundamental tool** for DRR. Among other things, it highlights the dissemination of the **benefits of prevention**, the facilitation of **effective and actionable measures for stakeholders' engagement** to risk reduction, and the promotion of a **society capable of coping with the changing wildfire risk landscape** across the EU. The above-mentioned strategic communication framework offers an excellent blueprint for planning and effectively implementing RA&C at EU, national and regional levels. As demonstrated by the set of initiatives, risk communication can make a significant impact throughout the DRM cycle. Complementary to risk-scenario information, risk knowledge and education can be inserted along the risk assessment and planning process, which has been demonstrated to be a powerful way to establish and conduct a **dialogue with stakeholders** towards risk reduction.

The survey-responses collected through the call show the diversity of successful initiatives on wildfire RA&C across EU, which can be easily framed under **systematic communication principles** to enhance its impact and further motivate the cooperation across agencies and sectors, as many initiatives indicate. Based on the initiatives, **effective risk and crisis communication is a mix of one-way, two-way, top-down, and bottom-up approaches**, which may serve to achieve different RA&C goals if they are designed accordingly. The **changing wildfire risk landscape necessitates the adaptation of existing RA&C tools and targets**. In this regard, **knowledge exchange across EU territories and a multi-hazard vision may accelerate the lessons learned** among authorities, practitioners, academia, and citizens. Globally, **an EU-wide wildfire RA&C approach has the potential to add value to national/regional efforts**, by expanding citizens awareness across boundaries and fostering the exchange of wildfire risk knowledge and communication as well as networking across agencies, authorities, and stakeholders.

4 / REFERENCES

4 / REFERENCES

- Campbell, N., Roper-Fetter, K., Yoder, M. (2020). Principles of Risk Communication: A Guide to Communicating with Socially Vulnerable Populations Across the Disaster Lifecycle. Boulder, CO: Natural Hazards Center, University of Colorado Boulder. https://hazards.colorado.edu/uploads/freeform/Risk%20Communication%20Guide_FINAL_508_Ed%20Feb%202021.pdf

- Casartelli V., Mysiak, J. (2023). Union Civil Protection Mechanism - Peer Review Programme for disaster risk management: Wildfire Peer Review Assessment Framework (Wildfire PRAF). https://civil-protection-humanitarian-aid.ec.europa.eu/system/files/2023-06/Wildfire_PRAF_V2.pdf

- Clarke, B., Otto, F. (2022). Reporting extreme weather and climate change. A guide for journalists. World Weather Attribution. https://www.worldweatherattribution.org/wp-content/uploads/ENG_WWA-Reporting-extreme-weather-and-climate-change.pdf

- Coombs, W. T., Holladay, S. J., & Wiley, J. (Eds.). (2010). The handbook of crisis communication. Blackwell Publishing Ltd. https://doi.org/10.1002/9781444314885.fmatter

- de Graaff, R. J., van de Veerdonk, C. (2012). Handreiking Communicatie over Waterveiligheidsrisico´s Buitendijks Deltaprogramma Nieuwbouw en Herstructurering. https://klimaatadaptatienederland.nl/publish/pages/119896/handreiking-communicatie-over-waterveiligheidsrisicos-buitendijks-_november-2012_1.pdf

- European Commission, Directorate-General for Environment, Nuijten, D., Onida, M., Lelouvier, R. (2021). Land-based wildfire prevention – Principles and experiences on managing landscapes, forests and woodlands for safety and resilience in Europe, Nuijten, D.(editor), Onida, M.(editor), Lelouvier, R.(editor), Publications Office of the European Union, 2021. https://data.europa.eu/doi/10.2779/695867

- European Commission, Directorate-General for Research and Innovation, (Ed.) (2018). FOREST FIRES — Sparking firesmart policies in the EU, Faivre, N. (editor), Moreno, J.M., Rego, F., Vallejo, R., Xanthopoulos, G. Publications Office of the European Union, 2018. https://data.europa.eu/doi/10.2777/181450

- European Union (2011). Council conclusions on an integrated approach to more effective risk, emergency, and crisis communication. 3135th Justice and Home Affairs Council Meeting, Council of the European Union, 13 and 14 December, Brussels. https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/jha/126887.pdf

- Ingalsbee, T. (2007). A Reporter's Guide to Wildland Fire. Published by Firefighters United for Safety, Ethics & Ecology (FUSEE). https://static1.squarespace.com/static/52802b23e4b0aea5e0585a6d/t/5b5687b870a6ad96923746c1/1532397503510/-Reporters+Guide+2007.pdf

- IPCC (2012). Summary for Policymakers. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 1-19. https://www.ipcc.ch/site/assets/uploads/2018/03/SREX_Full_Report-1.pdf

- Miner, C.L., Sands, Y., Pierre, H., eds. (2014). Communicating Forest Science. IUFRO Communications & Public Relations Working Party and the International Union of Forest Research Organizations (IUFRO) Special Programme for Development of Capacities (IUFRO-SPDC). Vienna, Austria. 185 p. https://www.iufro.org/fileadmin/material/science/spps/spdc/Training_Resources/Communicating_Forest_Science.pdf

- Müller, M.M., Vilà-Vilardell, L., Vacik, H. (2020). Forest fires in the Alps. State of knowledge, future challenges and options for an integrated fire management. EUSLAP Action Group 8. https://www.alpine-region.eu/sites/default/files/uploads/result/2233/attachments/200206_forestfires_ whitepaper_final_online.pdf

- OECD (2023). Taming Wildfires in the Context of Climate Change, OECD Publishing, Paris. https://doi.org/10.1787/dd00c367-en

- OECD (2016). Trends in Risk Communication Policies and Practices, OECD Reviews of Risk Management Policies, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264260467-en

- OECD (2014). Recommendation of the Council on the Governance of Critical Risks, OECD Publishing, Paris. https://www.oecd.org/gov/risk/recommendation-on-governance-of-critical-risks.htm

- OECD (2002). Guidance Document on Risk Communication for Chemical Risk Management. ENV/JM/MONO(2002)18, Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology, OECD, Paris. https://one.oecd.org/document/ENV/JM/MONO(2002)18/en/pdf

- Silva, J.S., Rego, F., Fernandes, P., Rigolot, E. (2010). Towards Integrated Fire Management – Outcomes of the European Project Fire Paradox. European Forest Institute Research Report 23. https://efi.int/sites/default/files/files/publication-bank/2018/efi_rr23.pdf

- Tarbuck, S., Zodrow, I. (Ed) (2021). From protection to prevention: The role of cooperative and mutual insurance in disaster risk reduction. The International Cooperative and Mutual Insurance Federation (ICMIF) and the United Nations Office for Disaster Risk Reduction (UNDRR). https://www.undrr.org/media/49169/

- United Nations Environment Programme (2022). Spreading like Wildfire – The Rising Threat of Extraordinary Landscape Fires. A UNEP Rapid Response Assessment. Nairobi. https://wedocs.unep.org/20.500.11822/38372

- United Nations Office for Disaster Risk Reduction (2022). Global Assessment Report on Disaster Risk Reduction 2022: Our World at Risk: Transforming Governance for a Resilient Future. Geneva. https://www.undrr.org/media/79595

- United Nations Office for Disaster Risk Reduction (2020). Evolving Risk of Wildfire in Europe. Rossi, J.L. (Coord.), Komac, B., Migliorini, M., Schwarze, R., Sigmund, Z., Awad, C., Chatelon, J.F., Goldamer, J.G., Marcelli, T., Morvan, D., Simeoni, A., Thiebes, B. European Science and Techcnology Advisory Group. 27 p. https://www.undrr.org/media/47703/

- United Nations Office for Disaster Risk Reduction (2015). Sendai Framework for Disaster Risk Reduction 2015-2030. UNISDR/GE/2015 - ICLUX EN5000 1st edition. Switzerland. https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

- World Bank (2021). Understanding the Needs of Civil Protection Agencies and Opportunities for Scaling up Disaster Risk Management Investments. Summary Report. http://hdl.handle.net/10986/36292


fo'c'sle ['fouksl] n. pont de gaillard. 2. (in
l'équipage.
focus¹, pl. foci, fo
'foukəsiz] n. 1. Mth: O
etc.); Opt: depth of f.,
profondeur de champ;
(ii) (of instrument) régl
au point; (ii) (of
(of headlamp) built


localiser à son foyer.
1. gaillard m; f. deck,
merchant vessel) poste m de
cuses ['foukəs, 'fousai,
pt: etc: foyer m (de lentille,
i) profondeur f de foyer; (ii)
in f., (i) (of image) au point;
; out of f., (i) (of image) pas
fold' [f
2. se
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5 / GLOSSARY

5 / GLOSSARY

Based on UNDRR terminology[1] when an alternative source is not indicated.

Coping capacity: The ability of people, organizations and systems, using available skills and resources, to manage adverse conditions, risk or disasters. The capacity to cope requires continuing awareness, resources and good management, both in normal times as well as during disasters or adverse conditions. Coping capacities contribute to the reduction of disaster risks.

Disaster risk management: is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses.

Disaster risk reduction: is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. It is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans.

Exposure: The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas. Measures of exposure can include the number of people or types of assets in an area. These can be combined with the specific vulnerability and capacity of the exposed elements to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest.

Hazard: A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socio-natural in origin.

Integrated fire management: A concept for planning and operational systems that include social, economic, cultural and ecological evaluations with the objective of minimizing the damage and maximizing the benefits of fire. These systems include a combination of prevention and suppression strategies and techniques that integrate the use of technical fires and regulate traditional burning (Silva et al. 2010).

Preparedness: The knowledge and capacities developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters. Preparedness action is carried out within the context of disaster risk management and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response to sustained recovery.

Prevention: Activities and measures to avoid existing and new disaster risks. Prevention (i.e., disaster prevention) expresses the concept and intention to completely avoid potential adverse impacts of hazardous events. While certain disaster risks cannot be eliminated, prevention aims at reducing vulnerability and exposure in such contexts where, as a result, the risk of disaster is removed.

Recovery: The restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and "build back better", to avoid or reduce future disaster risk.

Residual risk: The disaster risk that remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained. The presence of residual risk implies a continuing need to develop and support effective capacities for emergency services, preparedness, response and recovery, together with socioeconomic policies such as safety nets and risk transfer mechanisms, as part of a holistic approach.

Resilience: The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

[1] https://www.undrr.org/terminology

Response: Actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. Disaster response is predominantly focused on immediate and short-term needs and is sometimes called disaster relief. Effective, efficient and timely response relies on disaster risk-informed preparedness measures, including the development of the response capacities of individuals, communities, organizations, countries and the international community.

Vulnerability: The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

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ANNEX I. Risk awareness and communication initiatives: Discriptive table with basic information

Table of risk awareness and communication initiatives originating from the call for good practices. Colours have been attributed to the initiatives to their corresponding dominant risk management cycle phase (green: prevention; blue: preparedness; red: response; brown: recovery). When available, corresponding images are provided below (*).

ID	Name	**Description** *(extracted from the call and adapted by the authors, level of detail may vary according to available information)*	**Relevant websites, documents, reports, and other materials** *(available language in acronym[1])*	**Relevant keywords**
Austria				
1	Florentina Fuchs*	Florentina Fuchs- Hero, against forest fire. Florentina Fuchs was developed as a testimonial in the field of forest fire, forest fire prevention and awareness raising. She was placed at the side of the already established "Beaver Berti", who has been the mascot of Alpine Natural Hazards for several years. Florentina Fuchs is a heroine who courageously and boldly goes ahead to bring the issue and its importance for the Austrian forest before the curtain. She educates, creates awareness, stirs up interest and, land but not least, actively fights forest fires.	Website: BML Florentina Fuchs – Heroine against forest fires (DE, EN)	Wildfire risk awareness
Bangladesh				
40	Interactive training session	Interactive training sessions frequently organised by non-governmental organisations & civil society. The project has the aim of improving wildfire preparedness and awareness of wildfire prevention methods, with the action being defined and implemented by the National Civil Protection Authority.	*Not specified*	Wildfire risk awareness
Bulgaria				
2	Forest fire risk awareness campaign	In order to raise awareness of the risk of forest fires in the forest territories of the Republic of Bulgaria, signs with fire prevention content are placed, the means of mass awareness are used - media and social networks, including through the presentation of videos containing fire prevention messages.	Website: Executive Forest Agency (BG, EN) Social media: Executive Forest Agency (BG)	Wildfire prevention messages
Costa Rica, Guatemala & Honduras				
7	Local disaster prevention campaign (Campaña para la prevención local de desastres)	Natural risk prevention campaign with communication guidelines to national and local authorities and media.	Website: Regional Office for the Americas and the Caribbean, general information (EN, ES)	Disaster prevention, local scale
Croatia				
41	Yearly national campaign for fire-protection*	According to special measures of fire-protection of special interest for the Republic of Croatia, the Croatian Firefighting Association fulfils in general 3 main activities: educational TV- and radio spots on national and local broadcasting, billboards on coastal region and flyers.	*Not specified*	Wildfire risk education, fire protection

[1] Acronyms according to the ISO 639 language codes.

53	Paint it back (Boranka)*	The Scout and Guide Association of Croatia launched the awareness campaign Boranka (Paint it Back) in 2018 with the aim of restoring forests destroyed by fires and raise public awareness of forest fires. It combined voluntary reforestation actions and educational workshops. As part of the campaign, crayons made from ashes of burned trees were given out free in hundreds of thousands for everyone to draw their own trees and upload them on the Boranka web. For every drawn tree, Boranka volunteers would plant a real one. Many other organizations joined the campaign: the State Civil Protection Intervention Unit of the Civil Protection Directorate, the Croatian Mountain Rescue Service, Croatian Forests (State company responsible for the preservation of forests), the Croatian Fire Brigade, Croatian Army, Croatian Red Cross and. Due to its great acceptance, especially by young people, it has continued until today. Boranka is the largest reforestation campaign ever undertaken in Croatia and it became the largest European voluntary campaign to replant fire burned areas. By the end of 2022 more than 9.500 volunteers were involved in the reforestation actions planting more than 100.000 new trees in seedlings, seeds and acorns at the fire sites. More than 10,000 children participated in educational workshops held in more than 100 schools. Awards: 2019 Golden Euro Effie, 2021 European Citizen Award by European Parliament, 2022 Croatia Effie Award for long-term efficiency.	Press releases: Croatian Scouts Association wins European award for Boranka campaign (EN) Scouts of Croatia Win the European Citizens´ Prize (EN) Video: Boranka, Scouts of Croatia ¨Paint it back´ (EN)	Forest restoration, educational workshops, youth
Czech Republic				
49	The “Safe borderlands” project and “Joint management of specific risks in the Jesenik – Nysa region” project*	Wildfire risk awareness was improved by two projects implemented along the Czech-Polish border within the EU funds – the “Safe borderlands” project and “Joint management of specific risks in the Jesenik – Nysa region” project. Both initiatives enhanced the cooperation of all national bodies responsible for disaster response and security in the region and included adapting risk-prevention and risk-management measures for dealing with the consequences of climate change, one of them included fires. They improved the disaster preparedness of Czech and Polish firefighters who respond to emergencies along the border between the two countries. One of the key activities of both projects was increasing the level of cooperation and compatibility of systems in firefighting in the field of firefighting structure fires and wildfires. A methodology for joint cross-border intervention of firefighters was developed based on experiences that were exchanged by joint workshops. Also, common planning documentation for crisis preparedness was developed, based on common multi-criteria risk analysis of the border region. To ensure preparedness and manage joint interventions the system for the cross-border exchange of information was established. Allowing the exchange of information on risk and emergencies such as information from national systems (weather forecast, warnings, wildfire risks, etc.) and common solution plans (both methodology for joint firefighting and planning documentation is shared). Wildfire risk awareness was also improved by joint training and multiple collaborative exercises focused on firefighting. Lastly, the technical conditions for joint intervention in the Czech-Polish border was improved by supplementing the missing special equipment and material resources.	Websites: HZSOL common information portal (CS, PL) Safe borderlands project (CS, PL)	Cross-border collaboration, disaster response, information exchange
Czech Republic & Poland				
20	Stop the grass fires, there is only one earth (Stop pozarom traw, Ziemia jest tylko jedna)*	Risk awareness campaign “Stop grass fires” realized in the spring months - it informs on how burning out grass is harmful to the environment and how dangerous for people and animals it is and it debunks the myth that it is good for soils.	*Not specified*	Grass fire prevention
France				
3	Forest fire communication kit (Le kit de communication «Feu de forêt»)*	Communication campaign and tool kits by the Ministry of ecological transition and territorial cohesion, in wildfire risk awareness among other risks (Flood), and informative preparedness messages. These tools are available on the Ministry website, primarily dedicated for regional and local authorities to deliver to citizens, but in a public access, so that any stakeholder of the civil society may use them. This initiative is of national scope but remains a competence of the Ministry of Ecological Transition and Territorial Cohesion (Directorate General for Risk Prevention), with an approach of dissemination by regional and local authorities, civil society actors, and fire and rescue services.	Website: Forest fire communication kit (FR, EN, ES)	Communication tools, national to regional scope

Germany				
4	Awareness raising and education to communities*	The non-profit organization f2wald was founded in 2021 by students as part of a project work with the intention to raise awareness about wildfire prevention and to educate local communities about the dangers of wildfires and the impact of the climate crisis on fire behaviour. They believe that an essential component of wildland fire hazard mitigation is wildfire prevention. The initiative includes giving talks and media interviews, generating media content, attending events, and educating people about wildfire prevention at a booth. Crowdfunding is organized to finance prevention materials like flyers and posters and provide them free of charge. At the same time, efforts are made to reach out specifically to young people by being present on social media and giving presentations at educational institutions and youth fire departments. Their work focuses on home district, but benefits of the campaign preferably also reach fire departments, institutions, and agencies across the country, which is why a documentation and resources about the project is available, so that anyone can implement them independently. Although Germany has a lower wildfire risk potential compared to other European countries, the initiative recognizes the potential future danger because of climate change, strengthening their goal to protect local ecosystems and communities.	Social media: f2wald_de (DE) Video: Forest fires and what the climate crisis has to do with them #TreeTalk with Paul Grüneberg from 02.02.2022 (DE)	Wildfire risk education, youth
52	Firefighting hoses (Hozesolutions)	Local populations are mostly left out of the firefighting efforts due to the inherent risk and lack of suited equipment. The initiative believes in raising awareness through the introduction of suited containment tools during preparatory phases and regular drills on novel technology during the wildfire season. To this end the initiative puts forward a wildfire containment tool with an autonomous operating mode, drastically reducing the risk of firefighting personnel or local population in case of an approaching wildfire. The system consists of a length of firefighting hoses fitted with spraying nozzles at regular intervals to be installed along strategic locations on a ZIP-code level. The initiative firstly raises awareness during a preparatory stage ahead of the fire season through the identification of such strategic locations. Secondly it ensures preparedness during the wildfire season when setting up the system. This two-step approach in raising awareness is believed to be highly efficient as it keeps the subject of wildfire resilience present over a time period of twelve months. Live demonstrations have so far been undertaken in Portugal, France and Cyprus with academic partners to ensure a proper characterisation of the efficiency of the system. Those studies have shown the system to distribute the water in a highly efficient manner and has been successful in suppressing flames of more than 6 metres of height in shrubland. The demonstrations have been accompanied by local fire services and civil protection. Further demonstrations are planned in further locations in Europe.	Website: Hoze solutions GMBH (EN) Video: Papageno System (EN)	Wildfire risk awareness, wildfire suppression

Greece				
5	Innovative Action for the prevention of fires on Kythira Island*	"Innovative action for forest fire prevention in Kythira Island, Greece, through mobilization and cooperation of the population" is a 2.5-year project (after extension due to Covid) carried out by the Hellenic Society for the Protection of Nature (HSPN) and the Institute of Mediterranean Forest Ecosystems (IMFE) of the Hellenic Agricultural Organization "DIMITRA" with funding from the "Green Fund" of the Ministry of Environment and Energy. It was conceived after a large fire in August 2017 that burned 9% of the area of the island. The importance of strong prevention and volunteer mobilization became evident, especially after analyses that showed that the remote location of the island makes it extremely vulnerable to future disasters. As there was no capacity (mandate, manpower, funding) to perform extended technical works, it was decided to focus on the planning component of prevention and to work with the people, innovatively blending the two components where possible, with the objective to reduce the number of fires and burned area, and to mitigate damages. In doing so, it was intended to demonstrate, making prudent use of the small project budget, the efficiency that can be achieved through this approach. The methods used to pursue the aims of the project followed two directions. The first was an effort to understand and analyse the fire problem and the conditions (e.g., fuels, topography) on the island, in support of fire prevention and pre-combat planning. The second included all the efforts that aimed to mobilize the people on the island for fire prevention. Regarding the first, fire statistics were analysed to assess the characteristics of fire problem on the island. Forest fuels were surveyed, and a fuel map was developed for the island for the first time. Fire and innovative firefighting simulations revealed the seriousness of the problem. An evaluation of the risk of destruction of nearly all the buildings (n=610) in three selected settlements through a structure-by-structure assessment, with the help of small teams of volunteers revealed the potential for damages. All these were communicated to the citizens (including students) in various workshops and other activities, mobilizing them towards improved prevention. They were also communicated to the authorities (mayor, civil protection, Fire Service, Forest Service) to help them in their planning.	Websites: Kythera – Innovative actions along with the citizens (EL, EN) Institute of Mediterranean Forest Ecosystems, Info Kythera (EL, EN) Scientific paper: Innovative Action for Forest Fire Prevention in Kythira Island, Greece, through Mobilization and Cooperation of the Population: Methodology and Challenges (EN)	Wildfire damage mitigation, community engagement, stakeholder collaboration
6	Informative and educational campaign	Informative and educational campaign focusing on specific areas, according to relative risk assessment. The campaign includes lectures to schools and social clubs, messages through social media and training programs to the general population.	*Not specified*	Wildfire risk communication, education
Hungary				
8	Fire ban campaign (Tűzgyújtási tilalom)	In Hungary every year the attention of citizens and economic operators in called to the importance of wildfire prevention. First around the end of February (end of winter, snow and cold) to prevent spring wildfires, and prevent people to use fire to clean up the dry vegetation. Second time around the end of May, where the attention of people and especially farmers is called to prevent summer wildfires. If the situation is worsening the communication service of disaster management repeat the message in media regularly also providing some statistics. Experts from forestry and disaster management every day assessing the forest fire risk, also using some assessing programs, and decide about the declaration of fire ignition ban nationwide or to specific counties. According to legislation, forest managers have to introduce some special protecting and preparing measures during fire ignition ban, and it is forbidden to ignite fire in forests and their 200 meters vicinity. Fire ignition ban is withdrawn, when forestry and disaster management specialists decide about it, according to the modelling and expected situation.	Websites: Ministry of the interior, national directorate for disaster protection (HU) Fire ban (HU) Fire prohibition map (HU) Fire protection of forests (HU) Decree: Protection of forest against fire (HU)	Use of fire, wildfire risk communication
Ireland				
42	Wildfire Risk Monitoring - Fire Danger Notices	Calculation and dissemination of dynamic Wildfire Risk and Fire Danger (indexes on maps) in cooperation between Departments and addressed to stakeholders.	Websites: Fire Management publications (EN, GD) Met Éireann - The Irish Meteorological Service - Fire Weather Index (EN)	Fire weather index, wildfire risk map

Italy				
9	Firewise communities in Tuscany	Forest fire-fighting communities (which in the United States are called Firewise) directly involve citizens in the management of prevention activities, so that each becomes fully aware of the level of risk present on the territory with respect to the ignition and propagation of a forest fire. The Firewise have, therefore, a role of active protection from fires and are spreading in Tuscany as a response strongly desired by the Regional Forest Fire Prevention Organisation, which has implemented a series of prevention measures to reduce the risk of having to face extreme events beyond the extinguishing capacity of the forest fire-fighting teams and the air fleet. The aim is to make citizens living in the so-called interface areas - i.e. those located between the urban settlement and the forest - aware of the need to adapt the spaces around their properties to protect themselves and increase personal and neighbourhood safety. Through Firewise, people become active participants in the fight against forest fires: around their own structures/factories they create and maintain strips with a lower density of vegetation with the aim of reducing the effects of fire. Self-protection means, therefore, sharing the risk of forest fires, which is even more increased by the ongoing climate change, as witnessed by the large fires that have developed in recent years in vast areas of countries traditionally traversed by fire, but also in territories for which the problem of forest fires is completely new. The Firewise Community enables people living in or near forests to learn the best way to protect their forest heritage and teaches them how to behave correctly in the event of a fire. Thus, work is done to avert fire, but at the same time to be ready, in any case, to deal with it, limiting the consequences to a minimum. The Region of Tuscany has also defined guidelines that serve to clarify the concept of Firewise community and the ways in which public, private and voluntary associations can work together to pursue the same aim of prevention and self-protection from forest fires.	Website: Firewise – Forest firefighting community (IT)	Community engagement, wildfire prevention measures, self-protection
10	Educational fire prevention initiative to school children	Implemented in Tuscany (Italy) by DREAm ITALIA forest fire-fighting instructors and inspired by the MEFYTU project developed by the Pau Costa Foundation. The project is aimed at primary and secondary school students and includes: one interactive day at the school, a self-work part by the students, one learning day at the regional forest fire training centre "La Pineta". The aim is to disseminate the culture of forest fire prevention to school classes, together with the concepts of integrated fire management and fire ecology. At the same time, the regional forest fire organisation, its components, tasks, and active firefighting methods are explained. Then, on the first day, which takes place at the school in the classroom of the students, these topics are introduced through interaction with the students, multimedia material and practical and demonstrative exercises to demonstrate the effectiveness of silvicultural interventions in forest fire prevention. On the day that later takes place at the regional training centre, all the activities of the training centre, firefighting methods, equipment, and future prospects based also on climate change are explained to the pupils. During the day, practical activities are also carried out, such as the use of water sprinklers and the observation of releases from the regional forest firefighting helicopter, as well as the observation of fire behaviour in the specially equipped area in the training centre. Finally, for secondary schools, pupils are expected to present a communication work they have created to promote one of the 10 themes on the subject of forest fires and fire ecology.	Website: enterprise D.R.E.AM. Italia (IT, EN)	Wildfire risk education, fire ecology

11	Specific prevention plans (Piani specifici di prevenzione)*	A specific forest fire prevention plan is a tool inspired by the principles of forest fire risk management, with the aim to reduce the risk of occurrence of big wildfires that damage wide forest areas, human settlements, and population. This is done by planning silvicultural works in strategical points with a work-program which lasts 10 years. Its structure is the result of an integrated study of the area, field work, GIS work and technical experience. During the drafting of the plan this work is in coordination with local authorities' technicians and taking into account where the private properties are. The tool has been developed and applied in many areas of the Tuscany Region, and it can be applied also in other areas with high wildfire risk, adapting it to the context-specific environmental conditions, fire-regime and Wildland Urban Interface presence. In the Tuscany Region the planned works are financed by RDP funds. The development of the prevention plan doesn´t consider administrative boundaries and public/private properties, with the amendment (March 2018) to the Forestry Law of the Tuscany Region (Legge Regionale 21 marzo 2000, n.39: art. 74/bis) it's stipulated an agreement between the public forest entity and private owners.	Website: Tuscany Region, specific prevention plans (IT)	Silviculture, wildfire risk reduction, strategic points
12	I Do Not Risk (Io Non Rischio)*	Because of increasing wildfire risk conditions, in 2022 the "Io Non Rischio" (I don't take risks) initiative was extended to include wildfire risk, since the campaign was already active on other natural risks since 2011. Io Non Rischio is a national communication campaign on good civil protection practices. It is also a purpose, an exhortation to take the issue into consideration, because only through knowledge, awareness and good practices is it possible to say, "I don't take risks". I don't take risks is also the slogan of the campaign, the umbrella under which every risk is explained to citizens together with the good practices to reduce its impact on people and property. The idea of the campaign is to train civil protection volunteers on risk knowledge and communication and then let them get out into the streets of their cities and towns to meet citizens and inform them. An idea conceived and proposed by Anpas (a national association of volunteers) and immediately embraced by the Civil Protection Department and its scientific partners Ingv, ReLuis and Cima with the contribution of the Conference of Regions and Autonomous Provinces and Anci-National Association of Italian Municipalities. Concerning wildfires, at this stage a short flyer has been prepared and it is going to be issued. The training material is under preparation and a first webinar on the main aspects of wildfire risk will be organized. The training for trainers will be conducted in order to prepare volunteers to inform citizens during events that will be organized in several main Municipalities at national level.	Website: campaign Io Non Rischio (IT, EN)	Best practices, wildfire risk awareness
Japan				
13	Awareness raising - social dialogue	This initiative promotes the acquisition of practical knowledge by sharing expertise and everyday knowledge through interactions between scientists and citizens on wildfire suppression through a two-way dialogue dedicated to understanding and empathy. Ideas are also exchanged, and hazard maps developed for more detailed and practical citizen evaluation activities through data simulation of wildfire causes and weather conditions.	*Not specified*	Knowledge exchange, two-way dialogue
Latvia				
14	Campaigns of State Forest Service and State Fire and Rescue Service	There are no specific measures for wildland fire prevention measures as Latvia, which historically is not a country seriously affected by wildland fires. Although wildland fire risk does exist, especially due to climate change. Every year State Forest Service provides information campaigns before forest fire season, while State Fire and Rescue Service provide information campaigns about wildfires in agricultural lands and wildfires.	Website: State forest service (LT)	Wildfire season, rural population
15	High risk information	Every year, the beginning and end of the combustible period are announced in mass media (television, radio, etc.).	*Not specified*	Wildfire risk communication

Lebanon				
16	National fire emergency plan for fire preparedness, risk reduction and awareness*	The Ministry of Environment in Lebanon in collaboration with international organizations, national agencies, the University of Balamand, NGOs and local community groups launched in 2022 the national fire emergency plan for fire preparedness, risk reduction and awareness. The purpose of this Plan was to coordinate national and local efforts in readiness to address wildfires, reduce fire risk and create awareness about fire risks. The main highlights of the plan included 1) Prioritizing "hotspot" area of very high fire risk (around 14 different zones), 2) Launching of the National campaign for forest fire prevention #صق_انلاب_قيرح (i.e., minus one fire) from Akkar (which was heavily affected by fires in 2021 (i.e., the main objective of the campaign is to reduce the extent of forest fires by 25% in comparison to annual averages), 3) Launching "make a different week" i.e., the national week for fire awareness and prevention (i.e., a number of prevention activities with the participation of local community groups took place across the country), 4) Supporting the engagement of first responder teams and the creation of follow-up Whatsapp group for selected "hotspot" areas, 5) Facilitating the provision of basic equipment and tools for local firefighting units in collaboration with NGOs, 6) Communicating fire danger forecast alerts to local community groups, 7) Launching of an awareness social media campaign in collaboration with local and National NGOs, and 8) Promoting awareness on forest fires in schools (school plays, distribution of a fire book, etc.).	Social media hashtag: #صق_انلاب_قيرح (AR)	Fire emergency plan, stakeholder collaboration
Malta				
17	Wildfire risk awareness campaign	In order to reduce the possibility of wildfires, the Civil Protection authority in Malta through its social media, meetings at schools and at local level aims to launch a campaign to educate and also raise the awareness of risks that climate change and possible negligence could possibly generate wildfire in wooded areas that are scattered on the islands. These campaigns aim to inform how the public should react and on actions to take if one encounters or experiences a wildfire. The Civil Protection authority also carries out discussions with the entity responsible for the upkeep of parks, woodlands, and 'forested' areas around the islands so that proper housekeeping is carried out in order to avoid such wildfires from occurring. This also helps bring awareness of such a phenomenon to these entities and help with maintaining proper access to fire response and water supplies in these locations.	Website: National Civil Protection (EN)	Forest management, how to act
Netherlands				
18	Wildfire risk map (Natuurbrandri-sico)	National safety strategy and risk communication through risk map.	Website: Wildfire risk map (NL)	Wildfire risk map
Norway				
19	Best practice and knowledge sharing report (Brandrapport)*	Cooperation initiatives between the forestry sector and fire suppression services in the Nordic region. Best practice examples and knowledge sharing. Cases in Finland, Norway, Sweden.	Report: Cooperation initiatives between the forestry sector and fire suppression services in the Nordic region (EN)	Best practices, knowledge exchange
50	Knowledge Exchange*	Initiative promoting wildfire behaviour analysis and trying to raise awareness around the topic of wildfires, studying the Scandinavian reality, connecting main actors (researchers, fire and rescue services, civil actions...) and trying to set up a knowledge exchange from South to North experiences in both ways.	*Not specified*	Wildfire behaviour, wildfire risk awareness, knowledge exchange
Philippines				
51	Fire safety lectures	The UL FSRI Fire Safety Academy follows a program of 46.5 hours of fire safety lectures.	Website: Fire Safety Academy (EN)	Fire safety

Portugal				
21	Forest defence (Defesa da floresta)*	Raising public awareness on the importance of managing biomass associated with areas surrounding different infrastructures and buildings. At municipal level, this action consists of implementing the secondary biomass management network. The purpose of this set of land parcels, strategically located (passively protecting people and goods), is to guarantee the total or partial removal of forest biomass, through allocation to non-forest uses and the use of certain activities or silvicultural techniques, in order to reduce the risk of fire. The main objective of this network is to safeguard people and property and fight forest fires. Depending on their size and location (biomass management network), they can play a role in reducing the area covered by large fires, allowing and facilitating direct firefighting intervention, reducing the effects of passing fires, passively protecting access routes, infrastructures and social facilities, built-up areas and forest stands of special value, and isolation from potential fire ignition points.	Website: Municipality of Torres Vedras, Forest defence (PT, ES, EN, FR, ZH, UK) Factsheet: Protect your Forest (PT) Pamphlet: Cleaning of forest lands (PT)	Forest management, wildfire risk reduction, protection
22	Safe village, safe people (Aldeia segura pessoas seguras)*	The extensive rural fires that occurred in mainland Portugal in the summer of 2017 led to a call for action in terms of preparedness and awareness. As a result, the "Safe Village, Safe People" Programme was established with the objectives of a) establishing structural measures (including places for refuge) for the protection of people and property, especially in the urban-wild interface, and, b) triggering awareness-raising actions regarding risky behaviours and self-protection measures, supported by evacuation drills. The Programme is managed by the central government, via the Civil Protection Authority, which establish general guidelines. However, given the proximity and the multiplier effect of the municipal and civil parish councils, the implementation of the Programme occurs at local level in order to achieve a high level of citizen's commitment.	Website: Safe village safe people (PT, EN, FR, DE, IT, ES)	Wildfire risk awareness, WUI, municipal scale
43	Daily wildfire risk information	This initiative includes workshops about burning safety awareness for population, information about daily fire risk, radio and online information about daily risk and rules about them, and fire safety in wild tracks.	*Not specified*	Wildfire risk communication, fire safety
Portugal & Spain				
23	Disasters Avoided	The purpose of this research project called Disasters Avoided, sponsored by NASA, is to inspire action from governments, funders, businesses, the non-profit sector, and the public by compiling, verifying, and sharing compelling good-news examples of potential disasters which could have happened, but did not, because action was proactively taken before it was too late. The project aims to show how integrated action leads to a good state of resilience, focusing on examples of disasters that have been avoided through intelligent action. The intention is to show how linkages (or in some cases, vulnerabilities) in a system come together in an intelligent way to provide resilience and an ability to flex and adapt, which helps people and the planet to prosper. Wildfire examples of good practice are an important part of the project - in Europe and elsewhere around the world.	Website: Disasters Avoided – a research project for NASA (EN)	Disasters, resilience
Republic of Cyprus				
24	Save the Forests Week	The Department of Forests of Cyprus, of the Ministry of Agriculture, Rural Development and Environment, during May 2022 organised a wildfire risk awareness initiative, designated as the "Save the Forests Week". During this period, through a series of planned events and activities, an attempt was undertaken to sensitize the whole society of Cyprus, for the need of protection of the forests from fires. The event was announced by the Minister of Agriculture, Rural Development and Environment, of the Republic of Cyprus, at a Press Conference which took place on 23 May, 2022. The main events that were organised included, meetings with stakeholders involved in fire protection, lectures at schools, distribution of relevant educational material to the public, interviews through the media, broadcasting of video and documentaries through the tv channels and the social media.	Website: Department of Forests (MOA) (EL, EN)	Wildfire sensibilization, fire protection
Slovakia				
44	Wildfire risk management training and preparation	Risk awareness and preparation through the engagement of regional fire and rescue services, the cooperation with mayors, National Park authorities and forestry institutions.	*Not specified*	Stakeholder collaboration

Slovenia				
25	Activities for awareness raising among residents*	With the aim of raising awareness among residents for the implementation of personal and mutual protection and appropriate handling in the event of natural and other disasters, the Administration for Civil Protection and Disaster Relief prepares and implements various activities in recent years that also relate to wildfires. The activities are carried out as informal forms of training and are intended for general public (children, adults, the elderly, invalids and the professional public. Awareness-raising activities are carried out throughout the year, especially during fire risk announcements, during October - fire safety month project (if the topic is appropriate), at various fairs, events, campaigns, etc.	Website: Republic of Slovenia government (SL, EN)	Mutual protection against wildfires
Spain				
26	Educational program MeFiTu*	The Mediterranean region is characterized by a climate with a high risk of wildfire, which will intensify in the face of a climate change scenario. However, the population does not have the knowledge or the tools to prevent or react to these episodes. Aware of this problem, the Pau Costa Foundation promotes the educational program MeFiTu, "Mediterranean forests, fire and you" raising awareness about fire ecology aimed at primary and secondary school students (6 to 13 years). MeFiTu wants to promote the transmission of knowledge and experiences about wildfires with the aim of reorienting the social perception of fire and supporting the importance of sustainable forest management. Objectives of the educational program include bringing awareness to a new generation about the role of fire in the ecosystem and forest management based on scientific knowledge; Promote collaboration and the exchange of knowledge and experiences between local entities, technicians, and educational centres; Offer opportunities to students and raise awareness of potential jobs and careers in territorial and forestry, livestock, and agriculture; and Promote and raise awareness of employment and economic opportunities linked to the rural world with the aim of building resilient societies. The workshop has 3 activities given in one day at schools: Activity in the classroom to learn the concepts; Preparation and burning of models simulating two forests, one with a high load of vegetation and the other without management; A field trip to learn about forests through discovery and art activities. Students develop and build new conceptual, procedural, and emotional structures through experimentation and play.	Webiste: The Mediterranean Forest, the Fire and You (MeFiTu), environmental Education (ES, EN, CA)	Wildfire risk perception, education, forest management
27	FireFlocks Program (Ramats de Foc)*	The Mediterranean basin is characterized by unmanaged forests under increasing vulnerability to wildfires due to climate change. A small number of wildfires are responsible for most of the burnt area. These large forest fires represent a growing risk for society, as firefighting services are unable to deal with, despite the high budgets and investments allocated. Silvopastoralism is a common practice with high benefits for society (landscape conservation, fire risk management, and the production of high-quality meat and dairy products). But the presence of herds and shepherds is becoming increasingly uncommon, leading to the growth of fire prone forests. Thus, the presence of livestock in woodlands has become a shared common interest of owners, farmers, firefighters, environment rangers, and businesses willing to sell food products with an added value. Fireflocks brings together all public and private agents interested in the continuity of silvopastoralism, by aligning their various needs, and articulating a production and consumption chain of food products from herds with the added value of decreasing fire risk in woodlands with a strategic role in the propagation of wildfires (as determined by Firefighters of Catalonia and the Department of Agriculture). The Artisan Butchers Guild of Girona counties works on adding value to the products of the participating farmers, through a label that certifies the herds' fire risk management tasks. Customers will thereby know that eating Ramats de Foc products delivers societal benefits; it will keep alive local extensive livestock farming and preserve forests.	Website: FireFlocks (ES, EN, CA)	Silvopastoralism, market value

28	Art&Fire Initiative	The Art&Fire programme proposes new formats and ways to reach out to the general public. In this case, Art is the vehicle to channel different activities to raise social awareness on wildfire risk. Art&Fire is composed of several items. Fire memories is a virtual exhibition of works by the artist Josep Serra, his paintings trigger reflections on wildfires and their impact. Playing with Fire was created and produced jointly with the Museum of Rural Life in Tarragona, Spain and aimed at reflecting on the current management of forests and the rural environment in a context of climate change. The exhibition displayed works from renowned artists (Miró, Brossa, Guinovart among others) and it included a workshop, IncendiArt, where children were encouraged to create their own paintings using materials from wildfire remnants such as charcoal or ash. Now, all the exhibition content is available online. Incandescent Memories is an itinerary exhibition (more than 10 different locations) of 21 paintings by the artist Josep Serra. The exhibition reflects the invisible work of the emergency professionals and their feelings. It makes us thing of burned landscapes as scenarios of opportunity. Fire vs Fire is a virtual walk through the art gallery of artist Pep Serra. Lastly, the Pau Costa Foundation clips are a series of short videos to explain wildfire key concepts through art. The videos mix image, music and texts creating an all-enveloping and inspirational atmosphere. Moreover, the Foundation hosts a data base of art works, made up mainly from donations by artist Pep Serra, and has the commitment to disseminating these works. Art is considered as an effective means to connect with society, in order to raise awareness in wildfire risk.	Websites: Pau Costa Foundation project overview (ES, EN, CA) Playing with Fire (ES, EN, CA) Videos: Fire Memories, virtual exhibition Josep Serra (EN) PCF clips on WUI (ES)	Art, social awareness, wildfire risk reduction
29	Firewise in EU*	Firewise is a program developed by the National Fire Protection Association (NFPA USA) that provides a framework to help WUI communities get organised and take action to improve fire risk understanding. NFPA also created a Preparedness Day to actively involve communities. Citizens are invited to check their surroundings and invite neighbours to do the same; clean the surroundings from a Firewise perspective, diversify the interventions in three areas, and create a family evacuation plan (alternative exit routes, emergency phone numbers, own emergency supply kit etc.). At the end, the main objective is to empower the community to undertake wildfire risk reduction actions together with local stakeholders (Fire Service, Civil Protection authorities...). Communities that accomplish all the measures needed to protect their homes against wildfires are awarded with a certificate proving the resistance of the community. The Pau Costa Foundation is implementing this approach in the European context through the following a set of steps. First defining WUI communities, the creating board committees formed by residents and other wildfire stakeholders. The board committee has the duty to meet regularly, especially during the first stages of the implementation process. The organization of Community awareness activity (Wildfire Preparedness Day). The development of a wildfire risk assessment adapted to the study site that will serve as a guideline to address all the actions. The board committee develop an action plan that mainly consists in the actions that must be followed for risk reduction and how to implement them. Hosting one or more working events, so residents and wildfire experts can work together in prevention and preparedness tasks. Share the actions and accomplishments locally to engage more residents or even other communities. The community takes the lead.	Website: Pau Costa Foundation Preparedness day (ES)	WUI, community engagement, wildfire risk reduction

30	Plan 42: Forest Fire Prevention	Plan 42 is a comprehensive forest fire prevention program designed for social participation by Junta de Castilla y León. Prevention plan focuses on preventing fire opening (active prevention), working with social intervention tools and environmental education for the most affected rural regions. It was prepared with two specific aims: promote awareness and train and educate rural population in other procedures of land management (avoiding using uncontrolled fire); and develop forest management initiatives to make local residents appreciate more the forest and therefore protect it. Plan 42 works in the 154 municipalities with the highest forest fires rate in the autonomous community, grouped into 9 rural regions, each one of which counts on a coordinator, an expert in Environmental Education and 8 technicians. Technicians are located in the rural regions, what makes possible the detailed work, concrete diagnosis of the situation, effective adaptation to each circumstance and proximity to population in their general conflicts and needs, motivating their participation and collective design of new solutions and attitudes towards fires and forest use and management. Active prevention works from two main bases, cultural change and forest enhancement and revaluation, but it is also necessary crime prosecution collaborating directly with National Security Forces and the Prosecution Service.	Website: PLAN 42 - Junta de Castilla y Leon. Additional content available on webpage (ES)	Rural population, forest management
31	Against fire; yesterday, today... always; For biodiversity with life... against fire (Contra el fuego; ayer, hoy... siempre; Por la biodiversidadl con la vida... contra el fuego)*	Since the 90s, from the Spanish Forest Fires Service belonging to the Central Government Administration, several school environmental education campaigns about forest fires prevention were launched to be developed and implemented throughout the national territory. These campaigns began with the presentation of a board game in which schoolchildren, helped by their teachers, had to develop a fire-fighting strategy but not against their classmates but against fire. The aim was to extinguish fire using the less means and the less burnt area, the better. The game gave monitors the opportunity to introduce preventive messages. This competition took place at local, regional, and national levels. These face-to-face campaigns were carried out during the school year with 2,000 schools participating and visited twice a year by an environmental education team carrying out different activities, workshops and experiences with teachers and schoolchildren in high-risk areas. Along with the game, other supplies such as posters, brochures, video, didactic books, multimedia material, newsletters, stickers, field notebooks, school calendar and others were distributed.	Websites: Ministry for the ecological transition and demographic challenge (ES, CA, GL, EU, FR, EN) School environmental education campaign for the prevention of forest fires (2009) (ES, CA, GL, EU, FR, EN)	Wildfire risk education, board game, firefighting strategy
32	Integral Wildfire Prevention Teams - EPRIF	The Integral Wildfire Prevention Teams (EPRIF) were created in Spain in 1998 by the Ministry of Environment to collaborate with the autonomous communities´ forest services in searching for solutions related to the causes of forest fires, working directly with rural population. Their main goals are to contribute to the decrease of number of fires, assist the preventive planning of forest areas and promote public awareness of the impact of forest fires. Their principal activities are focused on planning, implementing, and monitoring prescribed burns, reconciliation of interests with farmers and ranchers, training, awareness and environmental education actions. Currently, there are 17 teams distributed all over Spain consisting of 2 or 4 people (2 forestry engineers and 2 foremen). In the last decade, they were part of the planning and execution of 13 542 hectares, with the main objective of removing shrubs for supporting pastures regeneration. They also participate in mechanical weeding and ploughing works, meetings with different groups, field works evaluation, field data collection, technical advice on municipality prevention plans, preventive silviculture, and collaboration with wildfire suppression operations.	Videos: "EPRIFs as tools for the prevention of major fires"(ES) Global actions of EPRIF teams (ES) Awareness-raising actions with the school population (ES) Carrying out prescribed burning (ES) Actions in the agro-forestry interface (ES) Actions in the forest-urban interface (ES) Reconciliation of interests with hunting managers (ES) Self-protection systems in urban areas (ES) Clearing, shredding and biomass extraction (ES)	Fuel management, wildfire impact, wildfire prevention plans

33	Forest of Forests; Aunt Filipa... and Life; Don't Burn Life (Bosque de bosques; La tía Filipa... y la vida; No quemes la vida)*	Rural campaign for forest fires prevention consisted in carrying out activities such as exhibitions, talks or presentations in areas with the highest fires rates. After several tests, it was observed that talks with just one talking person involved, were of very little interest, therefore, the idea of making stage/ theatre plays appeared. Performances were specifically written for the campaign where population could identify themselves, without accusatory intention, so that consequences of mistakes and negligence in the use of fire were shown. Creators and scriptwriters were professional staff as well as the actors and these plays. They took place in summer, at night, in selected villages with a high rate of wildfires or in fire prone areas, with basically all the neighbours attendance. Afterwards, a survey was carried out where it was usual to find answers showing that, what was shown in the stage was also a real problem in the municipality. These direct awareness actions were especially aimed at farmers and ranchers to remind them the fire severity as well as promoting the correct use of fire as an agricultural and farming tool	Website: Theatre representations on the forest fire topic (ES, CA, GL, EU, FR, EN)	Rural population, theatre, use of fire
45	112 Aragón	Regarding wildfires, 112 Aragón has a video and an infographic with self-protection tips that are published continuously in times of fire risk. The tips are spread through the social networks of 112 Aragón (Twitter and Facebook). They have also been published during the summer on the front page of the 112 Aragón website. In addition, they have been included in some press releases issued by the government of Aragón.	Website: 112 Aragon (ES) Video: Tips112 on what to do if you are near a #forestfire (ES) Infographic: Advice on self-protection against forest fires (ES) Press release: Red alert for danger of forest fires in several areas of Aragon (ES)	Self-protection
Sweden				
34	Heating everyman's (Eldning allemansr)*	Fire has always been fascinating to humans. A crackling campfire enhances the outdoor experience. However, fires can also cause major devastation if not handled correctly. The Right of Public Access (Allemansrätt) grants no automatic right to light a fire. A fire is personal responsibility and should only be lit in safe conditions. This information folder contains things to consider when lighting a campfire or barbecue outdoors.	Website: Safety when burning in forest and land (SV, EN) Report: Lighting Fires and the Right of Public Access (EN)	Use of fire, risk responsibility
35	Fire risk forecasting system (Brandriskprognossystemet)	"Brandrisk skog och mark" is the Swedish national fire danger forecast system for vegetation fires (forest and grass fires). It is also a system for decision support and weather information. The system is developed by the Swedish Meteorological and Hydrological Institute (SMHI) in cooperation and with funding from the Swedish Civil Contingencies Agency (MSB). The web-based system is used by many users, for example MSB, municipal fire and rescue services, County Administrative Board, and the forestry industry.	Website: Information on forest and land at risk of fire (SV)	Wildfire danger forecast, decision support
36	Fire fuel classification web-based map service	Fire fuel classification is a web-based map service that is primarily intended to provide information to municipal rescue services and county administrations about the fire propensity of forest vegetation. The classification is based on a national project with several different authorities which, through remote sensing with satellites, classified vegetation in pixels of 10 m x 10 m. The classification can form a basis for obtaining a risk perception where larger contiguous areas are found with more or less fire-prone vegetation. The classification can also form a basis for decision-making during ongoing efforts to get an idea of fire spread and fire behaviour and thus which measures may need to be taken such as evacuation. Even after a fire, the fire classification can be a basis for analysis of the fire's behaviour, speed of spread and how it developed, as well as intensity.	Website: Fire fuel classification (SV, EN) Online map: Fire fuel classification and land cover data (SV)	Fuel classification, wildfire risk perception, wildfire behaviour

37	Handbook on Municipal Preparedness - Risk Catalogue 2022*	The Handbook on Municipal Preparedness has been developed by the Swedish Civil Contingencies Agency (MSB) due to an agreement between the national level, through MSB on appointment from the Swedish government, and the local level represented by the Swedish Association of Local Authorities and Regions (SKR). The different chapters in the handbook have been developed in close cooperation with different representatives on the local and regional level as well as experts on the national level. The risk catalogue is one of four parts in the handbook and contains, at the moment, 20 chapters on different risks, one being wildfires. The risks in the catalogue are based on national level risk assessments and analyses, however, the information has been adjusted to fit the purpose as well as the municipal target group. Even though the risk catalogue is primarily developed to support the municipalities in executing their risk and vulnerability assessments, the catalogue also aims at informing other stakeholders such as regional actors (health regions as well as county administrative boards), national level agencies, the public and private sector. The different risks are described in more general terms, but also based on consequences, uncertainties, developments, and trends, where to find risk assessment, geographical information, responsibilities, and roles and such. The main purpose is to give a brief introduction to the different risks and then refer the reader to further in-depth material.	Website: Risk Catalogue (SV, EN). Municipal handbooks available for each risk type (SV)	All risks information, multi-level approach
38	Forestry guidelines (Skogsbruket)	Risk management regarding fire during forestry work: Forestry's guidelines for risk management regarding fire are to reduce the risk of unwanted forest fires as a result of forestry work. The guidelines provide suggestions for suitable measures to prevent fires and describe which equipment should be present for different types of machine work. In addition, they describe how the routines for how consultation should take place between the various actors involved. What can be considered appropriate measures can vary based on prevailing conditions. But the guidelines state that consideration must be given to both prevailing and forecasted risk and weather conditions, access to different fuel types, topography and proliferation risks. Based on the guidelines, it is forestry's responsibility to produce instructions and training.	Report: Risk management regarding fire in forestry work (SV)	Forestry guidelines, wildfire risk reduction
39	Tourist information on fire (Dalsland Nordmarken)	The work done in the Dalsland Nordmarken wilderness area is a good example of a local tourism organisation working together with landowners and local authorities to prevent forest fires in an area with a high number of tourists camping outdoors in the summer season. This initiative has focused on finding better ways to inform the large number of non-residents visiting this wilderness area during the summer season of current fire danger, fire bans, and responsible handling of fire at the campsites. Similar initiatives have also been implemented in other parts of Sweden.	Website: Dalsland Nordmarken lake district (SV, EN, DE)	Non-residents, use of fire
46	Fire danger forecast and warning	Information on fire danger to the public. The fire danger forecasts are calculated with the fire danger forecast system ("Brandrisk skog och mark") at the Swedish Meteorological and Hydrological Institute (SMHI) and then disseminated to the public via SMHI's website with warnings and advisories, the Swedish Civil Contingencies Agency (MSB)'s website and MSB smartphone app Brandrisk Ute (Fire Danger Outdoors). Furthermore, the fire danger forecasts are disseminated via local and national television, radio, and newspapers.	Websites: Warnings and advisories on SMHI (SV, EN) Fire danger forecasts and fire risk map (SV, EN)	Wildfire danger forecast, warnings
47	Fire Ban information (Eldningsf rbud)	Regulations on fire bans with associated information support: Guidance prepared as support for municipalities and county administrative boards to decide in a similar way on regional and local regulations on fire bans. Linked to the fire ban, documentation and support for various information measures has also been developed. Information materials are available in various forms such as printed materials, video films, etc.	Report: Guidance on fire bans (SV) Website: Information package on fire bans (SV, EN). Additional content available on webpage (FR, DE, ES) Video: Lighting fires and grilling in the forest and on open land (EN) Document: Messages about the Risk of Fire In the Forest and on Open Land, and Fire Bans (EN)	Decision support, fire bans

48	Fire Danger Outdoors smartphone app (Brandrisk Ute)	Brandrisk Ute (Fire Danger Outdoors) is a smartphone app from the Swedish Civil Contingencies Agency (MSB) aimed at private individuals. The app helps you be aware of the fire danger in forests and on open ground and is particularly useful during the spring and summer. It provides information and advice to help you reduce your risk of causing a grass or forest fire, for example if you intend to light a fire or have a barbecue. Fire danger forecast for your location: The app presents the current fire danger forecast for one´s location using the GPS function. One can also search for the fire danger in other locations and save locations as Favourites. One can view different types of forecasts in the map such as the risk of forest fires spreading, fuel dryness and grass fire danger. The fire danger forecast is updated every hour. One can view the danger class for every hour over the next 48 hours, as well as a fire danger value for the following five days. Fire danger data is gathered from the Swedish Meteorological and Hydrological Institute (SMHI). Check whether there is a fire ban in force: There may be a local fire ban in force at one´s location. So, check fire ban function in the app before lighting a fire. Brandrisk Ute also contains videos, FAQs and information about safer ways to light a fire outdoors without causing fires in vegetation.	Website: About App Brandrisk Ute (Fire Danger Outdoors) (SV, EN)	Smartphone app, wildfire danger, location specific

Images corresponding to some of the above listed initiatives

Initiative 1: Florentina Fuchs (link)

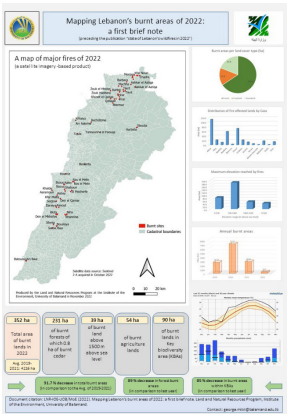
Initiative 3: Forest fire communication kit
(Le kit de communication «Feu de forêt») (link)

Initiative 4: Awareness raising and education to communities by NGO F2wald (link)

Initiative 5: Innovative Action for the prevention of fires on Kythira Island (link)

Initiative 11: Specific prevention plans
(Piani specifici di prevenzione) (link)

Initiative 12: I Do Not Risk (Io Non Rischio) (link)



Initiative 16: National fire emergency plan for fire preparedness, risk reduction and awareness

Initiative 19: Best practice and knowledge sharing report (Brandrapport) (link)

Initiative 20: Stop the grass fires, there is only one earth (Stop pozarom traw, Ziemia jest tylko jedna)

Initiative 21: Forest defence (Defesa da floresta) (link)

Initiative 22: Safe village, safe people (Aldeia segura pessoas seguras) (link)

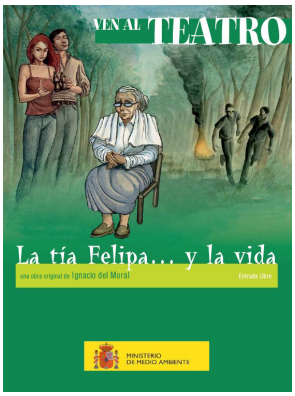
Initiative 25: Activities for awareness raising among residents (link)

Initiative 26: Educational program MeFiTu (link)

Initiative 27: FireFlocks Program (Ramats de Foc) (link)

Initiative 29: Firewise in EU (link)

Initiative 31: Against fire; yesterday, today... always; For biodiversity with life... against fire (Contra el fuego; ayer, hoy... siempre; Por la biodiversidadl con la vida... contra el fuego)

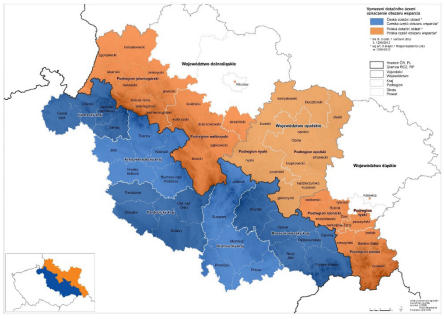


Initiative 33: Forest of Forests; Aunt Filipa... and Life; Don't Burn Life (Bosque de bosques; La tía Filipa... y la vida; No quemes la vida)

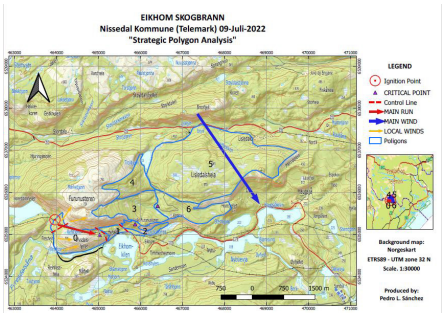
Initiative 34: Heating everyman's (Eldning allemansr) (link)

Initiative 37: Handbook on Municipal Preparedness - Risk Catalogue 2022 (link)

Initiative 41: Yearly national campaign for fire-protection



Initiative 49: The "Safe borderlands" project and "Joint management of specific risks in the Jesenik – Nysa region" project (link)



Initiative 50: Knowledge Exchange

Initiative 53: Paint in Back (Boranka) (link)

ANNEX II. Risk awareness and communication projects: Discriptive table with basic information

Name, Calendar and Funding	Description	RA&C end-users' outputs (available language in acronym)
Advanced Fire Analysis Network (AFAN) 2021 - 2022 DG ECHO	AFAN aims at formalising a European wildfire expert knowledge-sharing network focused on fire risk analysis (or assessment) and risk reduction. The initiative has the sub-objective to scale up existing regional and national and international knowledge and capacities, transfer them with the mission of shared mutual learning and create the basis of an operational network based on trust and support to generate an overall improvement of the European wildfire emergency response capacities and coordination.	Guidelines of fire analyst competencies and skills: helps to detect general capabilities and examples of tasks of fire analysis scope, the link detected between forest fire analysis and decision-making, and the responsibilities that may arise. This framework aims to facilitate the identification, exchange and characterisation of current wildfire analysis. The guide is targeted at an audience already initiated in the analysis of forest fires. EN* Guidelines on the use of tools, science and best practices for fire analysis: identifies and describes tools, sources of knowledge and good practices for fire analysis through real examples. EN Guidelines for remote assessment units: identifies and describes the main features of remote analysis of wildfires from an approach aimed at harmonizing fire analysts' capabilities. EN
Mediterranean Fuel-Type Maps Geodatabase for Wildland & Forest Fire Safety (ArcFUEL) 2011 - 2013 LIFE+	ArcFUEL aims to deliver, for the Mediterranean region, a complete, up-to-date, methodology for Fuel Classification Mapping (FCM). This would be made available on a Web-Geodatabase, and it would use 'readily available' harmonized, accessible and interoperable data, according to INSPIRE principles. The methodology is demonstrated via solid pilots in: Greece, Portugal, Italy and Spain.	2 public events in Portugal (Penela, Coimbra): public presentation of the project, objectives, and predictive outcomes at the headquarters of the volunteer firefighters. EN, PT Participation with a booth to ASITA2012 Conference. EN, PT
Cultures of Disaster Resilience among children and young people (CUIDAR)** 2015 - 2018 HORIZON 2020	The project addresses the exclusion of children and young people from the disaster planning and management process and provides innovative and creative communication channels for children's voices to be heard. In addition, it developed a child centred disasters management framework for use by policy/ decision makers in participating countries, the EU and beyond.	International Film "Transforming Disaster Planning – A Child Centred Approach". EN with subtitles in EN, ES, CA, IT, PT, EL. Leaflet – How Can We Improve Disaster Resilience? EN White paper for a Child-centred Disaster Management framework for Europe. EN Policy brief on "Participation as a tool for the resilience of children and young people in disaster situations". ES CUIDAR Book "Children and Young People's Participation in Disaster Risk Reduction". EN Film "Bringing children's voices into emergency management". EN, IT, CA
DIsaster Resilience for Extreme ClimaTe Events providing interoperable Data, models, communication and governance (DIRECTED)** 2022 - 2026 HORIZON 2020	The project aims to reduce vulnerability to extreme weather events and foster disaster-resilient European societies by promoting interoperability of data, models, communication and governance on all levels and between all actors of the disaster risk management and climate adaptation process.	Project in process. DIRECTED will boost the integration, accessibility and interoperability of data, models and tools supporting Climate Change Adaptation and Disaster Risk Management: from early warning systems through communication and climate change risk assessment tools. EN, DE
Educational Toolkit for Secondary Schools in Wildfires and the Climate Change Context (EduFire Toolkit)** 2022 - 2024 Erasmus + Programme of the European Union	The project has the purpose to educate high school students (12 to 16 years old) on wildfires prevention through a project-based learning (PBL) methodology by including a multidisciplinary approach. The project is developing a set of transdisciplinary challenges (addressed to children) and units (addressed to teachers) related to wildfires and their management as a way to include the topic in secondary schools.	Project in process. It will have educational guidelines and resources: Set of multidisciplinary teaching resources to support the student's learning process through developing projects that respond to real life problems. EN

Name, Calendar and Funding	Description	RA&C end-users' outputs (available language in acronym)
Efficient fire risk communication for resilient societies (eFIRECOM)** 2015 – 2016 DG ECHO	eFIRECOM aims at enhancing the resilience of citizens to wildfires in interface areas from the Mediterranean region, through effectively promoting and increasing awareness and participation on the culture of risk with updated knowledge and best practices. The results were scaled-up and transferred to other areas in Europe and from the Mediterranean that might be affected by episodes of extreme fire in the near future, and are useful to the strategic communication of other natural hazards such as floods, storms or avalanches.	Booklet on myths and facts about wildfires in the Mediterranean. EN, ES, FR, CA, AR Booklet with operational recommendations to enhance citizens' involvement in wildfire risk management through communication actions. EN, ES, FR, CA, AR Policy brief. EN, ES, FR, CA State of the art on fire risk communication to communities and municipalities. EN Report on operational recommendations to enhance communities and municipalities involvement in wildfire risk management through communication actions. EN Guideline for the self-evaluation of properties to the Wildfire risk in urban interface. EN, ES, FR, CA, AR Guideline for the assessment of wildfire risk in the municipality. EN, ES, FR, CA, AR Forest fire risk in the wildland-urban interface; elements for the analysis of the vulnerability of municipalities and homes at risk. EN, ES, CA, AR State of the art on fire risk communication to children, youth and teachers. EN Report on political recommendations to promote a fire risk culture amongst children, youth and teachers. EN Storybook for children about fire and forest fires in the Mediterranean. EN, ES, FR, CA, AR Teaching programs. EN, ES, FR, CA, AR Report on operational recommendations to enhance children, youth and teachers' involvement in wildfire risk management through communication actions. EN Short videos created with and for children and youth. EN, ES, FR, CA "Forest fires phenomenon" posters to be exposed in classroom. EN, ES, FR, CA, AR State of the art on the risk communication to journalists and media. EN Guideline for the journalists and media on the effective information of fire risk towards a better social understanding and resilience. EN, ES, FR, CA, AR Report on political recommendations to enhance journalists and media in wildfire risk management through communication actions. EN Report on technical recommendations to enhance journalists and media in wildfire risk management through communication actions. EN
Engage Society for Risk Awareness and Resilience (ENGAGE)** 2020 - 2023 HORIZON 2020	The project explores how individuals and local practices can interrelate effectively with planned preparedness and response, practitioners and technology. Led by a consortium of government officials, first responders, NGOs, SMEs, industries, academia and citizen associations, the project will use empirical data on individual and collective contributions to societal resilience.	Policy brief on "Communicating with Citizens in a Crisis". EN Knowledge platform. EN Model for assessing and enhancing societal resilience. EN
Service-Learning to improve training and employability in wildfire management in Southern Europe (Facing Fire)** 2016 - Ongoing Erasmus + Programme of the European Union	Service-Learning (S-L) to improve training and employability in wildfire management in Southern Europe. Main objective is to involve citizens in the problem of forest fires and, in this way, transfer scientific-technical knowledge and civic values to the population through educational strategies based on S-L.	Pedagogic design of training modules and learning materials for the application of Service-Learning projects in forest fire management. EN Design, development, and management of virtual environments for training and Service-Learning projects in fire prevention and management. EN Guide for the Institutionalization of Service-Learning at University Level. EN Training materials to design Service-Learning projects on wildfires. EN

Name, Calendar and Funding	Description	RA&C end-users' outputs (available language in acronym)
An innovative approach of Integrated Wildland Fire Management regulating the wildfire problem by the wise use of fire: solving the FIRE PARADOX (FIRE_PARADOX)** 2006 - 2010 FP6	The main objective of the Fire Paradox project was to produce and use science to inform decisions, practices and policies under integrated fire management in Europe.	Report "Towards Integrated Fire Management – Outcomes of the European Project Fire Paradox". EN Policy brief "Towards Integrated Fire Management". EN, FR, PT, EL, RU, ES, IT
The role of Integrated Fire Management on climate change adaptation for ecosystem services in tropical and subtropical regions (FIRE-ADAPT)** 2023 - 2026 HORIZON 2020	The project aims at addressing the full diversity of fire types and their different contexts by bringing together expertise from across regions from the Mediterranean Basin and Latin America for the purpose of improving our understanding of the role of Integrated Fire Management (IFM) for wildfire prevention and for enhancing natural and cultural ecosystem services.	Project in process. FIRE-ADAPT will create study-hubs, new research, and generate and empower networks to exchange knowledge. Main expected results are: 2 Handbooks of standardised research methodologies. EN Summary for policymakers and media about socio-environmental benefits of IFM. EN Guidelines on capacity building for integrated fire management. EN Book on IFM for Ecosystem Service Enhancement. EN White paper on technical recommendations for IFM. EN
Fire in the Earth System: Science & Society (FIRElinks)** 2019 - 2023 COST Action	The project aims to develop the EU-spanning network of scientists and practitioners involved in forest fire research and land management and connect communities from different scientific and geographic backgrounds, allowing the discussion of different experiences and the emergence of new approaches to fire research.	Report "Risk assessment and optimisation of management plans for supporting decision making during firefighting". EN Training school. EN Webinars. EN
Cross-sector dialogue for Wildfire Risk Management (Firelogue) 2021 - 2025 HORIZON 2020	Firelogue project brings together expertise from all around Europe when it comes to Wildfire Risk Management. From researchers to civil society organizations, Firelogue's partners have the experience, knowledge, together with a forward-thinking attitude that has placed them at the front and centre of all aspects related to WFRM to contribute with solutions and knowledge exchange. Exchange of best practices.	Lessons on Fire – powered by Firelogue platform (includes wildfire related projects and outputs, existing platforms, studies and reports, events, etc. https://lessonsonfire.firelogue.eu/). EN Leaflets and banner of the project. EN Joint Impact Assessment: joint discussion with the Grean Deal IA projects regarding WFRM impact assessments, targeting the understanding of reaching the impact set by Green Deal Call for 2030. EN Webinars, or: online space where the projects can convey and share with a wider audience the progress made. EN Trainings and demonstration exercises: co-participation, exchange and cross-fertilization among projects while deploying, testing, and validating their innovative technical or non-technical solutions in the scope of practical scenarios. EN
Innovative technologies and socio-ecological-economic solutions for fire resilient territories in Europe (FIRE-RES)** 2021 – 2025 HORIZON 2020	FIRE-RES is built around the concept of Integrated Fire Management. This is a planning and operational approach that includes social, economic, cultural and ecological dimensions. Its objective is to minimize the damage caused by wildfires and maximize its benefits.	Policy brief "Can economic incentives help reducing wildfire risk? Reviewing tools to motivate more fire-resilient land management". EN Recommendations and novel adaptative management scenarios to create resilient forest landscapes to EWE. EN Fire Education Platform (to compile and share knowledge and practices relevant to fire management).

Name, Calendar and Funding	Description	RA&C end-users' outputs (available language in acronym)
Developing a holistic, risk-wise strategy for European Wildfire Management (FirEUrisk) 2021 – 2025 HORIZON 2020	FirEUrisk project aims to improve wildfire risk assessment in Europe. The project will develop and evaluate a novel 3-stage management strategy that will update the current approaches to fighting wildfires, including new tools for: Assessing the danger and the vulnerabilities of communities and landscapes; Reducing their wildfire risks by integrating societal factors and communication; Adapting to the future climate for a resilient future. This plan of action is risk-centred and will cover every relevant aspect of this issue while also considering the environmental context and socio-economic circumstances.	The project will provide (when finished) guidelines for improved training and increase public awareness to minimize the effects of wildfires on the threatened communities, economies and ecosystems in Europe. EN
Fire and Rescue Innovation Network (Fire-IN)** 2016 - 2022 HORIZON 2020	EU-wide collaborative platform for First Responders, researchers and industries. The work in the project is organized in 3 phases: first – the identification of the capability gaps, experienced and expressed by the Fire & Rescue practitioners. In the second phase the project partners review ongoing and planned R&D projects and suggest promising solutions, addressing the gaps. During the third phase the project will establish an interactive cooperation with the research and industry and request proposals for the new R&D. Finally, the project will provide recommendations for the European Strategic Research and Standardisation Agenda on Security. The frequency and scope of natural disasters are increasing worldwide. Together with the high societal expectations for security and the increased concerns for health and safety of the responders, it presents new challenges for the Fire & Rescue, research, innovation and standardisation communities. The ultimate objective of the FIRE-IN project is to raise the security level of the EU citizens by improving the Fire & Rescue services capabilities to address various forms of hazards, natural or manmade.	A series of dossiers, a policy brief on "Landscape Fire Crisis Mitigation", a series of workshops with diverse fire stakeholders and technology providers including a national hub event to look at the future of wildfire challenges in newly fire prone countries (i.e., Germany) and what solutions providers are doing to address this. EN A Common Capability Challenges (CCC) matrix was developed with a detailed description of the CCC and examples of solutions that are available or being developed. EN
Reintroduction of burning in Boreal western taiga woodlands (LIFE Taiga)** 2015 - 2019 LIFE+	The aim of the project is to increase and conserve the biodiversity in the most common habitat type across much of Sweden: Western Taiga, by the use of controlled burning. Between 2015 and 2020 some 120 controlled burning events will be undertaken in coniferous woodlands containing mostly pine. All controlled burning events will be taking place in so called Natura 2000 sites which are already set aside for nature conservation and which the County Administrative Boards have responsibility to manage on behalf of the EU. Life-Taiga and burning for nature conservation involves restoring and conserving unique nature for coming generations.	Pedagogic film "Levande Taiga", which contains general knowledge about controlled burning. SV, EN subtitles Information leaflets and rollups. SV
Natural and Human-instigated Disasters Play (NHD Play)** 2018 – 2021 Erasmus + Programme of the European Union	The main aim of this project is to develop a culture of behavior and to increase the knowledge and skills of primary and secondary school students to respond to emergencies such as natural and human-instigated disasters and crises, responding to the changing environment in Europe, based on modern approaches and social constructivism through the use of ICT-based tools.	Handbook for teachers, students, parents, school principals etc. about Legislation, procedures and protocols ensuring safety and security of children at schools & Disasters, accidents, and crisis response. EN, BG, ES, IT, EL Online course "Natural Hazards: What's the most important thing we need to know!". EN, BG, ES, IT, EL Online game for primary school children: - Do you know what to do in case of earthquake? EN, BG, ES, IT, EL - Do you know what to do in case of flood? EN, BG, ES, IT, EL - Do you know what to do in case of fire? EN, BG, ES, IT, EL
Prevention Action Increases Large fire response preparedness (PREVAIL)** 2019 - 2021 DG ECHO	The aims of PREVAIL are to identify, test and promote innovative approaches, techniques, and tools to streamline prevention measures to preparedness and response capacity actions, and to integrate large fire risk management into forest, rural and peri-urban planning. In addition, it aims at an improved integration between relevant actors and policies, throughout the disaster management cycle (prevention-preparedness-response) with a broad social participation.	Documentary "FIRE-SMART STORIES - A journey through sustainable wildfire risk prevention". EN A knowledge exchange platform related to the project website and dedicated to smart fuel management programs is also created to this aim with the website module on "Landscape Solutions to Wildfire" in Lessons on fire platform (platform is managed by Pau Costa Foundation): Compilation of initiatives of fire prevention, forest management, agriculture and livestock, and rural development/economies, all of which contribute to reduce wildfire risk and its impacts. EN

Name, Calendar and Funding	Description	RA&C end-users' outputs (available language in acronym)
Training the next generation of integrated fire management experts (Pyrolife) 2019 - 2025 H2020-MSCA	PyroLife trains the new generation of interdisciplinary experts in holistic fire management, acknowledging that knowledge transfer from southern Europe (and worldwide) to temperate Europe can support the new generation of experts and that fire risk planning, communication and management can learn from cross-risk lessons including temperate European expertise in water management. In doing so, this project combines how the North solves community problems with the fire knowledge of the European South.	Publications and resources: i. Factsheets: - "What is a fire resilient landscape?". EN - "What recommendations should we follow to communicate about wildfires?". EN - "How can we build resilience in territories with wildfires through changes that truly meet the needs of local communities?". EN ii. Report "A toolkit for fostering co-creation and participative community engagement with vulnerable communities at risk". EN Events: i. 4 Training events about "Fire in the landscape: Introduction to biophysical aspects", "Understanding fire: human dimensions and planning, "Making change: science-policy interaction", "Ways forward: integrated fire management". EN ii. 4 Workshops: interactive events that cover future challenges and associated uncertainty (Fundamental Fire Management Science, Stakeholder Engagement, Risk Communication, Changing Policy). EN iii. Knowledge Dissemination to science & stakeholders: - Webinars. EN • Living with Fire: Traditional fire management and disaster risk reduction from indigenous perspectives and cultures around the world • People Making Change • Other webinars on Preliminary outcomes on Wildfire Risk Management, citizens engagement and policy review in Europe - Online course: Basics of Risk Communication. EN - Writing Policy Briefs: Develop, write and disseminate a policy brief within a real context. EN - Workshop: How is the territory preparing for the next forest fire? EN
Reinforcing civil protection capabilities into multi-hazard risk assessment under climate change (RECIPE) 2020 - 2021 DG ECHO	The project seeks to develop operational recommendations and tools to reinforce civil protection, emergency management, and risk planning for different natural hazards across Europe, simultaneously addressing the impacts of climate change. This is achieved through an integrated risk-management approach, and exchange of lessons learned and best practices.	Guidelines to incorporate projected climate change impacts into DSS and platforms. EN RECIPE summary results to improve Civil Protection capabilities in municipalities. CA Guidelines for flood civil protection planning with participatory approach with a prototype tool for monitoring participatory process. EN (summary report), IT (full report) Prototype for improved decision making in landslide and rockfall risk management. EN (summary report), DE (full report) Guidelines for a participatory crisis management plan to manage wind throw along roads. EN (summary report), DE (full report) Support tool and guidelines for integrated risk assessment and planning for landscape and wild-land urban interface. EN (Summary report), CA (Full report of the Catalan case study), PT (Full report of the Portuguese case study) Protocol for wildfire and avalanche risk management in mountain areas. EN (summary report), CA (full report) Visualizer tool for managing emergency situations in case of high avalanche risk. EN (summary report), CA (full report)

Name, Calendar and Funding	Description	RA&C end-users' outputs (available language in acronym)
Training and Knowledge Sharing Platform for First Responders and Educational Tools for students' and citizens' awareness and preparedness against Natural and Manmade Disasters and Risks (RESISTANT) 2021 - 2022 DG ECHO	RESISTANT aims to significantly evolve the foundations of training of first responders and also put in place a virtual 'agora' for first and second responders, academia, market practitioners, volunteers, and other civil protection stakeholders to share knowledge and exchange best practices, especially in cross-border crisis management. Moreover, RESISTANT's aim is to build the first European Crisis Training Platform to train first responders through threefold comprehensive training.	Training Platform for First Responders & Civilians: 1. Material for First responders: - 6 Educational material: Basics principles of fire line personnel's safety in forest fires, Development process of a civil protection operational forces, Forest fire risk assessment in Southern Croatia, Forest fire risks assessment in Croatia, Evacuation planning – Earthquake – Fire, Evacuation of vulnerable. EN - 3 Operational material: Full-scale exercise-Flood case caused by torrent in North Macedonia, Tabletop training exercise-Earthquake response during the COVID-19 pandemic in Croatia, Tabletop training exercise-Emergency Management Frameworks in North Macedonia-Greece. EN 2. Material for Civilians. 4 types: - Children (Pupils of primary schools aged 6 to 11 years)-3 power point presentations with animations: How to react in case of earthquake for children, How to react in case of fire for children, How to react in case of flood for children. EN - Adolescents (Pupils of secondary schools aged 12 to 18 years): • 3 emergency guides: How to react in case of flood, How to react in case of fire, How to react in case of earthquake. EN • 3 videos: How to react in case of flood, How to react in case of fire, How to react in case of earthquake. EN, SL • 3 safety checklists: Flood Safety Checklists, Fire Safety Checklists, Earthquake Safety Checklists. EN - People with Disabilities (Education and awareness raising for civilians): 3 videos: How to react in case of flood, How to react in case of fire, How to react in case of earthquake. EN, SL - Trainers (Educators from primary and secondary schools, Civil Protection Authorities staff and Municipal employees): Document "Disaster risk assessment model for local authorities" for risk assessment and vulnerability analysis. EN
European observatory on disaster risk and crisis management best practices (Roadmap) 2021 - 2022 DG ECHO	The main goal of the project is to contribute to establishing the foundations or baselines of a European "Doctrine on disaster risk and crisis management" funded on the cooperation of scientific/academic communities and disaster risk management (DRM) authorities. In this light, Roadmap contributes to increase access to information on DRM and disaster risk reduction (DRR) by systematically collecting, reviewing, and analysing past and ongoing experiences. The goal is to identify good practices, successful stories and lessons learnt, and make them readily available and usable to the communities and practitioners interested and active in DRM and DRR fields to further increase the understanding of DRM solutions, in compliance with the United Nations' Sendai Framework for Disaster Risk Reduction 2015- 2030 (SFDRR, 2015).	Thematic paper "Good practices in risk and crisis communication": maps out and evaluates, against established criteria, communication Good Practices in risk and crisis management in multi-hazard risk scenarios. EN
Integrated Technological and Information Platform for Wildfire Management (SILVANUS)** 2021 - 2025 HORIZON 2020	The key output of the project is the release of a climate resilient forest management platform to prevent and suppress forest fire. SILVANUS relies on environmental, technical and social sciences experts to support regional and national authorities responsible for wildfire management in their respective countries. SILVANUS scientists and research engineers will aid the civil protection authorities to efficiently monitor forest resources, to evaluate biodiversity, to generate more accurate fire risk indicators, and promote safety regulations among the local population affected by wildfire through awareness campaigns.	User products (EN): Augmented Reality/Virtual Reality Training for Firefighters SILVANUS Fire Spread Model Citizen Engagement App (with the modules: Guidelines, Reports & Alerts, Practical Tips, Discover, Quizzes and News) Deliverable "Citizen engagement methodology". EN

Name, Calendar and Funding	Description	RA&C end-users' outputs (available language in acronym)
A Holistic Fire Management Ecosystem for Prevention, Detection and Restoration of Environmental Disasters (TREEADS)** 2021 - 2025 HORIZON 2020	TREEADS aims to increase environmental sustainability and urban/ rural ecosystems safety through redefining and reinforcing forests protection and management by developing and validating an innovative, sustainable and applied holistic wildfire management approach. TREEADS will tackle a number of major challenges that wildfires pose by building upon state-of-the-art high TRL products and unite them in a holistic Fire Management Ecosystem consisting of various innovative technologies and systems to optimize and reuse the available Socio-technological Resources in all three main phases of Wildfires. By adopting a multi-stakeholder, multi-actor approach at its core, the TREEADS solutions will contribute to sustainable development as an inclusive societal process and secure sustainability and resilience of natural environment, as well as local human societies.	TREEADS is developing an innovative, sustainable and applied holistic wildfire management ecosystem. TREEADS computational system will be able to simulate different scenarios of incidents and analyse alternative suggestions of actions (Prevention and Preparedness), to simulate fire and smoke, offer a complete DSS for first responders and an AR/VR training system necessary for the training and development of firefighters' skills (Detection and Response), and will build a new land and field-based restoration initiative (Restoration and Adaptation).
Vulnerable Elements in Spain and Portugal and Risk Assessment (VESPRA)** 2020 - 2022 DG ECHO	VESPRA arises for the improvement of the risk management mechanisms, focusing in the border area between Spain and Portugal both for local risks as forest fires, and for other general ones such as the affectation by adverse meteorological phenomena or the dispersion of pollutants in wide areas. VESPRA will result in a system to assist decision-making in the event of an emergency in order to improve the harmonised identification and mapping of vulnerable elements and the integration of vulnerability in a joint information system for the evaluation and assessment of the transnational emergency response. In addition, on-site training exercises for civil protection authorities will be carried out.	An open-source computing geographic information-based platform for data and information exchange with a common methodology for (1) harmonization of data collection; (2) vulnerability and impact assessment; (3) assistance in making operational and preventive decisions in the emergency. EN, ES, PT
Wildland-Urban Interface Virtual Essays Workbench (WUIVIEW) 2019 - 2021 DG ECHO	The main aim of WUIVIEW project is to design, setup, test and operate a virtual workbench service for the performance-based analysis of fire environments in the surroundings of buildings at the wildland-urban interface. The WUIVIEW action will develop an innovative risk management tool that will help WUI communities adapting to face the new generation of forest fires that have already arisen due to climate change. Once implemented, WUIVIEW will become a powerful platform to perform essays and simulation studies dealing with structures survivability, sheltering assessment, building subsystems hazard testing and fire protection systems evaluation. The development of the system will improve knowledge base on microscale fuels fire hazards and on building systems and materials vulnerability, which will be of help to develop better policies and standards to prevent WUI disasters.	Recommendations on structure survivability and sheltering capacity. EN PBD (Performance-Based Design) WUI-specific final guideline. EN Set of leaflets in different languages for educational purposes. EN Àgueda et al. (2023). Evaluating wildfire vulnerability of Mediterranean dwellings using fuzzy logic applied to expert judgement. International Journal of Wildland Fire 32(6) 1011-1029. EN

*EN: English; ES: Spanish; CA: Catalan; FR: French; IT: Italian; EL: Greek; PT: Portuguese; DE: German; BG: Bulgarian; AR: Arabic; RU: Russian; SV: Swedish; SL: Sign Language.

** Projects collected by the expert team, in addition to those acquired through the call for good practices.

ANNEX III. TEMPLATE FOR THE COLLECTION OF GOOD PRACTICES ON WILDFIRE RISK AWARENESS IN EUROPE

EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR EUROPEAN CIVIL PROTECTION AND HUMANITARIAN AID OPERATIONS (ECHO)

Disaster Preparedness and Prevention

Prevention and Disaster Risk Management

Brussels 19/12/2022

ECHO.B.2

Subject: Union Civil Protection Mechanism (UCPM) **Wildfire prevention action plan – Looking for good practices on wildfire risk awareness in Europe**

The 2022 wildfire season confirmed a worrying upward trend, with more wildfire events occurred and more hectares of forest burnt than in previous years. Climate change is expected to further worsen this trend. With human action causing most ignitions in Europe, increasing risk awareness among the population is critical for wildfire prevention.

The Union Civil Protection Mechanism (UCPM) Member States and Participating States called on the Commission to support national efforts to prevent wildfires, most recently at the ministerial meeting on reinforcing wildfire preparedness and response in September 2022. Following up on this, the Commission put forward a **Wildfire prevention action plan**, composed of ten actions, aimed to improve capacity, knowledge and financing opportunities for wildfire prevention.

Action 4 of the Wildfire prevention action plan focuses on the **collection of good practices on wildfire risk awareness in Europe**.

Do you have any good examples of wildfire risk awareness initiative, such as campaigns or any other practise that was/is successful to raise awareness on wildfire risk and/or on increase citizens' preparedness? If so, please share them with us **by 6 February 2023**. We will review and showcase them via the Union Civil Protection Knowledge Network and present them in a dedicated event.

Please find a template for the collection of good practices on wildfire risk awareness hereafter. Please fill out one template per each practise you wish to submit as a good practice. For any question your may have and in order to submit your proposals, please email:

ECHO-CP-PREV@ec.europa.eu by **6 February 2023**.

TEMPLATE FOR THE COLLECTION OF GOOD PRACTICES ON WILDFIRE RISK AWARENESS IN EUROPE

1. CONTRIBUTOR

NAME:

ORGANIZATION:

COUNTRY:

2. DESCRIPTION: BRIEF SUMMARY DESCRIPTION OF THE WILDFIRE RISK AWARENESS INITIATIVE *(FREE TEXT, 250 WORDS LIMIT).*

Text

3. ACTIVITY / APPROACH: ***INDICATE IF THE PRACTISE IS PART OF A WHOLE-HAZARD INITIATIVE OR IT IS AIMED SPECIFICALLY TO PREVENT WILDFIRE RISK.*** *(TICK THE RELEVANT BOX).*

☐ All hazards approach ☐ **Wildfire specific**

4. OBJECTIVES: DESCRIBE THE OBJECTIVES OF THE INITIATIVE. *TICK BOXES (MORE THAN ONE ALLOWED)*

☐ Increase wildfire risk awareness	☐ Improve wildfire preparedness
☐ Improve citizens' self-protection in case of wildfires	☐ Other
☐ Improve awareness of wildfire prevention methods	

If other, please specify, _____

5. ROLE OF THE NATIONAL CIVIL PROTECTION AUTHORITY: ***IS THE NATIONAL CIVIL PROTECTION AUTHORITY AT NATIONAL, REGIONAL AND LOCAL/MUNICIPAL LEVEL INVOLVED IN THE DESIGN AND IMPLEMENTATION OF THE INITIATIVE.*** *TICK THE RELEVANT BOX (MORE THAN ONE ALLOWED)*

☐ **Action defined and implimented by the National Civil Protection Authority**

☐ **Action defined by National Civil Protection Authority & implemented at regional/municipal level**

☐ **Action defined and implemented at regional / municipal level** ☐ **Other**

If other, please specify, _____

6. LEGAL / POLICY CONTEXT: ***PLEASE INDICATE IN WHICH LEGAL/POLICY CONTEXT THIS ACTION WAS INCLUDED.*** *TICK THE RELEVANT BOX (MORE THAN ONE ALLOWED).*

☐ National legal framework	☐ Contingency/emergency plan (icl. evacuation plans)
☐ National Communication strategy	☐ Measure defined and implemented at regional / local level

☐ Other	

If other, please specify, _____

7. ACTIVITY – MAIN ACTIONS[1]: *PLEASE SPECIFY THE MAIN ACTIVITY OF THE ACTION:*
TICK THE RELEVANT BOX (MORE THAN ONE ALLOWED)

Main activity	**Add. Information**
☐ Online information	Website address:
☐ Risk Awareness campaign	Name of the action and target group:
☐ Education in schools	Specify school level:
☐ Training / Exercises	Target group:
☐ Other	

If other, please specify, _____

8. ACTIVITY – DISSEMINATION OF INFORMATION: *PLEASE INDICATE WHICH COMMUNICATION CHANNELS WERE USED BY THIS ACTION.* *TICK THE RELEVANT BOX (MORE THAN ONE ALLOWED).*

Main areas	**Add. Information on how dissemination was ensured**
☐ Online information	Website address:
☐ Traditional media (TV, Radio)	Please specify:
☐ Social media	Please specify:
☐ Printed material	Please specify:
☐ Event / exhibition, other	Please specify:
☐ Other	

If other, please specify, _____

9. RELEVANCE FOR PREVENTION: *PLEASE SPECIFY THE MAIN ACTIVITY OF THE ACTION:*
TICK THE RELEVANT BOX (MORE THAN ONE ALLOWED)

☐ Inform on exposure to wildfire risk	☐ How to keep your property safe
☐ Inform on vegetation mgt. and vegetation waste treatment	☐ Landuse planning information
☐ Inform on fire propagation factors	☐ Other

If other, please specify, _____

10. RELEVANCE FOR PREPAREDNESS: *PLEASE SPECIFY THE MAIN ACTIVITY OF THE ACTION:*
TICK THE RELEVANT BOX (MORE THAN ONE ALLOWED)

[1] These core actions were identified in the occasion of 2022 Civil Protection Forum, Risk awareness session.

☐ How to recognise an alert and know what to do	☐ How to ask for help
☐ How to behave in dangerous situations	☐ How to evacuate safely
☐ How to take care of family (children, elderly)	☐ Other
☐ How to take care of those most in need (e.g. people with disabilities or otherwise vulnerable groups)	

If other, please specify, _____

11. TARGET GROUPS: *PLEASE INDICATE TARGET GROUPS* *TICK THE RELEVANT BOX (MORE THAN ONE ALLOWED)*

☐ General public	☐ Youth ☒ Other
☐ Vulnerable groups	☐ Non-residents / Tourists

If other, please specify, _____

Information about actors involved, the form of participation and the participation process. (*FREE TEXT, 100 WORDS*).

Text

12. STAKEHOLDERS' INVOLVEMENT: PLEASE SPECIFY RELEVANT ACTORS INVOLVED *(TICK BOX AND FREE TEXT).*

☐ Researchers	☐ Media / communication (TV, Radio…)
☐ Volunteers	☐ Non- governmental stakeholders

If yes, please specify how_____

13. FREQUENCY AND DURATION OF THE INITIATIVE *PLEASE INDICATE THE DATE OF THE INITIATIVE OR UPDATE.* *(TICK THE RELEVANT BOX)*

Starting date: _____	**End date:_____**
Frequency	Duration
☐ Monthly	☐ 1 week
☐ Yearly	☐ 1 month or more
☐ Only once	☐ Other

If other please specify, _____

14. REPLICABILITY AND ACCESSIBILITY: *PLEASE EXPLAIN TO WHAT THE RESULTS CAN REPLICATED AND/OR CAN BE SCALED UP IN THE FUTURE.* *(FREE TEXT 100 WORDS)*

Text

15. SUCCESS FACTORS: *DESCRIBE FACTORS THAT HAVE BEEN DECISIVE FOR A SUCCESSFUL IMPLEMENTATION.* *(FREE TEXT 500 WORDS).*

Text

ANNEX – ADDITIONAL INFORMATION

Free text - Provide contacts of reference institution (and person) directly involved in the development and implementation of the case Describe the time needed to implement the measure - Describe costs (possibly providing quantitative estimate) and funding sources - List the most relevant websites that refer to the original documents and information - Documents highly relevant (please share) - Reports of communication materials providing more detailed information on the case studies.

Please provide additional information:

Contacts:

_____

_____

Implementation start and end date:

_____

_____

Costs / estimate of costs of the action:

_____

_____

Relevant websites:

_____

_____

Relevant documents, reports and other materials (please attach):

_____

_____

Please also attach relevant documents – Thank you!

Union Civil Protection Knowledge Network