Firelogue

Fire Up the Dialogue

D2.11 – SUMMARY REPORT OF RESEARCH INTEGRATION BOARD II

Project: Cross-sector dialogue for Wildfire Risk Management

Acronym: Firelogue

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List of Abbreviations

Abbreviation	Meaning
AI	Artificial Intelligence
CSA	Coordination and Support Action
D	Deliverable
DoA	Description of the Action
EC	European Commission
EFFIS	European Forest Fire Information System
EU	European Union
GD	Green Deal
HLFM	Holistic Wildfire Management
IA(s)	Innovation Action(s)
IWRM	Integrated Wildfire Management
PRAF	Peer Review Assessment Framework
REA	European Research Executive Agency
RIA	Research and Innovation Action
RIB	Research Integration Board
UN	United Nations
WFRM	Wildfire Risk Management
WP	Work package
WPAP	Wildfire Prevention Action Plan
WUI	Wildland-Urban Interface

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Executive Summary

This document briefly summarizes the key research integration activities, which were potentiated by Firelogue, namely by the Firelogue Research Integration Board (RIB). The main objective of this board is to reinforce and potentiate the development of integrated and synergistic approaches and outcomes from wildfire-related EU projects concerning several topics of interest within WFRM. Firstly, building-up from the previous interactions that were held in 2022, namely the Clustering and other scientific events, several exchanges were maintained to potentiate synergies between projects in certain topics and areas of interest. In the scope of Firelogue's RIB, an online meeting was held in September 2023, updating on current interactions and ongoing and foreseen activities. Many other interactions and dedicated meetings were held following these initiatives.

It is also foreseen the participation of all EU WFRM projects in the next Clustering Event, on the 22nd of November 2023 in Brussels, which integrates common topics and dedicated sessions to the wildfires-related EU projects, being also a great opportunity to develop networking activities with other EU projects. In sum, EC is bringing these projects together to potentiate synergies, also to integrate potential contributions to mitigate wildfire-related impacts by 2030.

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1. Introduction

The Firelogue project, as a Coordination and Support Action (CSA), has as a main goal the coordination and integration of the Green Deal Innovation Action's (IAs) as well as other H2020 projects, namely FirEUrisk. The objective is to reinforce their overall expected impacts (Fig 1). In this sense, Firelogue will promote fruitful interactions in several common or related activities between projects to avoid overlaps, but most importantly to maximize the overall outcomes for the EU.

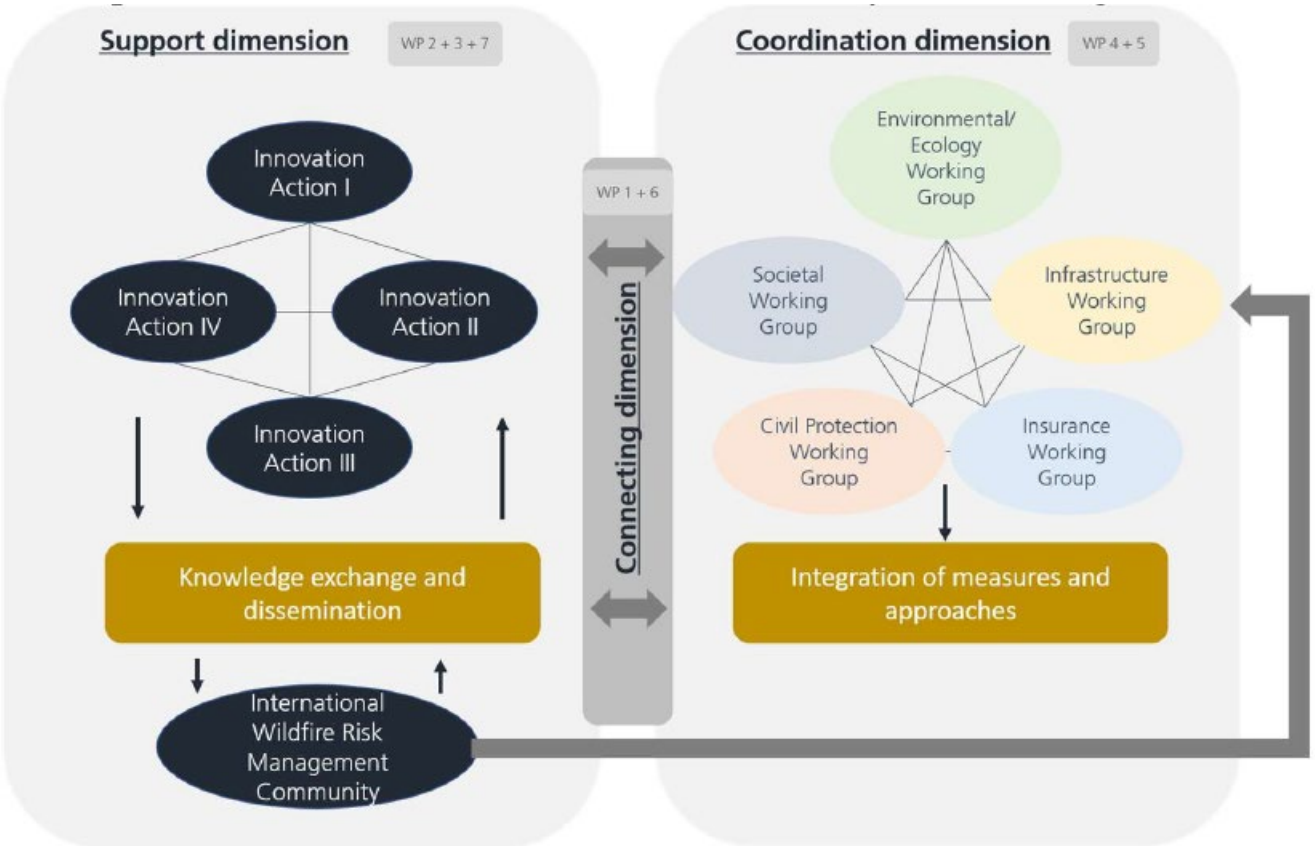

Figure 1 - FIRELOGUE's Coordination and Support Dimensions; Source: Firelogue DoA

The RIB is chaired by Prof. Viegas from ADAI, but it is highly supported and guided by Firelogue coordination as well. This board is composed by project coordinators of the IAs as well as FirEUrisk and other relevant projects at EU level. The RIB will meet once a year aiming to exchange knowledge and updates on recent research findings and policy developments as well as gaps, synergies and needs identification. These events will be an opportunity to reinforce overall and strategic coordination and integration among EU projects.

The deliverable 2.11 is a brief report that summarizes key activities and topics related to RIB scope and activity, namely towards improved wildfire EU projects overall outcomes and impacts.

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1.1. List of WFRM-related EU projects

Table 1 - List of WFRM EU research projects

Project full name	Project acronym	Funding line	website	Coordination
A Holistic Fire Management Ecosystem for Prevention, Detection and Restoration of Environmental Disasters	TREEADS	Green Deal Call, LC-GD-1-1-2020 - Preventing and fighting extreme wildfires with the integration and demonstration of innovative means. GA: 101036926	https://treeads-project.eu/	RISE FIRE RESEARCH AS
Fire and Rescue Innovation Network (concluded on October 2022)	FIRE-IN	H2020 call 3.7 (Secure Societies), SEC-21-GM-2016-2017 - Pan European Networks of practitioners and other actors in thefield of security. GA: 101037247	https://www.fire-in.eu/	ASSOCIATION PEGASE
Fire in the Earth System: Science & Society	FIRELinks	COST (European Cooperation in Science and Technology) action. CA: 18135	https://firelinks.eu/	University of Valencia and Swansea university
Cross-sector dialogue for wildfire risk management	FIRELOGUE	Green Deal Call, LC-GD-1-1-2020 - Preventing and fighting extreme wildfires with the integration and demonstration of innovative means. GA: 101036534	https://firelogue.eu/	Fraunhofer
Innovative technologies and socio-ecological-economic solutions for fire resilient territories in Europe	FIRE-RES	Green Deal Call, LC-GD-1-1-2020 - Preventing and fighting extreme wildfires with the integration and demonstration of innovative means. GA: 101037419	https://fire-res.eu/	CTFC - Consorci Centre De Ciencia I Tecnologia Forestal De Catalunya
Developing a holistic, risk-wise strategy for European wildfire management	FirEUrisk	H2020 – Call 3.5 (Societal Challenges), LC-CLA-15-2020 - Forest Fires risk reduction: towards an integrated fire management approach in the E.U. GA: 101003890	https://fireurisk.eu/	ADAI - Association for the Development of Industrial Aerodynamics
Structured approaches for forest fire emergencies in resilient societies	SAFERS	H2020 – Call 3.5, SC5-16-2019 - Development of commercial activities and services through the use of GEOSS and Copernicus data. GA: 869353	https://safers-project.eu/	FONDAZIONE LINKS - Leading Innovation & Knowledge For Society
Training the next generation of Integrated Management Experts	PyroLife	Horizon 2020 research and innovation programme MSCA-ITN-2019 – Innovative Training Networks under grant agreement No 860787	https://pyrolife.lessonsonfire.eu/	Wageningen University & Research
Climate resilient forest management platform to prevent and suppress forest fire	SILVANUS	Green Deal Call, LC-GD-1-1-2020 - Preventing and fighting extreme wildfires with the integration and demonstration of innovative means. GA: 101037247	https://cordis.europa.eu/project/id/101037247https://silvanus-project.eu/	Universita Telematica Pegaso

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1.2. WFRM-related EU projects logo and main objectives

In this section, we briefly present the main objectives of the key projects at EU level involved in WFRM. In the scope of RIB, we will try to keep these projects involved as well as other that may be willing to join later.

The EU-funded TREEADS project will focus on the forests at risk of wildfire to develop new products and integrate them in a holistic Fire Management platform aimed at optimising and reusing the existing socio-technological resources.

The main aim of FIRElinks is to power synergistic collaborations between European research groups and stakeholders with the objective to synthesise the existing knowledge and expertise, and to define a concerted research agenda which promotes an integrated approach to create fire-resilient landscapes, taking into account biological, biochemical and physical, but also socio-economic, historical, geographical, sociological, perception and policy constraints.

The EU-funded Firelogue project aims to support and coordinate the consolidation of knowledge from the wildfire risk related Green Deal Innovation Actions and the wider community. It integrates the findings across stakeholder groups and fire management, and promotes discussion via forums and workshops, leading to exchange among a large range of stakeholders.

The EU-funded FIRE-RES project will promote the implementation of a more holistic fire management approach and support the transition towards more resilient landscapes and communities. By integrating research, technology, civil protection, policy and governance spheres related to wildfires, the project will generate new knowledge about sustainable integrated fire management models.

The main objective of the FirEUrisk proposal is to develop, test and disseminate an Integrated and Science-Based Strategy for wildfire risk management in Europe. This integrated strategy will: 1) expand the capabilities of existing wildfire risk assessment systems, including critical factors and processes not currently addressed; 2) use risk-assessment to drive wildfire management and reduce current fire risk conditions, and 3) adapt fire management strategies to expected future climate and socio-economic changes.

The EU-funded SAFERS project will develop a complex emergency management system capable of acting along the whole emergency management cycle, thanks to the coupled use of heterogeneous Big Data, advanced models, and AI. Earth Observation data from Copernicus and GEOSS will be the primary data source, which will be combined with data from social media, smoke detectors, and mobile applications.

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PyroLife focuses on incorporating diverse backgrounds that may promote creativity for innovative wildfire strategies. A key goal of the initiative is to instil intersectional, transferable knowledge and maximize employability for its graduates. PyroLife is a novel facet in the global wildfire network and may bring innovative ideas from a wide range of fields during a critical time in wildland fire research.

The key project output is the release of a climate resilient forest management platform to prevent and limit the spread of forest fire. SILVANUS relies on environmental, technical and social sciences experts to support regional and national authorities responsible for wildfire management. The project will develop intelligent fire ignition models using climate and weather data, as well as a stakeholder engagement programme in forest regions to assess fire risk indicators.

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2. Previous clustering actions and topics explored

Following the first actions to synergistically develop activities among EU WFRM related projects, several actions and topics are being developed building-up from previous actions and discussions, namely the clustering event held in 2022- These activities were described in the Firelogue deliverable 2.6-1 – "Summary report of Research Integration Board I".
Following the first year of interaction, this session will briefly introduce present and future initiatives involving the EU WFRM projects and RIB activity.

2.1. IX International Conference on Forest Fire Research & 17th International Wildland Fire Safety Summit - Coimbra, Portugal

European Research and Innovation plenary session

Purpose: During the second day of the Conference, the Coordination and Support Action Firelogue coordinated a plenary session dedicated to present some important Wildfire Research Initiatives in Europe. The session started with a lecture on EU wildfire policy by Nicolas Faivre, a high-level officer from the EC. Afterwards, the Green Deal innovation actions, SILVANUS, FIRE-RES and TREEADS projects together with the precursor project FirEUrisk, are going to present their main objectives and recent outcomes. This session aims at presenting to the international Fire Science Community what is being done in the European Community in the scope of Wildfire Risk Management.
Scope: Plenary session having all projects presented and discussed with worldwide participants.
Date: 15th November 2022

Wildfire Risk Management research cooperation roadmap for Europe and beyond

Purpose: Building up from the previous session, FirEUrisk and Firelogue consortia moderated this parallel session to further exchange and network with an emphasis on the following topics:

- Impact Assessment of projects and their innovations towards Green Deal targets
- Case Study collaboration and comparability of results
- European Fuel Map

This session provided a fruitful discussion on the major steps required to define a roadmap to synergistically cooperate towards improved Wildfire Risk Management research in Europe.
Scope: Dedicated session having all projects focusing on how to cooperate on WFRM for EU and beyond, also taking advantage of the worldwide audience.
Date: 15th November 2022

Project Dissemination Session

Purpose: Networking activity involving worldwide WFRM projects.
Scope: Dedicated project presentation having Q&A sessions to potentiate interactions.
Date: 15th November 2022

2.1.1. Main takes expected

<u>Harmonisation of fuel maps (building on the FirEUrisk product):</u>

- What are reasonable resolution levels?
- Are indicators used available in all countries?

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- Field parameters from IAs would be needed to validate the map;
- Map is limited to EU;
- It is currently in the validation stage in five study areas;
- EFFIS is incorporating this map;
- WUI mapping is included for the whole of Europe;
- Complementarity with other products has to be understood;
- Opportunities to exchange data and provide field data should be explored;
- Metadata catalogue and common terminology is needed.

Impact Assessment

- Definitions are needed, for example: what are fatalities?
- We cannot avoid fatalities entirely although this should be the aim;
- Training and a range of aspects play a role;
- We have to differentiate citizen and fire fighter fatalities both require different strategies;
- Impact has to me measured over a longer period of time than the project lifetime;
- Key Performance indicators of projects have to be connected with the Green Deal targets;
- Objectives/outputs of the projects have to be compared (Note: this is something that is reflected in the WFRM Cluster Roadmap).

Case study collaboration

- SAFERS collaborates with drone projects to incorporate their data in the decision support system;
- Data base of information with restricted access would be helpful;
- How can we scale results?
- Create partnerships and collaborate on exploitation activities;
- Adapt solutions to other areas;
- Find investors and therefore have matchmaking events (FIRE-RES);
- The socio-economic environment plays an important role understand policy traditions and innovations;
- Events always create political pressure;
- Develop concrete collaboration topics and set priorities.

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2.2. Workshop – RISE-SD2023 event – Rhodes, Greece

Figure 2 - RISE-SD 2023 event – Rhodes, Greece

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RISE-SD Workshop on wildfire management policies and innovation:

The RISE-SD Wildfire workshop took place in Rhodes (Gr) on 30/5/2023 and included three panels discussing different aspects of wildfire management research.

Panel 1 focused on the importance of having a common language to ensure smooth communication between researchers, developers, and decision-makers, avoiding misunderstanding and confusion. The panel discussed the similarities between integrated and holistic wildfire risk management, including four core principles and managerial phases. The interplay between forestry, technology, and civil protection was also discussed, as well as the importance of governance and multi-stakeholder engagement. The panel suggested agreeing on terminology and concept components for integrated and holistic wildfire risk management and implementing one digital meeting with panel participants and interested experts.

Panel 2 discussed the Wildfire Prevention Action Plan (WPAP) and the call for good practice on wildfire risk awareness. Relevant projects under DG ECHO were also addressed, including PREVAIL and RECIPE. The panel suggested vulgarizing project results and making recommendations available early to facilitate wildfire risk management implementation. The impact of different suppression strategies was also discussed, and the panel suggested developing a policy recommendation task force.

Panel 3 discussed general technology and wildfire risk management, including understanding user needs and defining "operational" aspects. The panel also discussed data and artificial intelligence (AI) aspects, including the need for data sharing and interoperability of solutions. The panel suggested collaborating on exploitation activities and facilitating case study exchanges.

Overall, the workshop discussed the importance of developing a joint language for wildfire risk management, the need for science-policy-practitioners collaboration, and the contribution of research and technology to address the growing threat of wildfires in Europe.

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Panel 1: "Holistic approach and integrated management of landscape wildfires."

The aim was to provide a better understanding of the concepts and terms related to wildfire management used by both national authorities and the EC. What steps can we take to move away from preventing and suppressing wildfires and towards a more inclusive and integrated approach to wildfire management?

Moderators: George Eftychidis (STWS), Claudia Berchtold (FHG)

Keynote speaker: Domingos Viegas (ADAI)

Panellists: Claudio Rossi (LINKS), George Sakkas (KEMEA), Diogo Vallim (CBS)

Keynote points

- Domingos Viegas stressed the importance of taking a comprehensive approach to managing wildfires, which involves considering all phases, spatial scales, the involvement of various agencies and authorities, and eco-socio-economic factors.
- Researchers, practitioners, and policymakers must have a shared understanding of the terms used in wildfire management. These terms are frequently found in the E.C. documentation.
- Panel 1 discussed Integrated Wildfire Risk Management (IWFRM) and Holistic Landscape Fire Management (HLFM) strategies.
- IWFRM and HLFM are different strategies aiming to reduce wildfire risk and minimize impact on ecosystems, society, and the economy.
- IWFRM aims to minimize the harmful effects of wildfires by incorporating risk reduction strategies into wildfire management plans and operations. This requires cooperation among various groups, including landowners, firefighters, policymakers, authorities, volunteers, and the general public.
- HLFM is a method that integrates wildfire management with landscape and forest management goals. It sees wildfires as a process that can be controlled as part of a comprehensive landscape management approach.
- HLFM addresses various aspects such as socio-economic risks, protection needs, and ecological, environmental, and biodiversity concerns. It employs nature-based solutions such as vegetation management, beneficial fires, and ecological restoration to reduce fire risk at the landscape level.
- A proactive landscape-level approach is necessary to tackle the worsening wildfire issues caused by climate change.
- The strategies have different time horizons. IWFRM focuses on the short-term, while HLFM looks at the medium to long-term perspective.
- FirEUrisk's Holistic Risk-wise Strategy for wildfire management revolves around wildfire risk management and is organized in three steps: risk assessment, risk reduction, and adaptation to risk.
- The FirEUrisk consortium has published a detailed diagram that outlines a comprehensive approach to integrating risk.

Discussion points

- The topic of discussion is the integrated and holistic approach to managing landscape wildfires, emphasizing that the issue should be tackled comprehensively.
- Fire prevention and suppression, often seen as opposing parts of wildfire risk management, are complementary strategies that should be implemented together.
- To effectively manage wildfires, it is necessary to manage the entire landscape by creating firebreaks and vegetation mosaics.

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- In order to effectively manage fires, it's important to consider the past, present, and future of the landscape.
- When it comes to managing fires, it's crucial to assess and reduce any potential risks and adapt accordingly. Additionally, implementing effective governance methods and structures is crucial.
- Effective communication is crucial for managing wildfire risks, involving stakeholders such as researchers, operational teams, and policymakers. It is essential that all parties have a shared understanding and use clear language.
- The holistic approach to fire management is often mentioned in various documents and reports. This approach aligns with the integrated wildfire risk management approach, which aims to lessen the risks of wildfires and reduce their impacts.
- Integrated wildfire risk management involves engaging landowners, firefighters, policymakers, and the public to reduce the harmful effects of wildfires on people and the environment. This approach focuses on prevention, preparedness, response, and recovery.
- On the other hand, the holistic approach combines wildfire management with broader landscape management goals. It recognizes wildfires as valuable natural processes that benefit ecosystems and biodiversity. The four main principles of this approach are ecological restoration, fire prevention, fire management, and community engagement.
- Both methods aim to minimize major fires and properly handle wildfires. They acknowledge the significance of involving the community in wildfire management.
- In the past, wildfire management has mainly concentrated on lessening the danger of wildfires, sometimes neglecting to consider their positive impact on the environment and restoring ecosystems.
- The holistic approach acknowledges the ecological advantages of wildfires and aims to manage them to attain wider landscape goals.
- Adopting a combination of various strategies, including risk assessment, risk reduction, and risk adaptation, is promoted by FirEUrisk as an effective approach to wildfire management.
- A new approach has been defined in FirEUrisk to analyse the various components of wildfire risk. This method considers all the relevant factors and variables that impact the risk of wildfire and covers all stages of fire management. The project's main goal is to evaluate risks by studying all relevant factors, minimizing risks by modifying certain variables and adjusting communities and environments to meet future conditions.
- It is possible to use multiple strategies for managing wildfire risk without them conflicting with each other. The key is to implement various strategies to manage the risk of wildfires effectively.
- Keeping the bigger picture in mind while experts focus on specific aspects of a complicated problem is crucial. A thorough evaluation of risks is required.
- Two primary approaches are being examined for managing wildfire risk: integrated and holistic landscape management. The latter involves using landscape management techniques to decrease risk and adjust to future circumstances. Some people believe the integrated management approach is reactive, while the holistic approach is proactive. The proposed approach involves a combination of strategies to balance risk assessment, risk reduction, and adaptation.
- There is ongoing consideration of infrastructure providers and finding a balance between market-based and governmental insurance schemes.
- It is important to move away from using associability as a measure of risk and instead focus on a more accurate representation of danger.

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- Establishing a universal understanding and criteria for defining risk and sustainability is important.
- There is a demand for a public warning system that includes all age groups and uses standard procedures.
- Who owns the risk? (Porto Conference framework).
- It has been suggested that integrating holistic practices is important and vice versa. However, it's important to note that a holistic approach should extend beyond just the emergency phase.
- Integrated management includes Public Early Warning systems and fire detection systems.
- Research in wildfire science is rather marginal in most fire-related projects and is often overwhelmed and dominated by technology solutions that address partial problems, missing the more important and, presumably, the most essential.
- Including socio-economical aspects in risk modelling (TREEADS).
- The involvement of multiple stakeholders requires effective governance.
- The ownership of forests also impacts the IWFRM and local matters such as volunteers and community associations.
- Maintaining a well-rounded approach that includes forestry/land management, civil protection/firefighting, and technology in developing strategies to manage wildfires is crucial.
- The holistic approach includes creating landscape patches and mosaics.
- Definition of 'holistic' and 'integrated' in the context of wildfire management:
    - Holistic approach considers the entire ecosystem and its various components, acknowledging wildfires in the context of a larger ecological system, including the interaction between fire, vegetation, wildlife, climate, and human activities.
    - Integrated approach focuses on the coordination and integration of various fire management activities and stakeholders involved across different phases. It emphasizes the need to bring together different agencies for efficient wildfire management.

To summarize, wildfire-integrated management prioritises response, while a holistic approach prioritises the resilience of the landscape and forest. In this aspect, the holistic approach is aligned with the long-term objective of sustainable forest and land management to ensure environmental, economic, social, and cultural opportunities.

Sustainable forest and land management, integrated wildfire management, and a holistic approach to wildfire management should all be part of a comprehensive strategy to manage the landscape in a way that balances the need for fire as a natural part of the ecosystem with the need to protect human life, property, and ensure the conservation of the natural environment.

Key takeaways:

- Try to agree on a terminology and concept components of integrates and holistic wildfire risk management. This could translate into a joint paper.
- Specify how the projects apply integrated management and ensure that their solutions contribute to it.
- This is something we can discuss during the Clustering Event in November
- Implement one digital meeting with the panel participants + interested experts from the I.A.s and FirEUrisk on the topic prior to the Clustering Event in November.
- Within the next few years, Firelogue will be aggregating various policy deliverables. Embrace an integrated and holistic approach: Advocate for a comprehensive and integrated approach to managing landscape wildfires, recognizing the need to address prevention, suppression, landscape management, ecological restoration, and community engagement together.
- Embrace a comprehensive approach: Highlight the importance of considering all phases, spatial scales,

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agencies, and eco-socio-economic factors in wildfire management, aiming for a comprehensive approach.

- Establish a shared understanding of terminology: Foster a shared understanding of key terms used in wildfire management among researchers, practitioners, and policymakers to ensure effective communication and collaboration.
- Explore integrated wildfire management (IWFRM) and holistic landscape fire management (HLFM): Investigate and compare the strategies of IWFRM and HLFM, which aim to reduce wildfire risk and minimize impacts on ecosystems, society, and the economy.
- Cooperate and engage stakeholders: Encourage cooperation and engagement among various groups, including landowners, firefighters, policymakers, authorities, volunteers, and the general public, to implement IWFRM strategies and achieve effective wildfire management.
- Focus on proactive landscape-level approaches: Prioritize a proactive approach to wildfire management, considering the medium to long-term perspective of HLFM and utilizing nature-based solutions, vegetation management, beneficial fires, and ecological restoration to reduce fire risk at the landscape level.
- Enhance communication and shared understanding: Foster effective communication among stakeholders, including researchers, operational teams, and policymakers, to ensure a shared understanding and clear language in managing wildfire risks.
- Balance risk assessment, reduction, and adaptation: Promote a combination of strategies that encompass risk assessment, risk reduction, and risk adaptation to effectively manage wildfire risks and adapt to future conditions.
- Focus on landscape management and ecosystem benefits: Emphasize the importance of landscape management techniques, such as creating firebreaks and vegetation mosaics, to manage wildfires while recognizing the ecological benefits of wildfires for ecosystems and biodiversity.
- Consider socio-economic aspects and governance: Incorporate socio-economic factors into risk modelling and recognize the role of effective governance structures in engaging multiple stakeholders and managing wildfires, including ownership of forests and involvement of local communities.

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Panel 2: "National wildfire management Action Plan (incl. a peer-review framework)"

Keynote points

During this panel, the DG ECHO's presented the Wildfire Prevention Action Plan's ten actions and discussed exploring opportunities for using current scientific knowledge and research to support and enhance relevant prevention efforts. How can we move toward science-based and standardized national wildfire Action Plans and review them?

Moderators: George Eftychidis (STWS), Claudia Berchtold (FHG)

Keynote speaker: Cristina Brailescu (DG ECHO)

Panellists: Andrea Majlinogava (TUZ), Col. Fabrice Chassagne (DGSC), Guillermo Griem (DG ECHO), Ioannis Papoutsis (NOA)

Wildfire Prevention Action Plan (WPAP):

- The goal is to strengthen prevention efforts by improving capacity at both the regional and member state levels.
- One of the ways to accomplish its objectives is through peer reviews.
- Peer reviews are used to evaluate the efficiency of wildfire management systems among member states.
- Peer reviews are useful in identifying gaps and areas that need improvement in the prevention and management of wildfires.
- Peer reviews can encourage member states to share knowledge and exchange best practices with each other.

Peer Review Assessment Framework (PRAF):

- A structure of what a wildfire management system should include is provided.
- The aim is to establish a shared understanding of what defines a successful wildfire management system.
- PRAF covers different aspects of preventing and managing wildfires, including early detection, monitoring, and response.
- Can be used to assess the effectiveness of wildfire management systems in member states.
- Can help identify gaps and areas for improvement in wildfire prevention and management.
- The Wildfire Prevention Action Plan and Peer Review Assessment Framework work together to improve prevention efforts.
- The PRAF may address terminology issues, such as the ideas of integrated management and a holistic approach.
- The Porto framework considers the statements outlined in the WPRAF, ensuring that research and development align with policy.
- A call for good practices was launched in December 2022, and 50 submissions were received. These practices will be published by the end of 2023.
- In early 2024, there will be a proposal for an E.U. pilot program aimed at supporting wildfire risk awareness activities.
- Economics of disaster prevention, preparedness (W.B.) and a related e-learning course offered by the E.U. Academy.
- Wildfire projects of DG ECHO in 2022 (2 in Türkiye, 1 in Latvia, WUITIPS for tourism and SAILOR for Georgia/Azerbaijan
- Policymakers require simplified language, concise videos, e-learning resources, proxy projects like Firelogue, practical and applied recommendations for scientific frameworks, and end-user involvement in knowledge sharing. It's best not to suggest too much as it may confuse policymakers.

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- Sometimes, the way knowledge and research results are presented is just as important as the information itself.

Discussion points:

- The policy context of WFPAP has been well-received by end users, who appreciate the support it provides for coordinated wildfire management in the European Union. Researchers working on R&D projects can utilise this plan and framework in their research efforts.
- Wildfires have migrated to the Northern region of France at the national level.
- Policymakers value time, therefore policy briefs issued during a project's duration are more useful than a highly detailed and structured document at the project's end.
- Engaging with stakeholders is essential to prevent and manage wildfires efficiently.
- To effectively manage risks, it is crucial to communicate with stakeholders and comprehend their viewpoints and preferences on risk awareness.
- The findings of the R&D projects could be utilised to create policy recommendations at the E.U. level. This work is currently being carried out in the context of ongoing R&D projects.
- Firelogue plans to collaborate on a deliverable that focuses on policy briefs. The goal is to emphasize the importance of having good policies in place for effective disaster management.
- It is essential to promote forestry methods and establish effective fuel management plans to mitigate future fires.
- To improve wildfire management in Europe, it may be beneficial to establish specific guidelines instead of solely relying on national ones. The WPRAF could be a useful tool in achieving this goal.
- Research and satellite data could play a crucial role in developing national prevention action plans.
- Predictive modelling and AI can be used to forecast the occurrence and spread of wildfires.
- Understanding the cause-and-effect relationships in wildfires requires research on causality, which is of utmost importance.
- There is research needed to analyse the economic effects of wildfires and determine if taking preventative measures is a cost-effective solution.
- There is a significant emphasis on studying the effects of climate change, which includes analysing how it affects society, the environment, and the economy.
- It has been realised that crop fires have a significant impact on both the agricultural and economic sectors. Thus, efforts are being made to adjust strategies for preventing and reducing the risks of fires in agriculture.
- It is important to enhance wildfire management and decrease risk in WUI areas by implementing strategies such as building codes or managing vegetation around homes.
- It is crucial to prioritize risk assessment, risk reduction, and adaptation to risk in managing wildfires. This includes emphasizing strategies for adapting to future fire regimes that may be impacted by climate change.
- Projects are currently creating maps for the entire European region, such as fuel maps and land use change maps. These maps aim to predict changes that may occur until the year 2050. These maps have the potential to shape future wildfire management policies and assist managers in reducing the increased risk of wildfires due to climate change.
- It is important to test and verify the effectiveness of remote technologies e.g. using drones for detecting, mapping, and managing wildfires.
- In France, forest fire management follows an integrated approach, guided by the concepts of anticipation and prevention. There are four main objectives under this approach: preventing fires, stopping them at an

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early stage, preventing catastrophic development, and restoring affected areas to reduce human vulnerability.

- It is important to strike a balance between standardising procedures and recognising the unique characteristics of organisations involved in wildfire management.
- There is a requirement for efficient wildfire suppression models, along with easily understandable outcomes in terms of risk communication.

Key takeaways:

- Utilise peer reviews: Emphasize the importance of peer reviews in evaluating the efficiency of wildfire management systems among member states and identifying gaps for improvement.
- Enhance knowledge sharing and best practices: Encourage member states to actively share knowledge and exchange best practices through peer reviews, contributing to improved wildfire prevention and management.
- Align research with the Peer Review Assessment Framework (PRAF): Ensure that research and development efforts align with the PRAF, which provides a shared understanding of what defines a successful wildfire management system.
- Simplify language and use multimedia resources: Recognise that policymakers require simplified language, concise videos, e-learning resources, and practical recommendations. Present research results in a manner that is easily understandable and accessible.
- Consider presentation methods: Acknowledge that the way knowledge and research results are presented is crucial. Utilise effective communication strategies, such as concise videos and practical recommendations, to engage policymakers and facilitate decision-making.
- Specify the relation between joint fire projects definition/concept of integrated and holistic WFRM and the most recent governance frameworks (namely DG ECHO and Porto)
- Development of a "Policy recommendation task force" to meet twice a year.
- Formulation of joint policy recommendations
- Utilise existing policy frameworks: Researchers should leverage the well-received policy context of the European Union's Wildland Fire Prevention and Preparedness Action Plan (WFPAP) in their R&D projects for coordinated wildfire management.
- Focus on northern region wildfires: Prioritise research efforts on understanding and addressing the migration of wildfires to the northern region of France at the national level.
- Provide timely and concise policy briefs: Policy briefs issued during the project's duration should be prioritised over detailed documents at the end, as policymakers value time and require concise information for effective decision-making.
- Engage stakeholders and consider their perspectives: Active engagement with stakeholders is crucial to efficiently prevent and manage wildfires. Understanding stakeholders' viewpoints and preferences on risk awareness is essential for effective risk management.
- Develop practical solutions and policy recommendations: Utilise the findings from R&D projects to create specific policy recommendations at the EU level, ensuring that the research contributes to practical solutions for wildfire management.

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Panel 3: "Science and Technology Contribution to Improving Wildfire Management Operations."

The discussion included various technologies, innovative solutions, and common standards that could aid in integrating wildfire management tasks into a comprehensive framework.

Moderators: Claudia Berchtold (FHG), George Eftychidis (STWS)

Keynote speaker: Nicolas Faivre (EC/REA)

Pannelists: Claudia Berchtold (FHG), Ioannis Gitas (AUTH), Krishna Chandramouli (Venaka TReLeaf), Claudio Rossi (LINKS), Ioannis Papoutsis (NOA), Frederique Giroud (CEREN), Joao Silva/Claire Kowalewski (DG ECHO)

Keynote points

- Wildfire management R&D projects in Europe involve a range of stakeholders with different profiles, operational needs, and requirements.
- Creating technology that can be used in multiple countries within the EU and meet the needs of different users and organizations can be difficult and may not always be feasible.
- Research results can be improved in terms of quality and usability by implementing standardization and procedural guidance.
- It is crucial to have a common scientific language and approach in fire management.
- When R&D and end-users work together consistently, it can result in better knowledge sharing, exchange of ideas, and the development of a common communication language.
- End-user organisations' participation in R&D projects varies and is often limited due to operational commitments.
- Working directly with practitioners can be difficult because they may not have the necessary technical skills and may struggle to see the benefits of research that is not directly related to their day-to-day work.
- Usually, the implementation of new and innovative solutions in European projects is not immediately reflected in operational practice.
- Organisations, divisions, or offices focused on research and innovation within Ministries, Public Services, and Authorities could help improve communication and provide assistance in implementing effective solutions for managing wildfires.
- Establishing an internal R&I office would aid in converting research findings into practical applications.
- In order for an organisation's R&I ambassador to be effective, they must have a clear understanding of the concept and be able to communicate it internally.
- It can be difficult to offer research and development results to users for free because they may not perceive any value without payment. However, charging for these results can create problems with budget and procedures.
- Many end-users struggle with sharing data and revealing information for projects.
- In order to integrate into their SOPs, end-users need map products that have been validated.
- To ensure operationality over extended periods (3-6 months), research findings must be tested with end-users at pilot sites.
- It could be advantageous to set up a network of permanent pilot sites with available data sets throughout the European Union to test research findings from E.U. R&D projects.
- It can be difficult to achieve results that are both scientifically accurate and practical in real-life operations.
- Many end-user organisations involved in R&D projects do not make any commitments, even regarding the requirements and needs they contribute.
- The existing "digital divide" in the society can affect how research findings are utilized. The term "digital

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divide" refers to the inequality that exists when certain individuals or communities lack access to technology that is commonly used as a solution.

- Training of end-users, including citizens (e.g., for evacuation), is necessary to support the use of research results.
- While the needs within the European Union are similar, the specific requirements can vary based on the country, organisation type, and national policies.
- Firelogue has several working groups that focus on coordinating research efforts in different areas, including Critical Infrastructures, Environment & Ecology, Insurance, Civil Protection, and Citizen Engagement.
- There are various strategies that can enhance communication. These include using social media to detect events, utilising virtual and augmented reality for training, customising messages for diverse stakeholder groups, and improving communication during emergencies.
- Improving communication during fire emergencies in remote wilderness areas can be achieved by using 5G connectivity, which offers several advantages.
- To effectively communicate risks, various methodologies are investigated in the context of R&D projects, such as designing informative posters and launching social media campaigns online.
- In SAFERS they are currently testing an alpha version of a new app that is focused on citizen engagement for risk awareness. This app includes a machine learning component that can be integrated into online learning platforms.
- For some people, understanding and communicating risks can be difficult without a comprehensive grasp of the concept.
- Educational programs on risk management are necessary for schools to increase risk awareness.
- Locating information about wildfires can be a challenging task since it is usually scattered, mainly on social media. Silvanus works on effective ways of handling this issue.
- SAFERS developed a chatbot on Telegram that utilises gamification for learning about emergency management, including understanding risks and citizen participation.
- In order to maintain quality and usefulness, it is necessary to filter out misinformation and "fake content" from social media.

Discussion points

- Working collaboratively with users is essential in wildfire management research, and there are challenges as well as opportunities in pursuing this approach.
- Ensuring that research results are in line with the tools and policies already in use by the users is crucial.
- Due to climate change, it has become necessary to expand work to cover agricultural fires.
- It is important to have products and services that are validated and meet the actual needs of users.
- In order to apply research findings effectively, it is necessary to have consistent policies across various legislative environments.
- Incorporating infield demonstrations is crucial to engage a wider audience with a keen interest in wildfire management.
- Research and development can be challenging due to various viewpoints, regulations, policies, and limited user participation.
- One important concern is ensuring that business models are both affordable and sustainable for end users.
- Transferring data across different domains is often challenging due to concerns of possible mishaps, exposing confidential information, and the lack of a common language. Overcoming these obstacles

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requires a change in perspective from the user's end.

- It is essential to invest in training for new technologies to ensure that users can learn and adapt to them effectively.
- It is crucial for users to feel a sense of ownership over the developed product.
- When using A.I. in applications that affect society, the environment, or the economy, it's crucial to ensure that the A.I. tools used are explainable.
- Intermediary organizations are necessary to connect researchers with end-users.
- It is essential for critical infrastructures to consider including wildfires in their business continuity plans and factor them in when making investments in new assets.
- Sharing data between safety and security sectors can be challenging, mostly because of the different terminologies and perspectives used by each sector.
- The increase in false information and deliberate misinformation is affecting how we handle emergency situations such as forest fires and earthquakes.
- Innovative results have been achieved through research projects in various areas including probabilistic forecasting, low-cost camera-based early fire detection, fire propagation modelling, and generating precise fuel maps. It is important for the relevant stakeholders and services to utilize these results.
- In SAFERS, they are developing a chatbot to help with communication between the control room and field personnel during emergency response efforts. This will assist with coordination and improve overall efficiency.
- In the future, chatbots may have the potential to offer instructions and psychological support during emergencies.
- Algorithms powered by Artificial Intelligence are being created to replicate or learn from data and models that show how fires spread.
- Developing a comprehensive platform that can handle diverse procedures within and across organizations and countries is a challenging task.
- Models are being developed and applied to evaluate fire safety measures, including determining the appropriate number of sprinklers required for a house during a fire.
- There is a growing concern about water scarcity, which has led to a need for research on how to combat fires with less water. This is linked to the potential use of fire as a tool to combat fire.
- A European forest fuel classification system and a fuel type map at the European level are necessary.
- Reducing fire risk involves a multi-criteria approach that takes into account factors such as danger, vulnerability, and perception. It also requires predicting and managing fire risks and developing policy recommendations.
- There is need to review, analyse and understand the policies of EU M.S. regarding forest management and responding to wildfires.
- There are concerns regarding the integration of various fire management solutions developed in the context of R&D.
- A major challenge that needs to be tackled is developing a comprehensive plan for fire management that links disparate pieces of heterogeneous information. Additionally, obtaining agreement from all stakeholders regarding the integration of different conceptual elements is also a challenge. The observation that research is often driven by a gap or a need observed with stakeholders.
- Official support is not provided for bringing E.U. wildfire stakeholders together and making adaptive suggestions for integrated processes.

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- Technology-heavy projects tend to receive more attention and funding, which is a concerning issue.
- It is necessary to have a long-term innovation strategy that enables projects to build upon past innovations.
- A problem arises when several projects are assigned to create similar things in the same call without a clear plan for collaboration or coordination during implementation.
- Assessing and endorsing research and development findings is crucial to ascertain the optimal direction for the European Commission's research initiatives.
- The E.U. is investing significantly in the ongoing research on extreme wildfires. We need to identify areas where research is lacking in tackling challenges related to fire suppression, fire prevention, and adaptation, particularly in extreme wildfire events.
- The planning and decision-making process often neglects the forest owners and the local community.

Key takeaways:

- Address stakeholder diversity: Recognise and account for the diverse profiles, operational needs, and requirements of stakeholders involved in wildfire management R&D projects in Europe.
- Standardise research processes: Implement standardisation and procedural guidance to improve the quality and usability of research results in wildfire management.
- Foster collaboration and knowledge sharing: Encourage consistent collaboration between R&D teams and end-users to enhance knowledge sharing, exchange ideas, and develop a common communication language.
- Establish internal R&I offices: Create dedicated research and innovation offices within organisations to facilitate the conversion of research findings into practical applications and support effective implementation.
- Enhance communication and training: Improve communication strategies using social media, virtual and augmented reality, customized messaging, and 5G connectivity to enhance risk awareness, citizen engagement, and training programs.
- Collaboration on exploitation activities & specification of technological contributions to an integrated management approach
- Facilitation of case study exchanges
- Foster collaborative research efforts with users: Emphasise the importance of involving end-users in wildfire management research, addressing challenges, and leveraging opportunities.
- Align research with existing tools and policies: Ensure that research results are compatible and in line with the tools and policies already used by end-users for effective implementation.
- Expand research to cover agricultural fires: Recognise the need to extend wildfire management research to include agricultural fires due to the effects of climate change.
- Develop validated products and services: Focus on creating products and services that are validated and meet the actual needs of end-users for improved effectiveness.
- Establish consistent policies: Advocate for consistent policies across different legislative environments to facilitate the application of research findings in practice.
- Incorporate infield demonstrations: Emphasise the importance of conducting infield demonstrations to engage a wider audience interested in wildfire management and showcase the practical applications of research.
- Address diverse viewpoints, regulations, and limited user participation: Overcome challenges associated with various viewpoints, regulations, policies, and limited user participation to foster effective research and development efforts.

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- Ensure affordable and sustainable business models: Prioritize developing both affordable and sustainable business models for end-users to encourage widespread adoption.
- Address data transfer challenges: Tackle obstacles to transferring data across different domains by addressing mishaps, confidentiality, and establishing a common language to facilitate collaboration and knowledge exchange.
- Invest in training for new technologies: Allocate resources to training programs that enable end-users to effectively learn and adapt to new technologies, ensuring successful implementation in wildfire management practices.

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2.3. 2nd Research Integration Board meeting

Building-up from the previous meetings and scientific events, the 2nd RIB meeting aimed to further exchange, namely on current updates and ongoing developments.

2.3.1. Agenda

Table 2 - Agenda for the 2nd RIB meeting

Time	Agenda Item
10:00 – 12:00	Introduction – Claudia Berchtold and Domingos Viegas Strengthening collaboration among projects: - All EU fuel mapping activities Other topics Next clustering event – Claudia Berchtold and All

2.3.2. Main takes

The initial part of the meeting was dedicated to introducing previous and ongoing topics of interest, namely involving the EU WFRM projects to understand their perspectives and strategies (ppt available in annexes).

After this introduction and contextualization, the EU WFRM projects pointed out several considerations, including:

- There are overlaps in the research topics and initiatives presented. The projects (namely TREEADS) may try to contribute providing also data, at least from the countries where they are developing pilot site activities, also coordinating similar approaches and efforts to improve the overall outcome;
- Projects are open to share knowledge and participate as far as possible in pilot sites demonstrations, but also in contributing to specific topics, i.e., the EU fuel map, etc;
- Firelogue proposed a dedicated meeting having the participation of all pilot site leaders, to better prepare the overall integration and participation of other EU WFRM projects;
- Pilot sites and case studies might be a great opportunity to further exploit good solutions and previous developments. The ones organized in the Mediterranean countries might be better participated and raise more interest to all projects;
- Firelogue asked for a pragmatic way to further develop the EU fuel map developed by FirEUrisk, namely on how to potentiate future improvements considering the potential contributions from the other EU projects;
    - The projects are aiming a different spatial resolution for this input (i.e., FirEUrisk developed at 1 km2 Vs Fire-Res that aims for 1 hm2). Although the categories could be the same, this different in spatial detail poses increased challenges of integration This will also impact on the fuel models derived as well as on the other aspects, including risk assessment and management;
- TREEADS project is interested in participating in the Spanish pilot site event. However, other projects also referred their interest in participating in the pilot sites and case studies of other projects;
- It was also highlighted the need of data, namely regarding updated fuel maps in central and northern EU countries, i.e., for Netherlands and considering their specificity and fragmented areas; also, the importance of mentioning significant fires instead of large fires, as smaller fires might have also a big impact even without consuming large areas;
    - The existent fuel maps produced by FirEUrisk might be adapted or improved. However, they

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already have detailed areas in Central and norther regions, namely in the German/Poland/Czech Republic and Sweden pilot sites.

- Firelogue might potentiate a white paper putting together this effort concerning fuel maps, perhaps sharing approaches and case studies regarding fuel maps development and improvement;
- SAFERS highlighted their next case study event, that will at local level be important to apply the developed dashboard, but also engaging with local stakeholders at the same time;
- Silvanus project reinforced the complexity of the several scales involved in WFRM, namely the algorithms they are developing for temporal scales, wildfire management, etc. They are also interested in sharing and work on a much more detailed resolution together with other approaches. Some of them might be even open data or going to be open publications;
- Open access publications or open data repositories should be pursued.

Next clustering event - provisional agenda and contributions

Claudia Berchtold (FhG) presented the provisional agenda for the clustering event (shown in session 3), also highlighting expected contributions from the EU WFRM projects. This event will be also an opportunity to develop networking activities with other EU projects coming from other sources of funding, namely DG-ECHO projects.

- It was referred the need of a preparatory meeting on early November, to better integrate the complementary interventions and perspectives within the selected topics;

Fire-Res informed and invited all EU projects to attend the policy event, that would be held on October 24th in Brussels, more information would be disseminated soon.

Domingos Viegas reinforced the importance of keeping periodic bilateral and dedicated meetings to follow-up the identified topics of interest. After no additional points, the meeting was concluded.

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3. Next clustering event

WFRM Project Clustering Event 2023 | Integrated Wildfire Risk Management

Purpose: Showcase first project results; exchange about coherence and complementarity between the projects with respect to Integrated WFRM; outreach strategies towards the science-policy-practice communities.
Scope: One full day in person meeting (ca. 09:00-17:30)
Date: 22nd November 2023
Location: Royal Library of Belgium (KBR), Boulevard l'Empereur 2, Brussels 1000, Belgium
Number of participants: ca. 80 from FirEUrisk, FIRE-RES, SILVANUS and TREEADS as well as from other projects such as SAFERS, FireLinks, FireAdapt, DG ECHO projects; EGFF members, EC representatives and other guests.

2.1.1. Provisional agenda

Table 3 - Provisional agenda for the next clustering event

Time	Agenda Item		
09:00 – 09:15	**Welcome and Introduction**		
9:15 – 09:30	**Keynote on Disaster Resilience** An innovative approach to multi-hazard and multi-risk by the Myriad project		
09:30 – 10:15	**Overview of the H2020 Fire Projects FirEUrisk, FIRE-RES, SILVANUS and TREEADS**		
10:15 – 11:15	**Project pitches – DG ECHO Fire projects** - AFAN - IPA Flood and Fires - WUITIPS		
11:15 – 11:30	**Coffee break**		
11:30 - 13:15	**Integrated Wildfire Risk Governance** Discuss approaches to integrated WFR management and governance while		
	11:30 – 12:00	**Introduction to the topic by FirEUrisk & AGIF**	
	12:15 – 13:15	**Break-out groups** (Two groups per topic):	
		Assessing and evaluating the risk of fire (Lucrecia Pettinari & Domingos Viegas) (requested)	**Governing wildfire risk** (George Eftychidis, Pau Brunet or Eduard Plana) (requested)
13:15 – 14:00	**Lunch Break**		
14:00 - 14:15	**Integration of solutions and project results | Firelogue offers** • Lessons on Fire by Firelogue platform | Technology Mall and solutions registry • Thematic Working Groups approach and the Justice dimension of WFRM		
14:15 – 15:45	**Thematic Workshops** *Note: This session builds on established exchanges between the Green Deal IAs and FirEUrisk. It will present the collaboration implemented so far and give room for in-depth discussion of items identified by preparatory digital meetings.*		

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	Policy recommendations and coherence (Eduard Plana) Discuss first/draft recommendations from the projects and_their links with EU policies such as Forestry or Adaptation strategies.	**Fuel mapping and modelling** (Domingos Viegas, t.b.c) Present the collaboration between the projects and discuss further synergies as well as the applicability of mapping and modelling approaches; drafting of policy recommendations	**Impact Assessment** (Mariza Kaskara) Present the joint White Paper on the Green Deal targets as well as the projects' impact assessment methodologies: How to compare results across Europe and identify progress on policy targets?
15:45 – 16:00	**Coffee Break**		
16:00-16:30	**Reports from the break-out groups**		
16:30 – 17:15	**Projects' solution highlights** (Moderated by Mariza Kaskara) Note: The solutions presented should highlight how they contribute to a holistic approach of managing wildfires Open to all research projects. Projects can present 2-3 of their solution highlights		
17:15 – 17:30	**Closing remarks** (Moderated by Nicolas Faivre) **Note:** *To be confirmed: take-away messages from the European Commission*		
17:30 – 19:00	**Walking dinner** Continuation of informal discussions and solution highlights		

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4. Key actions and topics of interest

Firelogue CSA developed a Wildfire Risk Management (WFRM) Project Cluster Roadmap to better frame collaboration and coordination, namely considering Eu expected impacts by 2030, deliverables and identified topics and initiatives of interest. Below some of the key aspects and actions on going are listed:

- Joint participation of the EU WFRM projects in several relevant scientific events related to WFRM, including:
  - IX International Conference on Forest Fire Research & 17th International Wildland Fire Safety Summit – 2022 - Coimbra, Portugal
  - 9th International Wildland Fire Conference – 2022 - Porto, Portugal;

- Sharing of knowledge and scientific activities:
  - i.e., European fuel map developed by FirEURisk project;
  - Taxonomy and harmonised terminology between projects;
  - Extreme EU forest fires database;
  - Case studies and pilot sites as places of sharing of knowledge and solutions;

- Coordinated dissemination initiatives top potentiate coverage and reach at national and EU level, i.e., following the #EUfireprojectsunited, working synergistically with Communication and Dissemination teams from all EU WFRM projects enrolled;

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5. Conclusions

Firelogue, as a coordination and support action, is potentiating synergistic interactions between EU WFRM projects. Although this represents a complex process that needs time, integration, and coordination, some of the outcomes and shared activities are already an encouraging signal at present but also for the upcoming future. In this sense, several activities are already being integrated between projects, including scientific and dissemination activities. The RIB is also involved in this effort, bringing together all project coordinators to build-upon the interactions previously established. Topics of interest were identified, keeping projects and their teams on board, also contributing to improve overall outcomes and solutions. Previous interactions during dedicated meetings or scientific events have been quite successful, potentiating collaborations and knowledge sharing amongst projects, namely those already happening in events and at local demonstrations. The upcoming activities are also relevant, namely the next clustering event, which will potentiate transversal topics of common interest as well as networking with other EU projects from other funding programs.

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