



**AFAN**

### **D3.2.**

AFAN principles for a sustainable network structure





# bombers



**D.R.E.A.M.**  
ITALIA



**Gwasanaeth Tân ac Achub**  
De Cymru  
South Wales  
Fire and Rescue Service



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# List of Acronyms

PCF	Pau Costa Foundation
SWFRS	South Wales Fire and Rescue Service
EFFIS	European Forest Fire Information System
GWIS	Global Wildfire Information System
DRMKC	Disaster Risk Management Knowledge Centre

# Executive Summary

The content of this deliverable is intended to contribute to the understanding of the functioning of networks of expertise, and more precisely fire analyst networks. With the overarching objective to help identify those aspects that make knowledge networks sustainable over time. Throughout the document, the *raison d'être* of networks of expertise, needs, and objectives, structures, roles of the members, and resources used are described and discussed.

The document does not seek to provide specific details or discuss any networks in particular. Instead, the present document articulates a generic cross-sectional vision of the functioning of networks of expertise. Therefore, the information used has been obtained through interviews from people in different organisations and different countries that belong to fire analyst networks or that are experts on the topic.

The document is based on the recollection of experiences and the analysis of those and takes this approach to capture the vision of the members of the networks, particularities, needs, and the most common profiles that appear. Thus, adding value to this report by providing a bottom-up and inside-out description of networks.

The target readers are experts, teams, and organisations that want to create, maintain, or join a network, and people who want to understand how networks work, what they are based on, and what kind of platforms or other resources are useful to the people who are in them.

This document is produced in the framework of the AFAN project, a project dedicated to empowering and promote networks of expertise in fire analysis. This report corresponds to the Deliverable 3.2. AFAN principles for a sustainable network structure from Task 3.2. Network structure, engagement, and outreach and from Work package 3 Communication and Visibility of the [Advanced Fire Analysis Network](#) project.

The project is funded under the Union Civil Protection Mechanism, and more particularly under the Knowledge Networks initiative, which has the fundamental role to support existing knowledge networks of expertise across Europe.

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# 1. Introduction

## | 1.1 Context

The socio-economic changes in the last century together with climate change contribute to the rise of intense and fast-evolving wildfires that exceed the capacity of extinguishing systems to act on them. Consequently, forest fires are currently a predominant disturbance across European landscapes, to the point that they have become a serious risk to the safety of people, property, and landscapes.

Therefore, it seems evident that current and future risk management implies the need for a paradigm shift towards an approach that does not only focus on extinction but also the management of the fire regime. To respond to this, the different organisations of the different countries have had to adapt and implement changes according to their respective new and future conditions (Vallejo et al., 2018).

Although a part of this need existed before, these drastic and rapid changes have increased the need to collect and share knowledge and experience to achieve better results in landscape and emergency management, this includes the better planning of preventative measures, fuel management, and the decision-making process during wildfire events.

To improve preparedness and response in changing environments, knowledge-sharing has become an essential component to complement the development of individual experience. This has been one of the main reasons that led to the emergence of networks of experts in forest fire analysis and keeps them going.

## | 1.2 Aim of the document

This document is intended to reflect the bases of the networking, how networks work, the enablers and barriers to proper functioning, and the aspects that make them sustainable. The document also seeks to reflect on the context that defines the current networks of fire responders, and particularly the networks of wildfire analysts.

The report describes the most important aspects of the proper functioning of the networks. In this way, the interested parties will be able to identify and promote their proper functioning or, at a minimum, be aware of which aspects have worked and which have not in the past.

In the process of elaboration of the document, to obtain all the necessary information a series of interviews were conducted with thirteen people who are active members of one or more networks in different European countries, such as fire analysts, pyrometeorologists, landscape managers or network experts. The interviews have been used to collect points of view and be as representative as possible of the experience of being part of a functioning network. All the information provided

has been treated anonymously and, no specific networks have been mentioned to provide a more general view.

However, we are aware that there are other network structures and ways of doing things, so this document does not intend to create a methodology but to reflect the principles for sustainable network structures based on the experience of existing and functional networks around Europe. At the same time, we highlight that this is not a research document, but rather is a contribution to describe how sharing of expert and professional knowledge currently takes place in Europe.

This document complements other documents during the AFAN project. The description of the fire analyst profiles and the tasks and skills that this figure develops can be found in the framework proposed by Castellnou et al., 2021. The specific tasks that are developed for remote analysis and assessment are described in the framework proposed by Tonarelli et al., 2022. Examples of tools, science, and best practices used for fire analysis and assessment can be found in de Saint Germain, 2022. All these resources as well as other complementary information related to fire analysis can be found on AFAN's website: <https://fireanalysisnetwork.eu/>.

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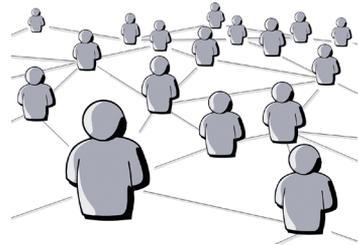
# 2. Framework

## | 2.1 Concept and objectives of networks

### 2.1.1 Definition

The “network of experts” concept is not new and in recent years it has evolved and gained importance in many fields of specialization. In a generic way and according to the Cambridge Dictionary:

- **Network:** 1. an arrangement of intersecting horizontal and vertical lines; 2. a group or system of interconnected people or things.
- **Networking:** the action or process of interacting with others to exchange information and develop professional or social contacts.



Entering the specific case of networks of wildfire analysts, the definition of the concept proposed by the interviewees is the application of the general one. Although there is no fixed definition, they understand networks as a **space of opportunity to interact with other people with similar needs and join efforts aimed at achieving a common goal**. Interviewees define a network as a group of **nodes** where they can connect with other people and organisations, from the same country or different countries, either remotely or in person, and with a specific interest known to all parties. Each individual or group can have different profiles and roles, but they are motivated by a deeper purpose.

Furthermore, as one of the interviewees said, “for a network to be sustainable and long-lasting, it must be formed of cohesive teams both professionally and personally”.

### 2.1.2 Goals of a network

Different factors can motivate the creation of a network, even the combination of several of them. There are many possibilities depending on the type of objectives pursued by the network, but according to the interviewees the most relevant are the following:

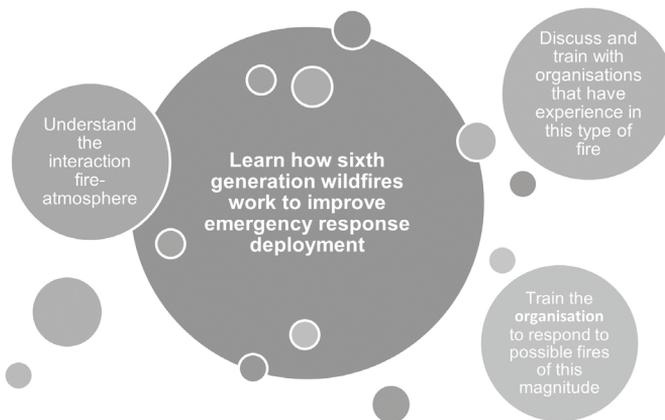
- **Exchange of experiences:** it consists of the exchange of people from different organisations to integrate into the work dynamics of the receiving organisation. This allows the parties involved to train together and learn how to work in other places, understand how preventive actions, preparedness, and emergency responses are organized and executed, work in a landscape with characteristics different from those of their country of origin, and gain experience in operational response, or even plan how to deal with a wildfire in a cross-border territory,

among others. To achieve the exchange of experiences, the best option is the exchange of people. In the field of wildfires, experience is very valuable. In the current situation where we have more and more unpredictable fire scenarios, we cannot pretend that professionals are nourished only by their own experiences (see section [2.6. Impact levels. Interests and needs](#)). The remote exchange of experience is very difficult, it is also difficult to establish personal relationships, which have a fundamental role in the proper functioning of the network.

- **Exchange of knowledge:** it consists of sharing knowledge and information acquired through experience and research with other parties. The final goal is to reach a common understanding and more solid resolution of a problem, either to gain knowledge or to share their achievements with the rest or to open new avenues of research and expertise. This allows the parties to have greater knowledge and a larger vision from different points of view, whether in research projects, in the planning of preventive actions, or in the analysis of fire behaviour during wildfire events to support the decision-making process. These objectives can be achieved both in-person and remotely since they generally do not require strict fieldwork. The exchange of knowledge is more organic and productive if the participating parties know each other beforehand and have a smooth professional relationship, which creates certain trust.

The two factors are compatible. The first group (exchange of experiences) is a response to needs focused on the response phase of the emergency, while the second (exchange of knowledge) is more general and involves different phases of emergency management and involves different groups involved in analysis-research-assessment of wildfires.

These two general groups can be divided into specific goals (see [Figure 1](#)). There are sub-objectives to achieve the largest goal. Ultimately, knowledge exchanges and training actions are preparedness actions, to be proactive and prepare before action needs to take place during wildfires.



*Figure 1: Example of different specific goals to achieve a larger objective (central bubble).*

*Source: own elaboration.*

Some of the interviewees also commented that in fire analyst networks there are often political reasons as a sub-objective. Nowadays politics is involved in practically everything that surrounds us, and in the case of wildfires, they are no exception, as policies dictate how the landscape is managed and how the response to emergencies takes place.

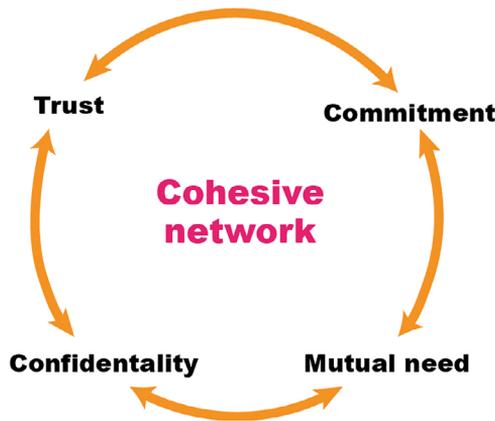
## | 2.2 Basis of networking

For a network of analysts to be robust and sustainable over time, the foundations must also be robust. In this aspect four basic principles are identified (see [Figure 2](#)):

- **Trust:** built over time and based on joint experiences. Not everyone connects or generates this trust, but when it is built, it facilitates the experience and knowledge exchanges. For an organisation that is looking for people to network with, it is essential to be able to recognise some people from their circle of trust. Some interviewees indicated that trust is first built between individuals, facilitates bonding, that at the same time triggers formal trust relationships between organisations. It is always much easier to work with those people you trust than not having to establish new alliances, this is especially relevant for wildfires, as the information shared is confidential, and the results may lead to decisions that impact on the resolution of the emergency. In other words, having prior trust guarantees that the network is more robust from the beginning. When trust is not present, it makes relationships between individuals or the network very hard, or non-existing. A network that is not capable of building trust between its members often fails.
- **Commitment:** having dedication and motivation for the cause is essential to maintain the stability of the network, it also fosters trust among members. The commitment provides security, and a perception that everyone is working to achieve the goals, and the efforts will be guaranteed. In some formal networks, organisations have decided to implement a signed commitment certificate that ensures that participants will not leave the project halfway through. However, this can generate a feeling of mistrust, so they must be careful with the consequences and choose the best way of working, considering the possibilities that guarantee the commitment and objectives of the network.
- **Confidentiality:** the information that flows in networks of fire analysis is not always public. Confidentiality, which is also related to trust, must be ensured by the members. If there is a commitment to confidentiality, it will be easier for members to feel comfortable sharing information with each other. In general, confidentiality is based on personal relationships, but in networks where there are many agents involved, and especially when working with sensitive information, it may be necessary to sign confidentiality agreements.

- **Mutual need:** this is essential for a network to exist. There must be a clear purpose, understood as a shared need of the members. The moment this need disappears or the network is not capable of responding to it, it loses its purpose and is no longer robust to the members. If there is no need, there is no connection.

These foundations are key and condition both the functioning of the network and the path of its members. Being networks based on both a professional and a personal component, failure to meet any of these requirements has a negative impact on the perception of the rest of the members, and may be a reason for rejection for future networks or projects.



*Figure 2: Basic principles for a cohesive network. Source: own elaboration.*

## | 2.3 Structure of the networks

### 2.3.1 Goals of a network

For a network to be created there must be at least one need, of whatever kind, shared by different people or organisations, in such a way that it gives them a reason to work together. A sustainable network is not created for a project interest or an economic interest, it is created because the people who participate in it need information/knowledge and need to share their experiences and results to contrast and learn from each other. Once the motivating factor has been identified, different ways to create and maintain the network appears, which can be classified as formal and informal.

- **Formal networks:** structures that have sustained institutional support, either from their organisations or from a higher-level institution (national, continental...). A common component of formal networks is that they are often created to be sustainable in the long term and therefore require the necessary

resources (e.g. technological, personal, and economic), to guarantee their efficient functioning. However, in the case of temporary projects, financing ends, so their foundations must be robust if long-term sustainability is to be guaranteed. In addition, formal networks must set clear goals based on the identified needs and commit to their compliance. According to the experience of those interviewed, the most common formal networks are a) formed by people with specific skills and capabilities within one same organisation; b) networks between different organisations based on projects or collaboration agreements; or c) networks promoted by European projects.

- **Informal networks:** structures that appear when there is no solid institutional support, but there is a need that is not addressed and cannot be resolved by a single member. They are based on the commitment of the people to the cause, and they look for any way to achieve it. Organisations may be involved and provide resources, but they do not attend to a project or a specific work plan, rather they are based and trust in the good work of the people who are part of it. This does not mean that there is no control, but it is a more flexible process where it is not necessary to achieve pre-established goals, but the way of working is adapted according to the need(s) addressed and the results that are expected. Although it may seem contradictory due to not having as many resources as formal networks, according to the interviewees, these types of connections are the ones that work best, as informal networks best adapt to the real needs of the parties. Even with fewer resources, great goals can be achieved. This is due to the more organic component of networks. In this case, specific participants are not imposed, but those who have ambition and motivation to get ahead with the objective, without having to invest too much time in secondary issues that diverge from the main purpose, are part of it.

In turn, the organisations that promote the networks have different ways of working depending on their objectives, and they are not exclusive. In addition, the hierarchical relationships established between the organisations and the members that are part of the networks are not always vertical or always horizontal, but rather vary in each case and depending on the different profiles.

Although networks are articulated based on a specific need known by all members, the people who are part of the network have different profiles, so that within the same network different groups with similar skills and abilities can be characterized. This allows identifying specific people for specific needs without having to depend on a different network. These are the situations in which sub-objectives may appear within the same network and may or may not involve all the members. This fact can motivate the creation of a different network or open its purpose. However, all actions have repercussions, so any variation in the objectives pursued by the network must be agreed upon with the members or, otherwise, the stability of the network may be compromised.

All interviewees agree that excessive bureaucracy of official organisations

impedes the efficient functioning of any network, formal and informal, and delays the expected advances. Interviewees agree that administrative procedures are a necessary process to have control of the actions carried out. However, finding ways to efficiently go through those processes and have clear communication, avoids overwhelming the members of the networks that need to focus on exchanging and learning. To make it technically possible, a political and institutional commitment is needed.

Supporters of informal networks are critical for formal networks, especially when they are supported by funding schemes that limit their agendas. Often, networks created from European-funded projects are perceived to be too rigid and do not allow to comprehensibly tackle the needs of the fire analyst community. Furthermore, the needs of analysts evolve and are changing and dynamic over time. Informal networks have some flexibility that allows them to adapt to changes. In contrast, the formal networks that are linked to projects are very rigid and do not allow their content to be adapted throughout the lifetime of the project.

### **2.3.2. Profiles represented in the networks**

Networks of expertise, in general, are formed from similar professional profiles and are relatively limited to new members because their needs and the type of sensitive knowledge that circulates through them have very particular characteristics. These networks are formed by groups of people who are capable of using this knowledge in a very concrete way to provide very concrete results (see [Figure 3](#)). However, due to the current situation and the resulting needs, these are increasingly more dynamic and involve different agents from the same or different fields of expertise and disciplines that can provide new solutions to the current challenges. For example, fire analyst networks require pyrometeorologists to help understand extreme fire behaviour linked to fire-atmosphere interactions. Transdisciplinarity contributes to reaching a better understanding of the problem and designing the best possible solution providing a different approach to the issue.

Transdisciplinary teams are especially important when it comes to solving problems that a single team or several teams from the same field cannot solve, and this, in the world of forest fires and especially with problems derived from global warming, occurs in many situations. In fact, in many cases, the creation of transdisciplinary teams is a key factor for the optimal achievement of objectives, whereas most of the networks that the interviewees have spoken about are made up of teams of professionals with very similar specialties.

Although at first, it seems that this fact has an easy solution, it should be noted that, as we have already seen, a network works when a specific objective or need is pursued, especially in the field of forest fires, so it becomes more difficult find professionals from different fields of work with the same goal to achieve. In these

cases, European projects play an important role, since they can allow the creation of networks with mixed teams and, if the basis and the objectives are solid, the network may continue to function even when the project ends.



*Figure 3: Different actors discussing during a wildfire analysis exercise during the workshop held in Valabre, France within the framework of the AFAN project. Source: AFAN website.*

According to the interviewees, the future of networks is in transdisciplinary teams. Thus, the needs that fire analysis networks will have to address (e.g. require solutions adapted to new social and environmental components). In other words, when we are faced with an issue of this magnitude, researchers and operators must work together and establish a healthy dialogue, identifying the operational needs to design the best solutions.

### **2.3.3. Belonging to a network**

For a person, a team, or an organisation to join an already structured network, they must mainly meet three requirements: 1) speak the same operational language to be able to understand each other during the process; 2) expose a problem or need with the network or that can provide a solution or a different point of view; and 3) be open to embarking on a path of learning from those who have more experience, leaving egos aside.

There is no single way to be part of these networks, but there is also no official way. The most common way is to be in the right place and at the right time, especially in informal networks, be it at a conference, appearing in publications, conducting research, a workshop, or a meeting, for example. It is important to have visibility within the field of expertise and be able to identify and be identified by the people who can best meet the objectives. In these situations, personal relationships are established that allow knowing those connection nodes among organisations that can foster a professional relationship, as is the case of analyst networks.

In addition to this, given that the discipline of forest fire analysis and the figure of the fire analyst is not yet established in all organisations or all command systems, it is difficult to know who does or does not have the skills to carry out this type of analysis (Castellnou, et al 2021). Therefore, there is no other way to evaluate who can be part of the network. It is something subjective and based on the personal and professional relationships, on the trust and commitment of that person for the cause, above hierarchies.

In other words, except for projects between organisations where an institution chooses who is part of the network and who is not, being able to join a network depends largely on personal relationships.

#### **2.3.4. Sustainability of the network**

Like any natural process, networks are born, grow, expand or not, mature, and die. This process can be longer or shorter depending on many factors.

Depending on the objectives pursued, type of network, members, etc. a network can be sustained or disappear. In most cases, a network dies when there is no well-defined objective(s).

Before the creation of the network, it is necessary to define very precisely what the goals to be achieved will be. This has a dual purpose. On the one hand, the ability for potential partners to decide if they have a real interest in being part of the network or not, and on the other hand, set solid foundations and a robust line of action. If this process of reflection and definition of objectives is not done correctly, that is, taking the necessary time and dialoguing with all the parties, even if the network initially begins to work, it will not have continuity since each member will understand the needs differently, adapting them to their own and without considering the rest.

Moreover, another situation of instability that can lead to the disappearance of a network is generated when there are more members consuming knowledge than generating it (see section [2.4 Different roles](#)).

## | 2.4. Different roles

Just as in any group of people, the members of a network have different profiles and roles, these roles are assigned (e.g. in formal networks) or organically appear (e.g. informal networks). According to the vision and experience of the interviewees, these roles can be classified into the following six, which can all be found in the same network, or only part of them.

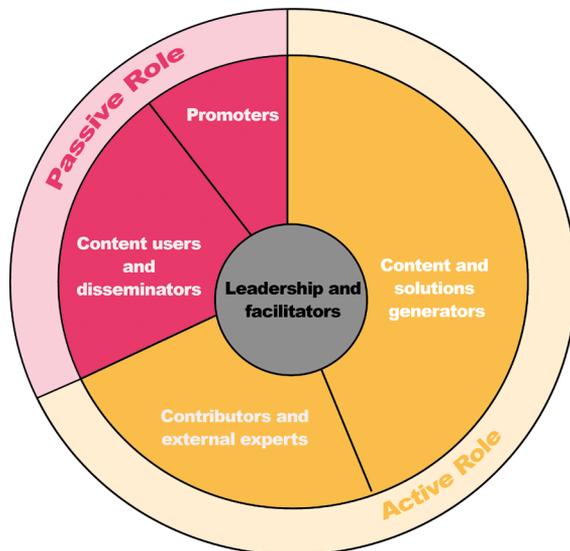
Roles that appear in most of the networks:

- **Content and solutions generators (e.g. fire analysts):** are the main group. These are people who create or contribute knowledge based on experiences, research, or both. They tend to be the most visible part of the network. They are the references that open the way for the rest. Their role is the most important since without their contributions the network would not be able to achieve its goals and would cease to function.
- **Contributors and external experts (e.g., researchers, planners, forest managers):** these people complement the knowledge and experiences of the main group. The objective of the network is not their main goal but at specific times they work with the members of the network. Their contributions can be very diverse, but they are mainly experts from other fields of expertise who contribute knowledge and different points of view (e.g., a meteorologist collaborating with analysts to model the behaviour of convective columns in sixth-generation fires).
- **Content users and disseminators:** people who use or spread the knowledge of other members and the knowledge generated by the network. It usually includes people who do not have extensive experience or knowledge on the subject, but who need to continue learning. They have a more passive role in the network, but they also make occasional contributions based on their abilities.
- **Promoters:** the institutions that support the networks, whether by providing economic resources, hiring personnel to facilitate, with a political commitment, creating projects, or in any other way that helps maintain the network with the greatest guarantees of comfort and facilitates the work of its members. They do not contribute with knowledge, they contribute to reach new parties and provide robustness to the network. Mainly in formal networks, they have the control to decide who is part or not of the network and look for specific results or interactions. When there is no figure of leadership or facilitator, the person(s) representing the institution usually assumes their role.

Roles that may or may not appear in networks. Sometimes those roles are developed by the figure of promoters:

- **Leadership:** this is a person or an organisation that connects all the members of the network, is the central node that all the members have as a reference, and is the connection point, the one with the most connections. Leadership gives visibility outside the network. It is not a role that is officially assigned but prescribed over time. They also tend to play an important role in generating knowledge and making the network more dynamic, although its main task is to establish relationships between members and find sources of knowledge that can contribute to the final objective. Robust networks are capable of functioning without this figure since they seek to connect without paying attention to hierarchies.
- **Facilitators:** are neutral agent or organisation whose function is to allow the exchange of dialogue among the participants and ensure that everyone works for the same goals without deviating from the main work path. They are also responsible for making the network cohesive, promoting a healthy learning environment, and moderating any conflicts that may arise, seeking to maintain respect and safety within the group. This role can be assumed by people from the same network or by external people specialized in this function.

These roles are assigned within the network based on the objectives pursued and the profile of each member or organisation, this is, in different networks the same person can have different roles, which are normally established horizontally, without regard to the organisations hierarchy (see [Figure 4](#)).



*Figure 4: Different roles of network participants. Active roles should represent a higher portion than passive roles for the network to work. Source: own elaboration graphic.*

In short, all the above variables reflect the different possibilities that network structures have. However, they can be classified into the two groups, formal and informal, according to their characteristics (see Table 1).

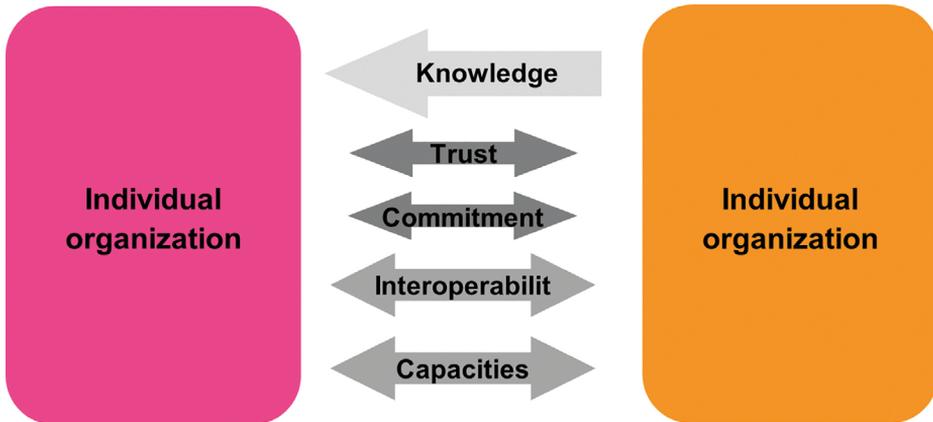
*Table 1: Main differences between formal networks and informal networks. Source: own elaboration*

Feature	Formal Networks	Informal Networks
Creation	Take more time to build the structure, often created top-down	Appears spontaneous based on an immediate need to be addressed
Access to the network	Formal process	Members of the network facilitate the access
Governing structures	Rigid, objectives are based on funding	Flexible, adaptable to the immediate needs
Institutional support	Temporal (e.g. through projects) / potential for long-term	No solid institutional support in the short term Support appears at a later stage
Resources	Available Connected to a political commitment	Limited
Roles	The network usually has promoters and facilitator Has a higher number of disseminators	Higher presence of knowledge providers Often no need for a facilitator.

## | 2.5. Benefits vs. cost. Inputs and outcomes

By definition, any type of network must be beneficial for all members. Theoretically, it is assumed that everyone contributes and receives equally, but the reality is different.

In all networks, all members make a profit, some more than others. As already mentioned, different roles exist within the network, if these are distributed in a balanced way among the members, the proper functioning of the network is ensured since everyone obtains a benefit (see [Figure 5](#)). On the opposite, networks that have more content users and disseminations than content and solution generators, tend to be unsustainable and disappear. This is a common factor in formal networks, especially those created through large projects with many agents and institutions involved.

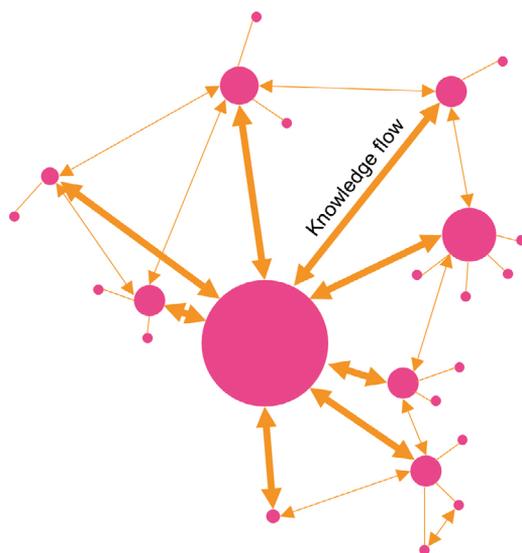


*Figure 5: Example of different types of benefits of networking. Source: own elaboration.*

The imbalance existing in some networks occurs mostly due to the greater number of organisations involved, where the contrast among the level of knowledge and experience in wildfire analysis is notable. This is not a criticism or a negative aspect of the project, but should invite reflection on the ambition of creating new networks in future projects and future networks (see [Figure 6](#)). We must be ambitious and fight to achieve an equal level of knowledge, adapted to the particularities of each territory, but where professionals can work indistinctly and guarantee a good understanding.

There are countries throughout the European territory that have a more frequent and severe fire regime due to their climatic, topographical, and socioeconomic conditions. This has motivated emergency organisations to invest more in wildfire analysis than others. This is a reality that has made fire analysis knowledge concentrated or more developed in some countries than in others. For this reason, it is important to organize and create networks taking into account these types of factors that can destabilize the network and encouraging all its members to grow according to their current possibilities, without anyone being excluded, but promoting diversity to enrich the network.

Meanwhile, part of the interviewees said that to minimize these inequalities and be able to create more solid networks, three levels can be differentiated (although it is not about putting labels on anyone): the pioneering organisations in fire analysis; organisations that have already implemented analytics and want to improve their capabilities; and organisations that are beginning to implement analytics into their operational structure.



*Figure 6: Knowledge flow between parties of a network of different levels. Source: own elaboration.*

The objective of this (invisible) differentiation is to be able to grow as an organisation making step changes proportionate to the realities of each one. That is to say, the organisations with more developed skills would be pulling forward those with a medium development, and the latter would be pulling forward those that start with the analysis. At no time is the professionalism of organisations questioned, rather the best way is sought so that everyone has the greatest possible benefit. Large step changes are unsustainable for organisations and they can be overwhelmed and not get all the benefits they expected.

## | 2.6. Impact levels. Interests and needs

The capacity to carry out fire analysis has not evolved at the same rate in all countries, nor in all organisations. It is because each one has been adapting to the needs of its territory and, therefore, of its wildfire realities, which do not have the same magnitude throughout the European territory, but rather there are many variations (topography, climate patterns, vegetation structures, social culture, socioeconomic models..).

In recent decades, climate change has mainly been modifying the rules of the game. We are seeing wildfire events in places where they have not occurred before, and in places where they have already occurred, they are now much more intense and with more severe consequences. This is why at present, networks take a primary role, as organisations from all over the world must prepare to face disturbances that they have not faced so far (see [Figure 7](#)).



*Figure 7: Joint training among different organisations during the workshop held in Valabre (France) within the framework of the AFAN project. Source: AFAN website.*

As not everyone has the same needs or starts from the same understanding, it is evident that networks are established at different levels. For example, over the years North American countries and Australia have gained experience and knowledge in extreme and devastating fires that extend over large areas. For a long time, knowledge of those types of fires was only available in those countries. However, fires of similar magnitude are now taking place in other regions (e.g. Pedrógão Grande fire of 2017 (Portugal), and the Las Máquinas Fire of 2017 (Chile)) and generate new opportunities for exchanges of knowledge and experiences.

The common need of addressing unprecedented future fires, stresses the establishment of networks at different levels (international, continental, national or regional) to anticipate wildfire scenarios and prepare both prevention, preparedness, and extinction actions, and thus create a more resilient territory and organisations.

## **| 2.7. Supporting tools**

In this section, the interviewees unanimously agreed. Two factors have been identified as the most useful support for proven to have worked best.

## 2.7.1. People exchanges

Meeting face to face with whom you are going to work or are working with is essential to create links, and build trust both professional and personal.

Exchanges of people between organisations have many benefits, especially in the case of fire analysts, since it is not a closed discipline, but each analyst works according to their needs and resources. This allows knowing how the different organisations work, understanding the needs of each country, establishing a common operating language, sharing knowledge and lessons learned, creating trust and commitment, establishing the path to achieve the objectives pursued in a more agile way, and even laying the foundations for remote analysis, among many other benefits.

There must be a clear and defined purpose for an exchange to be useful and beneficial. It is not just about visiting other organisations and other countries, but about doing it with a predefined purpose. As some of the interviewees argued, exchanges among small groups of people and with a specific objective achieve better results compared to large exchanges of people among organisations. It consists of focusing on those people who contribute or can contribute to the network and who comply with its bases.

In addition, getting out of the comfort zone motivates an emergency manager professional to continue learning and training. Those professionals who have had the opportunity to experience situations that they have not yet had in their respective territories will be able to face them with greater security and awareness when they do while having a broader vision. If we base learning on our own experiences, we only learn what is already known. When exchange and learn from others, we learn about fires that are yet to come (unknown). In both cases, there is advancement, but one is better than the other. We must not wait to live the experience in person to learn from it. If we do, we will be late.

## 2.7.2. Online platforms used by networks

Wildfire analysts use a variety of tools to support their tasks (see some examples in Castellnou et al., 2021; Tonarelli et al., 2022 and de Saint Germain, 2022). There are different tools and resources that are useful both for analysis and for connecting different analysts, some of them created by the European Commission (e.g.: EFFIS, Copernicus, GWIS, DRMKC...). Each organisation, including each analyst, adapts the resources available to them according to their needs. There is no single method of working. In addition, there is also a wide variety of platforms from external companies that are providing good results due to their dynamism and ease of use. These types of resources, such as instant messaging applications or cloud storage portals, are being widely used by organisations and analysts in the exchange of information.

Focusing on the tools that allow networking, most of the interviewees agree that a paradigm shift is needed towards platforms where everyone can work, where they can contribute their data and consult the data of others.

There are some overarching rules to be applied for a platform to be used by networks: 1) it should maintain a similar format to the tools that are already in use, for example, if we talk about sharing documents or cartography, it could have a style like Google Drive, Dropbox or OneDrive; in the case of map viewers, it should have a format similar to Google Earth or ArcGIS. 2) The platform must be managed by an official organism, to ensure confidentiality, and have the flexibility to modify its format and content based on the needs identified at all times. 3) rigid platforms will not succeed, and 4) if tools are already available, we must be able to integrate existing tools and encourage the use of those resources that are giving good results.

At present, there are several useful platforms provided by EU projects and official institutions, but their functions tend to overlap. While some users will register in all of them, others will only register in some of them that offer the rules proposed in the previous paragraph. New tools should complement or integrate the existing tools with more transversal and dynamic functionalities that can be adapted to the changing needs of the networks. Just as it happens with the sustainability of the networks, platforms that do not follow these principles are likely to be less used and eventually disappear.

This would allow not only the members of a network but also the entire community of fire analysts (not to the general public) to have a source of official data large enough to learn from fires that occurred in other parts of Europe or the world. In addition, this would motivate organisations to collect data during their forest fires, as well as to make them public, breaking the current secrecy.

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### 3. AFAN's contribution to network building and its achievements

The AFAN project has built a formal structure that supports and facilitates the activity of existing formal and informal networks. AFAN has allowed experts from different countries and different organisations to dialogue, debate, propose Europe-wide frameworks on fire analysis and create bonds of trust between them. In addition, thanks to the different activities carried out (workshops, webinars, project meetings, exchanges...) and the products generated, a common operating language has been proposed where everyone can understand each other and work (see [Figure 8](#)).



Figure 8: AFAN infographic. Source: AFAN website.

The interviewees valued positively all the activities carried out and the results achieved. However, they are critical about the continuity of these. They argue that the work done, is useless unless there is a continuation of the action. Another point widely shared is that the outcomes are useful for organisations, the community of analysts, and the interested public, but the European Commission should have the capacity to promote the implementation of these results and prevent them from remaining an isolated document.

It is about making the most of the efforts invested and capitalising on the knowledge and experience of the people who are part of the networks

and projects. In this way, a common framework would be favoured, and the projects would be given continuity even once they are finished.

Some of the interviewees also stated that thanks to the opportunity to have worked together on the project, they have been able to establish a more solid professional relationship and will keep in touch with future projects or actions.

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## 4. Conclusions

The changes in climatic conditions suffered in the last decades have forced emergency organisations to generate solutions to new problems without having any previous experience. In this context where wildfires have become a global problem, networks of experts in fire analysis have played, are playing, and will play a fundamental role in improving the management of wildfires and the **resilience** of society as a final consumer.

The means of fighting fires are very important resources and require financing, but we are facing wildfires that are not suppressed by adding more resources into suppression tasks, but rather by having a more **strategic view** to understanding where, how, and when we should do what. It is not just a matter of managing emergencies, but of foreseeing the best way to do it. The present challenges have no borders, and thus require a global united solution adapted to the regional needs.

Some of the interviewed analysts ask that the figure of the fire analyst is considered as another resource, a non-material asset, a **key tool** in managing wildfires and that they are mobilised in an emergency in the same way as the rest of the resources (see [Figure 8](#)).

For this, it is important to have nodes and connection points and facilitate the exchange of people. In short, it is necessary to promote mobility between organisations and make the necessary resources available to the fire analysis teams for this purpose. Support for the training of fire analysts is key both on the ground in real fire scenarios, as well as in controlled fires and tabletop exercises. Overall, this is helping to gain a much broader vision of reality and understanding of what is happening during the emergency and to design **common solutions** to the problems that are being faced. A common training framework is currently non-existent and would be most beneficial to guarantee good operational understanding between European organisations.

The members of the networks recognise the importance of **meeting and working face to face** to create trust and commitment and in different formats with other analysts. To achieve this objective, institutions must commit to it and create or improve current financing mechanisms. There are institutions like the European Commission that recognise the value of networks and try to support them, but facilitation and sustainability require continuous effort.

In addition, some of the analysts who have collaborated have identified a **platform** where they can exchange information to carry out analyses as a necessity. However, it is a topic of debate that must be supported by a large consensus of end users since there are already platforms with similar functionalities.

Institutions must invest in providing **structures that allow the flexibility** that networks of knowledge require. Some organisations have shared very specific needs. They cannot expect to depend on a project to have the necessary means, we must facilitate networking and facilitate the task of networks by believing in people and their abilities.

Integrating the analysts' needs is not often considered a **priority** in political agendas and therefore, positioning the value of fire analysis is a difficult challenge that formal networks must pursue in the future.

Finally, the importance of these projects for the **community of analysts and researchers** is notable, but always with a clear and previously defined objective that responds to identified needs. This is the only way to achieve stable networks and ensure their continuity over time.

5

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