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Landscape Fire Management Gap Analysis in Montenegro



ШАРМАХЕМ ФАРМАЦЕМ

HELVETAS

Ministarstvo poljoprivrede, šumarstva i vodoprivrede

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LIST OF INSTITUTIONS AND EXPERTS INVOLVED IN THE PREPARATION OF THE GAP ANALYSIS

Ministry of Agriculture, Forestry and Water Management
Ministry of Spatial Planning, Urbanism and State Property
Protection and Rescue Directorate of the Ministry of the Interior
Institute of Hydrometeorology and Seismology
Statistical Office – MONSTAT
Administration for the Management of Forests and Hunting Grounds
Cadastre and State Property Administration
Administration of Montenegro – Biotechnical Faculty
Association of Agricultural Producers of Montenegro
Hunting Association of Montenegro
NGO Green Home
NGO Young environmentalists

LIST OF ACRONYMS

AOG	Association of Olive Growers
CTPR	Coordination Team for Protection and Rescue
DPR	Directorate for Protection and Rescue
EsU	Employer's Union
EU	European Union
EUF	European Union Funds
FA	Forest Administration
FsA	Farmer's Association
FU	Fire Units
IHS	Institute of Hydrometeorology and Seismology
LFM	Landscape Fire Management
MAFW	Ministry of Agriculture, Forestry and Water Management
MF	Ministry of Finance
MFHG	Management of Forest and Hunting Grounds
MIA	Ministry for Internal Affairs
MJ	Ministry of Justice
MONSTAT	Statistical Office of Montenegro
MESDDN	Ministry of Ecology, Sustainable Development and Development of the North
MT	Ministry of Tourism
NATO	The North Atlantic Alliance
NGO	Non-Government Organization
NP	National Parks
REA	Real Estate Administration
SAB	State Administration Bodies
SI	State Inspection
UM	University of Montenegro
CM	Community of Municipalities

EXECUTIVE SUMMARY

This gap analysis provides a comprehensive evaluation of the Landscape Fire Management system in Montenegro assessing its effectiveness. The primary objective is to identify key deficiencies, hereafter referred to as gaps, and propose actionable recommendations to bridge those gaps and enhance the country's LFM system's capacity to manage landscape fires. This aims to safeguard natural resources and local communities' livelihoods, and to integrate the landscape fire management among all of its relevant stakeholders. This gap analysis was developed through a participatory approach, facilitated by multiple workshops organized by the Landscape Fire Management in the Western Balkans (LFMWB) Programme. These workshops brought together participants from the national LFM networks of Montenegro to collaboratively define, discuss and prioritize the identified gaps and measures for bridging them.

This gap analysis first identifies and defines the gaps, then offers brief explanation and context for each of the gaps. It then proposes a well-defined desired future state concerning the respective gaps. The desired state serves as a milestone and a reference for all intended improvements and actionable measures. To achieve this, the gap analysis document culminates in a detailed implementation framework table. This table acts similarly as a strategic action plan, listing each identified gap alongside proposed measures for bridging the gap, their period of implementation, the responsible institutions for undertaking or assisting in implementing the proposed measures, an approximation of a foreseen budget, and a priority level (urgency). The priorities in the implementation framework are colour-coded, meaning: Green (I) stands for the highest priority, Yellow (II) for moderate priority, and Blue (III) for lower priority measures.

The analysis reveals critical gaps across all four main phases (prevention, preparedness, suppression, and post-fire management) of the landscape fire management system in Montenegro:

- Prevention: Effective national Prevention of Landscape Fire Management (LFM) is compromised by inconsistent existing legislature for landscape fire management (LFM). This deficiency is compounded by poor public engagement, specifically a lack of public awareness of landscape fire management (LFM) and the absence of LFM principles in the education system. Furthermore, planning and risk factors are undermined by the absence of a national landscape fire risk map, the inadequate waste management system (which undermines landscape fire prevention and risk mitigation), and inadequate implementation of the existing strategy for the development of agriculture and rural areas.
- Preparedness: National Preparedness for Landscape Fire Management (LFM) is undermined by an insufficient number of specially trained forces for LF suppression and an insufficient number of voluntary firefighting organizations. Additionally, there is an inadequate infrastructure that hinders the access to high-risk LF areas and persistent inefficiencies of the public procurement system. Furthermore, planning and operational effectiveness are lacking due to the absence of a national-level fuel map, insufficient inclusion of LFM principles in the state and private-owned forests, insufficient development of fire-resilient heterogeneous re/afforestation, and a lack of landscape fire management (LFM) knowledge among farmers.
- Suppression capabilities for Landscape Fire Management (LFM) are characterized by the limited access to water sources for aerial LF suppression. This primary deficiency is compounded by a persistent lack of specialized vehicles and equipment for LF suppression, thereby restricting the effectiveness and safety of ground crews in combating major incidents.
- Postfire Management: Effective Postfire Management is compromised by a lack of adequate methodology for assessing damage after landscape fires. There is a persistent of scientific research on the management of landscape fires and burnt areas. Finally, long-term learning is hindered by a

lack of systemic post-fire analysis and record keeping of previous landscape fires, which collectively prevents the development of evidence-based strategies for recovery and future planning.

The successful implementation of the proposed recommendations is envisioned over a five-year period and is contingent upon strong coordination among government agencies, academic institutions, and local communities (science-policy-practitioners interface). This holistic approach aims to address both immediate critical needs and facilitate long-term systematic improvements, thereby significantly bolstering Montenegro's overall capacity to manage landscape fires effectively and sustainably.

The Landscape Fire Management (LFM) gap analysis report was fully validated and accepted by all participating stakeholders

INTRODUCTION

BACKGROUND

The LFMWB Programme aims to enhance the resilience of Western Balkan forests and landscapes against fires, benefiting the communities that rely on these landscapes for their livelihoods and socio-economic development. This is achieved through a participatory approach, involving the local population in decision-making processes, promoting gender equality, and raising public awareness about the importance of safeguarding natural resources.

The main outcomes of the Programme are:

(1) better cooperation, which implies the establishment of a permanent regional network, with a view to better cross-border cooperation in landscape fire management (LFM);

(2) formation of strong capacities for broader approaches to LFM, with the aim of enabling effective cross-sectoral cooperation at multiple levels;

(3) adopting better policies and strategies on LFM to support sustainable landscape management at local, national and regional levels.

To mitigate the negative impacts of LFs in the WB, it is necessary to have inclusive, cross-boundary cooperation and knowledge exchange to strengthen the capacities for landscape fire management (LFM) in the region. All of these aspects are incorporated in the Landscape fire management in the Western Balkans Programme. The Landscape Fire Management in the Western Balkans (LFMWB) is a project financed by the Swiss Agency for Development and Cooperation – SDC and coordinated by Farmahem from Skopje, North Macedonia with backstopping support from Helvetas Swiss Intercooperation from Switzerland. The first phase is designed to be implemented in the period from 01.02.2022 until 31.12.2026.

OBJECTIVES OF THE GAP ANALYSIS

The LFM Gap Analysis compares Montenegro's current fire management system with the envisioned future state of LFM to identify key deficiencies. This evaluation was conducted through several LFM workshops that engaged primary stakeholders from Montenegro's fire management institutions in a participatory process. The analysis was further supported by a prior SWOT assessment and the LFM Report on Montenegro, which provided a comprehensive baseline of the current system and a solid foundation for pinpointing gaps and devising bridging strategies. Ultimately, this forward-looking process aims to enhance the system by addressing its weaknesses, developing a targeted action plan, and identifying necessary improvements in competencies, productivity, and resource allocation.

SCOPE AND METHODOLOGY

The GAP analysis focuses on four key areas of landscape fire management: prevention, preparedness, extinguishing or suppression, and post-fire management. These areas align with the main phases of fire management and emphasize their importance in addressing gaps within the current system. The analysis

is based on data collected from national workshops, where participants from the LFM network provided insights into the situation.

This extensive evaluation was conducted during the 2nd and 3rd National Landscape Fire Management Workshop and meeting of the National Landscape Fire Management network in Montenegro, where the main shortcomings/gaps of the current landscape fire management system were defined through a SWOT analysis.

The Regional Fire Monitoring Centre (RFMC) also played an essential role in the facilitation of these workshops, and the document's preparation, as the report was consulted and drafted in collaboration, providing expertise.

Additionally, the document was sent for final comments to stakeholders, who provided valuable input. These comments have been incorporated into the final version of the report.

1. GAP IDENTIFICATION ON LANDSCAPE FIRE MANAGEMENT IN MONTENEGRO

This document, presented as a gap report, outlines the findings of the analysis by identifying gaps in Montenegro's current landscape fire management system. Focusing on four (4) key stages of fire management, prevention, preparedness, suppression and post-fire management, this chapter represents several gaps defined and described, and future desired stages to improve the country's resistance to landscape fires as well as the protection of the environment and the local community.

By examining these areas, we can better understand the challenges Montenegro faces in managing fire risks and ensure a more comprehensive, coordinated approach to wildfire management. The following outlines the specific gaps identified across these crucial areas.

Gap analysis for each of the elements of the four categories was done according to the following structure:

1. Gap formulation
2. Detailed description of the gap – explanation of root causes of the GAP
3. Desired state is actually an outcome or achieved objective in the period between 1 and 5 years. While the desired state defines WHAT needs to be achieved within a period of 1 – 5 years, the implementation plan proposes concreate measures/activities on HOW the desired state will be achieved.

1.1. PREVENTION

Prevention is a key stage in the LFM approach and is of great importance for reducing fire risk at the area level. This part of the analysis examines various fire prevention measures that include legislation, education and awareness raising as well as regulatory measures.

The analysis of strengths and weaknesses in the prevention phase defines a recommendation for strengthening regulations, strengthening campaigns for education and raising public awareness, space management and improving implementation mechanisms, in order to reduce the likelihood of fire at the level of Montenegro.

The fire management system at the level of Montenegro is based on a series of permanent laws and regulations that are in force. The most important segment is the implementation of legislation, inspection supervision and monitoring of the entire process. After the identified strengths and weaknesses in the system, the working groups at the National Workshops defined the following gaps in the prevention phase of the fire management system in Montenegro.

Table 1. *The main gaps identified at the prevention stage*

Gap 1.1 Inconsistent existing legislature for landscape fire management (LFM)

Current practice in Montenegro shows a discrepancy between sectoral laws, resulting in inadequate application of laws and bylaws. The reason lies in the lack of mutual harmonization of laws, which is a consequence of the lack of cross-sectoral cooperation.

In Montenegro, a significant gap exists within the legal framework governing landscape fire management, where discrepancies between sectoral laws lead to the inadequate application of laws and bylaws. This issue arises from the lack of mutual harmonization between these laws, which results in an inconsistent and fragmented approach to managing fire risks. The failure to align laws across different sectors means that the regulations intended to guide fire management are not effectively coordinated or implemented. This disjointed legal structure undermines the ability of authorities to apply a unified and comprehensive strategy to landscape fire management.

The root cause of this issue lies in two key factors. First, there is a distinct lack of mutual harmonization between the various sectoral laws that impact fire management. These laws, which were developed independently of one another, often conflict or overlap, creating confusion about which regulations take precedence or how they should be applied together. As a result, the legal framework lacks coherence, which hampers its effectiveness in managing fire risks.

Secondly, the absence of strong cross-sectoral cooperation exacerbates the problem. Various sectors involved in fire management, such as forestry, environmental protection, and emergency services, operate within their own isolated legal boundaries without regular coordination or communication. This lack of collaboration prevents the necessary adjustments from being made to laws and bylaws, meaning that opportunities for integration or improvement remain overlooked. Consequently, the legal structures remain fragmented, making it difficult to address the complex and interconnected challenges of landscape fire management.

Desired state: *Effective sectoral cooperation has been achieved, with clearly defined roles for all participants in the fire management system, as well as with clearly defined competencies and responsibilities of stakeholders in the fire management system. A fully integrated and harmonized legal framework for landscape fire management in Montenegro has been established, where sectoral laws have been aligned and cross-sectoral cooperation has been set up to ensure efficient, coordinated, and sustainable fire prevention, response, and recovery efforts. This cohesive approach has enhanced resilience, protected ecosystems, and supported the communities dependent on these landscapes.*

Gap 1.2 Lack of public awareness of landscape fire management (LFM)

The limited public awareness of landscape fire management (LFM) in Montenegro is one of the most significant gaps in this area, severely hindering the effectiveness of fire prevention and management strategies by restricting the community's involvement and proactive participation in these efforts.

The general public and many local authorities may not fully comprehend the risks associated with landscape fires or the long-term impact they have on both the environment and public safety. This lack of awareness often results in inadequate preparation and response to fire risks, leaving communities more vulnerable to fires when they occur.

Additionally, without a clear understanding of the role of LFM, stakeholders may be less motivated to adopt or support preventive measures. This gap affects not only the general population but also local governance and institutions, who may not prioritize LFM or incorporate it into broader land-use and development policies. Without strong institutional commitment, the necessary measures to protect vulnerable areas from fires are not adequately enforced or coordinated.

This deficiency stems from the lack of quality and continuous measures to raise awareness of the LFM, on the one hand, and the insufficient implementation of the envisaged LFM-compliant activities, to raise awareness of society as a whole. Despite the fact that all stakeholders are clearly separated through the Law on Protection and Rescue, there is no adequate involvement of relevant institutions that should prepare such campaigns and local communities, which are the bearers of the protection and rescue system. Insufficient involvement of all types of media, insufficient use of modern communication technologies is also the reason for the lack of quality campaigns to raise the level of public awareness. Due to the lack of comprehensive LFM promotional material and programmes, there is a significant effect on the risk of fire occurrence and high fire damage.

The lack of awareness of LFM in Montenegro can be traced to several interconnected root causes. One major factor is insufficient efforts to educate the public about the importance of fire management, resulting in a general lack of understanding regarding the role of the community in both preventing and responding to fires. Additionally, inadequate communication channels hinder the spread of information, with poor use of media and limited community outreach efforts making it difficult to engage a wider audience.

Another significant cause is the lack of cross-sectoral coordination. When government agencies, NGOs, and local communities do not effectively collaborate on awareness campaigns, efforts to educate the public become fragmented, inconsistent, and less impactful.

Cultural or societal factors may also play a role, as some communities may not view fires as a significant threat or may not understand the long-term benefits of fire management. This can lead to apathy toward fire management efforts, preventing active involvement. These factors collectively hinder the development of a well-informed, engaged public capable of effectively participating in fire management efforts.

Desired state: *An increased public awareness for landscape fires in Montenegro* ***has been achieved****, where awareness of LFM is widespread, leading to active community engagement and proactive participation in fire prevention and LF management efforts. This heightened awareness* ***has contributed*** *to more effective and collaborative strategies, improving fire resilience and safeguarding both the environment and local communities' livelihoods.*

Gap 1.3 Absence of LFM principles in the education system

Currently, the education system in Montenegro does not recognize the LFM approach and young generations are not aware of the dangers and challenges that LF brings. In addition, the absence of LFM from the education system makes it impossible to familiarize young generations with the impact of climate change on the occurrence of landscape fires, which reduces the efficiency of the protection and rescue system, especially in the segment of prevention.

Incorporating sufficient knowledge about Landscape Fire Management (LFM) into educational programmes is crucial for building a skilled and informed workforce capable of addressing fire risks in an effective and proactive manner. By educating future generations—particularly in fields such as forestry, environmental science, agriculture, and public policy—about fire prevention, preparedness, response, and recovery, educational programmes play a vital role in fostering a culture of fire safety and resilience. Well-informed professionals can contribute to better decision-making in both public and private sectors, ensuring that fire management practices align with best practices, regulatory standards, and climate change adaptation strategies.

Education programmes that emphasize LFM also address the gap of lack of public awareness and community engagement. As future leaders, workers, and citizens are equipped with a deep understanding of fire risks, they are more likely to adopt and promote fire-resistant practices in their personal and professional lives, benefiting entire communities. Furthermore, integrating LFM into education ensures the development of innovative solutions to the evolving challenges of wildfire management, contributing to the resilience of landscapes, ecosystems, and communities.

The insufficient knowledge about landscape fire management in educational programmes can be attributed to several potential causes, such as lack of integration into educational curricula and limited coverage in related fields. Even when fire management topics are covered, they are introduced only briefly in broader courses related to environmental management, forestry, or disaster risk reduction. This limits the depth of knowledge students acquire about the specific challenges and strategies related to landscape fire management.

Another cause of this gap is the lack of expertise among educators. Teachers and professors in educational institutions may lack the specialized training and expertise in landscape fire management. Without instructors who are well-versed in this area, it is difficult for students to gain a thorough understanding of fire management principles, risks, and strategies.

The existing educational programmes at the University of Agriculture and Forestry focus more on theoretical aspects of environmental management and less on practical, hands-on training in fire management. Landscape fire management requires real-world knowledge, including the use of technology (e.g., GIS, satellite monitoring), fieldwork, and direct experience in fire prevention and suppression, which may not be adequately addressed in traditional academic settings.

Opportunities for students to engage in field-based learning, internships, or work with fire management agencies are limited. Practical exposure to fire management activities—such as firebreak creation, wildfire response, and controlled burns—helps students connect theoretical knowledge with real-world fire challenges.

There is also limited awareness of the importance of Landscape Fire Management. Educational policymakers and institutions may not fully recognize the importance of incorporating landscape fire management into educational programmes.

Additionally, there is limited collaboration between academia and fire management authorities. Educational institutions do not have strong partnerships with relevant government bodies, fire management agencies, or non-governmental organizations involved in landscape fire management. Collaboration between academia and fire management professionals is essential for ensuring that the latest research, strategies, and practical experiences are incorporated into educational programmes.

Landscape fire management requires an interdisciplinary approach, integrating fields such as ecology, geography, meteorology, and public policy. Educational programmes that fail to adopt this holistic perspective may leave students with a limited understanding of the complex, interconnected nature of fire management.

Desired state: *Comprehensive integration of LFM principles across relevant educational curricula has been achieved, ensuring that students at various levels of education have gained the knowledge, skills, and practical experience needed to effectively manage and mitigate landscape fire risks.*

Gap 1.4 Absence of national landscape fire risk map

There is no adequate risk map in the existing system that contains levels of fire risk and fire sensitivity, negative impact on population, property and environment, transport infrastructure, response ability and evacuation, as well as proposed preventive measures to reduce risks.

A National Landscape Fire Risk Map is essential for providing a comprehensive, spatially informed overview of fire risks across the country. It serves as a critical tool for decision-making, enabling authorities to better understand the vulnerability of different landscapes to fire. By identifying areas of high, moderate, and low risk, it allows for the prioritization of resources, focused preventive measures, and targeted interventions.

Without a National Landscape Fire Risk Map, fire management efforts would become reactive and fragmented, increasing the potential for widespread destruction, inefficient responses, and slower recovery. The lack of targeted planning would hinder the country's ability to reduce fire risks, protect communities, and maintain resilient landscapes.

The lack of a national landscape fire risk map in Montenegro stems from mix of factors, such as insufficient institutional coordination. Fire management is spread across multiple institutions, such as forestry departments, environmental agencies, local government bodies, and emergency services. Coordination and collaboration are essential to gather, analyse, and share information about fire risks across different regions.

In addition, there is a lack of centralized management. Without a central body responsible for overseeing landscape fire management and risk assessment, there may be no clear leadership in creating a unified national fire risk map. A fragmented approach to fire management can lead to inconsistent and incomplete data collection.

Inadequate fire management planning is demonstrated by lack of comprehensive, forward-thinking fire management strategies at the national level. Fire risk mapping has not been seen as a priority, since broader fire management plans and strategies are not yet in place.

In addition, there is limited funding and resources. The development of a national landscape fire risk map requires funding for data collection, technology, research, and ongoing updates. Financial constraints within government budgets or a lack of investment in fire prevention and management result in the absence of this critical tool.

Also, key political decision makers do not recognize the value of landscape fire risk mapping as a preventive tool.

Addressing the lack of a national landscape fire risk map requires overcoming these challenges through enhanced data collection, improved coordination between institutions, increased funding, and capacity-building initiatives. By establishing a comprehensive and up-to-date fire risk map, Montenegro would be better equipped to proactively manage and mitigate the risks posed by landscape fires.

Desired state: *A continuously maintained, accurate, and up-to-date national landscape fire risk map has been created. This map has served as a critical tool in managing fire risks across the country.*

GAP 1.5 The inadequate waste management system: undermining landscape fire prevention and risk mitigation

In Montenegro, there is a Waste Management Law in force, with insufficient implementation, which has the following consequences:

- Lack of waste management
- Increasing amount of waste
- Lack of waste management map
- Lack of waste categorization
- Recycled waste cannot be used
- Difficult conditions for waste collection, transport, processing and disposal
- Monitoring of the entire waste management process

Several fundamental issues of adequate waste management contribute to the Landscape Fire Management issue in Montenegro.

A primary factor is the insufficient regulatory framework for waste management. Current laws and policies don't adequately prescribe or guide effective waste management practices, which creates a lack of clarity regarding the roles and responsibilities of various institutions and governmental levels. This regulatory void means that a crucial layer of **fire prevention** is missing, as unmanaged waste sites often become ignition points for landscape fires.

Secondly, **weak institutional coordination and management** mean that different agencies and local authorities involved in waste management often fail to collaborate efficiently. This fragmentation prevents the establishment of a unified and coherent waste management system. Without synchronized efforts, fire prevention strategies that should involve waste reduction and proper disposal cannot be effectively integrated into broader LFM plans.

Other significant contributing factors include **limited funding and resources** for developing essential infrastructure and proper waste management systems, alongside **insufficient public awareness and education**. Communities and businesses often don't fully grasp the importance of effective waste management or their role within the system. This lack of awareness directly contributes to improper waste disposal, creating artificial **fuel loads** that increase fire risk in landscapes which are often illegal dump sites.

Finally, **political and administrative challenges** hinder effective action. Waste management is frequently not prioritized by local authorities or national decision-makers, resulting in delays and insufficient attention to developing a consistent waste management system. This systemic neglect directly undermines LFM efforts by failing to address a key source of potential ignitions.

Collectively, these issues significantly **increase the risk of landscape fires**, particularly in peri-urban areas. The absence of proper waste management in these zones has already diminished their productive, ecological, and recreational functions, making them more vulnerable to fire events and complicating overall LFM strategies.

Desired state: *A well-structured and efficient waste management system in Montenegro has been established, which includes waste monitoring, landfill mapping, landfill maintenance, taking measures and activities to reduce waste, developing waste recycling processes, reusing collected waste, and properly disposing of all types of waste that cannot be reused. This system is supported by adequate resources and funding, with active public participation and awareness of the issue, reduces the risk of fire at the landscape level resulting from inadequate waste management, increases the protection of the environment, with an emphasis on strengthening the ecological, productive, and recreational functions of the landscape.*

Gap 1.6 Inadequate implementation of the existing strategy for the development of agriculture and rural areas

The inadequate implementation of the existing Strategy for the Development of Agriculture and Rural Areas can be attributed to several root causes.

The measures prescribed by this strategy do not have strong enough support from society to achieve the goals of this strategy.

One major factor is the frequency of changes in the institutional setup that occur after shifts in government. These changes often lead to unclear or overlapping responsibilities between institutions, making it difficult for the relevant ministries to effectively carry out their duties. For instance, the Ministry of Ecology may be assigned responsibility for areas that would logically fall under other ministries, such as agriculture or rural development, causing confusion and inefficiencies in the execution of the strategy.

Another root cause is the lack of institutional continuity and capacity. When government transitions occur, the continuity of ongoing projects and initiatives may be disrupted, and new institutional arrangements may not have the necessary expertise or resources to implement the strategy effectively.

The legislation is not fully aligned with the needs of this strategy, which, with insufficient financial support, results in the occurrence of intensive migration of the population, abandonment of agricultural land, reduction of the volume of livestock production, reduction of the area under quality grazing.

Additionally, there may be insufficient coordination between the various ministries involved in the strategy's implementation. Without clear communication and cooperation between the ministries, particularly when responsibilities are misaligned, the strategy can lack the cohesive approach needed for successful execution.

Finally, inadequate political will or prioritization could also contribute to this gap. If the development of agriculture and rural areas is not seen as a top priority by policymakers, necessary funding and support may not be allocated, further hindering the implementation process.

All this causes the occurrence of neglect of agricultural land, which increases the amount of flammable material in nature and significantly contributes to increasing the risk and exposure to potential landscape fires.

Desired state: *A well-coordinated and effective implementation of the Strategy for the Development of Agriculture and Rural Areas has been achieved, where clear responsibilities have been assigned to the appropriate institutions, ensuring a seamless execution of policies. This has been supported by stable institutional structures, with continuity across governmental transitions, allowing for effective collaboration between ministries.*

1.2. PREPAREDNESS

Given the increasing frequency and intensity of fires, as well as the expanding areas affected, it is of utmost importance to prepare both society and institutions for a more effective and adequate response.

Over many years, Montenegro applied a forest management system that aligns with nature, where forests were rejuvenated through selective and regenerative logging. This approach significantly contributed to the reduction of fire risk. These traditional practices reflect a strong commitment to preserving ecosystems and minimizing the potential impact of large fires on valuable forest resources. Central to these forestry practices was the focus on enhancing the openness of forests and forest land, which has proven to be an effective strategy in creating robust defences against forest fires. By switching to the concession system, where concessionaires focus solely on logging and wood export, other essential activities related to basic forest regeneration have been reduced to a minimum. This has significantly increased the risk of fire in valuable forest complexes. The current forest and forest land management system fails to ensure the necessary openness of these areas, and concessionaires are not sufficiently equipped for monitoring, early warning, or for quick access to extinguishing fires.

The preparedness phase, in its simplest sense, refers to a system that is well-prepared for both existing and potential fires. Such a system would be capable of significantly reducing the severity of the fire and successfully responding to the challenge by localizing the fire.

Preparedness includes the following segments:

✓ **Training and coordination of capacity building**

Assessment of training programmes for firefighters-rescuers, volunteers and other responsible persons, as well as the availability and suitability of equipment and resources. This implies the organization and coordination of all training processes for all subjects of protection and rescue. Likewise, material and technical equipping of all subjects of protection and rescue, as well as the creation of material reserves are a necessary condition for the establishment of an appropriate protection and rescue system.

✓ **Planning, collaboration and communication**

Assessment of the effectiveness of protection and rescue plans, communication and cooperation mechanisms between agencies and organizations, and the integration of modern fire early detection technologies.

✓ **Community involvement**

Examining the involvement of local self-governments and local communities, as a form of division under the Law on Territorial Organization, in preparedness for fires. Also, the level of involvement of the scientific community in the part of scientific and research activities should be assessed as well as the involvement of the scientific community in the development of spatial plans, sectoral studies and strategies.

Identifying gaps at this stage leads to recommendations to improve training programmes, update protection and rescue plans, improve communication and cooperation mechanisms, and increase community involvement to improve general preparedness for fires in the area. Preparedness, often referred to as pre-containment measures, is a key stage in area-level fire management, including proactive strategies and measures taken before fires start.

Table 2. *The main gaps identified at the preparedness stage*

Gap 2.1 Insufficient number of specially trained forces for lf suppression
Montenegro has clearly demonstrated the lack of trained teams to combat LF, and the problem is even more pronounced when we take into account the unfavourable age structure of the members of the protective services. Having a sufficient number of trained human resources in landscape fire management (LFM) is crucial because they possess the specialized knowledge and skills necessary to manage complex, large-scale fires in diverse environments. Due to insufficient training of security service members, the replenishment of protection units is periodic and unplanned, which operationally reduces the efficiency of the existing system. This problem is particularly pronounced in the north of the country, where, due to large migrations of the population, there is not enough staff to fill the protection units. Another cause could be a lack of awareness or prioritization of landscape fire management as a distinct field, leading to insufficient investment in training personnel for these specific needs. Additionally, there may be logistical and financial barriers that prevent firefighters from accessing specialized LFM training, such as limited resources or funding for training programmes. The shortage of qualified instructors or experts in the field may also hinder the expansion of appropriate training opportunities. Desired state: *A sufficient number of well-trained LFM professionals, with specialized skills to effectively manage fires in diverse landscapes* ***has been achieved****. This has* ***been supported*** *by comprehensive training programmes ensuring that firefighters are adequately prepared to handle both urban and landscape fire suppression challenges.*

Gap 2.2 Inadequate infrastructure that hinders the access to high-risk LF areas

The existing openness of forests and forest complexes does not meet the needs for sustainable forest management. The current concession management system implies the construction of forest infrastructure only for the purpose of timber exploitation, without fire railways and forest digging roads, which neglects other functions of forests.

One significant cause for this gap is the absence of a standardized methodology for constructing fire roads and fire paths. Without clear, well-defined guidelines for the development of this crucial infrastructure, efforts to create accessible routes to high-risk fire areas remain inconsistent or incomplete.

Another underlying cause is the lack of a comprehensive protection plan. Such a plan should function as an umbrella framework that integrates various specialized plans, including forest management strategies. Environmental protection derives from a spatial management plan, while plans for the protection of all ecosystems must include other plans (cultivation, exploitation, infrastructural opening of ecosystems, simple and extended reproduction), as well as plans that realize other functions of the ecosystem.

Also, the existing infrastructure is not well maintained, which reduces the possibility of adequate use for protection purposes. One of the major problems is the lack of quality cooperation between concessionaires and the local population, which has a significant negative impact on the infrastructure maintenance.

Additionally, the absence of a national land ownership system is a critical factor. Before developing methodologies for fire road construction or other infrastructure, a clear system for land ownership and land management needs to be established at the national level. This would ensure that responsibilities are clearly defined, and land use for fire prevention and management is coordinated across different regions, sectors, and stakeholders.

Desired state: *A well-established, coordinated infrastructure system that ensures easy and effective access to high-risk landscape fire areas has been put in place. Fire roads and forest digging roads have been constructed according to planning documentation, with their construction adapted to the Law on Forests and bylaws, using LFM principles.*

Gap 2.3 Insufficient inclusion of LFM principles in the state and private-owned forests (including fire risk reduction)

Forest owners and managers of forest land, as well as holders of other real rights to forests and forest land, do not implement necessary cultivation measures and technical measures to reduce the risk and potential damage from fires. As a direct consequence of the lack of adequate plans, there is insufficient care for forest stands, thinning is done untimely, the forest order is poorly established after logging, there is inadequate openness of forest complexes, and there is a lack of other silvicultural-technical measures, significantly increasing the risk of fire occurrence.

The key issue is that the owners of privately owned forests focus on logging for profit, regardless of the long-term health, protection, and regeneration of the forest. Their operations often overlook essential aspects of forest management, such as fire prevention, maintenance, and regeneration, which are crucial for ensuring sustainable forest ecosystems and minimizing fire hazards.

This narrow focus leads to insufficient forest management practices, significantly increasing the risk of fire.

The reason for this relationship of private forest owners is that there is no financial and legislative initiative for the implementation of fire prevention measures and forest management, focusing instead on short-term economic benefits. Ultimately, poor enforcement of regulations on forest management and fire risk prevention results in inadequate implementation of the necessary measures to reduce fire risk.

Desired state: *High-quality and comprehensive plans have been developed with an overview of silvicultural and cultivation measures, whereby a well-coordinated forest management system contributes to the reduction of fire risk through comprehensive fire prevention, regeneration, and management. Forest owners have prioritized long-term sustainability alongside economic interests, supported by strong regulatory oversight and clear incentives*

Gap 2.4 Insufficient number of voluntary firefighting organizations

Despite being clearly defined in the law, volunteer fire brigades in Montenegro are not yet fully recognized, leaving room for further development of both their human and material capacities. These volunteer associations play a crucial role in fire suppression, particularly in rural and remote areas where professional firefighting resources are scarce. To facilitate citizen participation in the protection and rescue of people and property endangered by emergencies, companies, entrepreneurs, and other legal entities are permitted to organize voluntary units. However, with only 10 volunteer fire brigades across the country, the current number is insufficient to meet the state's needs. The situation is further compounded by the uneven distribution of these brigades, which diminishes the overall efficiency of the firefighting system.

One primary cause is the lack of financial resources and incentives to support and sustain voluntary organizations, making it difficult for them to recruit, train, and retain members. Additionally, there may be limited public awareness of the importance and role of voluntary firefighting groups, which can lead to insufficient community engagement and participation.

Another contributing factor could be inadequate training and equipment, as voluntary organizations may struggle to access the resources needed for effective firefighting and operational readiness. Furthermore, weak institutional support and a lack of coordination with professional firefighting agencies can hinder the growth and effectiveness of these organizations, leading to reduced functionality and impact. Finally, social and demographic factors, such as declining volunteerism in general or the lack of incentives for individuals to dedicate time and effort to firefighting, could also contribute to the insufficient number of active and functional voluntary firefighting organizations.

Desired state: *A well-established and widely recognized network of volunteer fire brigades across Montenegro, with adequate human and material resources to effectively support fire suppression efforts, especially in rural and remote areas, has been achieved. Volunteer fire brigades are evenly distributed throughout the country, ensuring efficient and timely response to emergencies.*

Gap 2.5 Insufficient development of fire-resilient heterogeneous re/afforestation

The current practice of establishing new forest plantings is based on afforestation with conifer species, leading to the widespread creation of monocultures that are both fire-sensitive and ecologically unstable. This approach, driven largely by economic factors, has resulted in the expansion of forests with limited biodiversity. Consequently, the resilience of these forest complexes is significantly reduced, making them more vulnerable to catastrophic fires.

Another contributing factor is the lack of awareness or understanding among forest managers and decision-makers regarding the ecological benefits of biodiversity and the role of heterogeneous stands in fire prevention. Without recognition of these benefits, there is little incentive to diversify forest plantings.

Additionally, historical forest management practices may have reinforced monoculture planting as the norm, with limited evolution in the approach to forest management. This can result in a lack of technical knowledge or experience in creating and managing heterogeneous, fire-resistant forest systems.

Inadequate policies and regulations could also be a root cause, where there may be insufficient incentives or regulations that promote biodiversity in forest management. If policies prioritize economic returns over ecological sustainability, monoculture planting continues to dominate.

Desired state: *Greater participation of broadleaved species and mixed forest stands has been achieved, creating a diverse and ecologically stable forests and landscapes, where forest plantings are characterized by heterogeneous stands of both coniferous and deciduous species with adequate silvicultural measures ensuring greater fire-resilience.*

Gap 2.6 Absence of a national-level fuel map

In Montenegro, there is an absence of a national-level fuel map that shows the distribution of fuel models across the country or a region. This is a significant gap in the landscape fire management that has far-reaching implications for landscape fire prevention, preparedness, suppression, and postfire management. Fuel maps provide critical information about the distribution of the fuel models and their characteristics. This improves the decision-making process, helps evaluate and manage fire-hazard levels and the overall risk assessment and fire danger rating. The main root causes for this gap could include insufficient data collection and analysis on fire-prone vegetation types and fuels, leading to a lack of comprehensive and up-to-date information. Limited resources and/or technical expertise may hinder the creation and maintenance of a national-level fuel map. So that is also a part of this gap. Additionally, fragmented approaches to land and fire management across different regions or jurisdictions could lead to inconsistent mapping efforts, further complicating the development of a unified, nationwide fuel map. That is why a unified methodology for fuel sampling and mapping must be adopted. The fuel mapping efforts may also come across a challenge of lack of prioritization as a national policy, with other fire management needs taking precedence. Lastly, inadequate coordination between agencies responsible for environmental monitoring, land management, and fire suppression could result in missed opportunities to gather and integrate fuel data for landscape fire management, each in their own jurisdiction.

Desired state: *A comprehensive (and kept up to date) national-level fuel map that accurately identifies and categorizes all present fuel types and fuel models across the country has been established.*

Gap 2.7 Lack of landscape fire management (LFM) knowledge among farmers

Farmers in Montenegro do not possess knowledge and education about the harmful effects of burning agricultural remains, pastures and meadows on the quality and fertility of their land, as well as on the environment.

One primary cause is the lack of targeted education and training programmes on landscape fire management for farmers. Without adequate educational resources or training opportunities, farmers may not be aware of the risks, strategies, or best practices for fire prevention and management in their areas.

Another root cause could be limited access to relevant information or resources. Farmers may not have easy access to updated fire management guidelines, manuals, or tools, making it difficult for them to stay informed about the latest practices and techniques.

Additionally, lack of institutional support or awareness from government agencies or local authorities could contribute to this gap. If landscape fire management is not prioritized in agricultural policy or local development plans, farmers may not receive the support or encouragement to engage with fire management practices.

Cultural or traditional attitudes could also play a role. In some regions, farming practices may have been passed down through generations without integrating modern fire prevention strategies, and there may be a reluctance to adopt new methods that are perceived as unnecessary or too complex.

Finally, financial constraints could prevent farmers from investing in fire prevention measures or attending fire management training programmes. Without sufficient financial resources, farmers may be less likely to prioritize fire management over immediate agricultural needs.

Desired state: *A well-informed farming community with a strong understanding of landscape fire management has been achieved, where farmers are "equipped" with the knowledge and tools to effectively prevent, manage, and mitigate fire risks in their landscapes.*

Gap 2.8 Inefficiencies of the public procurement system

This gap arises from the current public procurement system, which creates significant challenges in meeting the financial needs for landscape fire risk reduction activities. The system's complexity and inefficiencies lead to delays and obstacles in securing necessary funds, resulting in a "bottleneck" that limits the timely implementation of fire risk mitigation measures. These activities are currently financed through a mix of state and local budgets, the Protection and Rescue Fund, and EU-funded international projects, but the existing procurement framework complicates the efficient allocation and use of these resources.

One key issue is the complexity and bureaucratic nature of the public procurement system, which often involves lengthy procedures, extensive documentation requirements, and rigid processes that slow down the allocation of funds for urgent fire risk reduction activities.

Another root cause could be the insufficient coordination between funding sources. The reliance on multiple funding channels—such as state and local budgets, the Protection and Rescue Fund, and EU funds—can lead to fragmented financial planning and delays.

Additionally, inadequate flexibility in the procurement system may limit its ability to adapt to the specific needs of fire risk reduction activities. The system may be more geared towards standard projects, rather than addressing the urgent and often dynamic nature of landscape fire management, making it harder to implement necessary measures quickly.

Limited capacity and expertise in procurement management within relevant institutions may also contribute to the issue. If those responsible for managing the procurement processes lack the necessary skills or experience, it can further slow down the process and prevent the efficient allocation of funds for critical fire prevention and mitigation efforts.

Finally, political or institutional inertia might play a role, where existing procurement regulations and practices are resistant to change, even in the face of evolving needs for fire management. This stagnation can prevent the public procurement system from being optimized to better support landscape fire risk reduction activities.

Desired state: *An efficient and streamlined public procurement system that facilitates the timely allocation and use of funds for landscape fire risk reduction activities has been established. A system that proves to be flexible, responsive, and well-coordinated, ensuring that financial resources from various sources—such as state and local budgets, the Protection and Rescue Fund, and EU funds—are quickly mobilized and effectively utilized. Procurement processes have been simplified, made transparent, and adapted to the specific needs of fire management, enabling rapid implementation of risk mitigation measures.*

1.3. SUPPRESSION

When fire prevention fails, the process of suppression begins. The fire suppression phase focuses on the localization and extinguishing of fires and utilizing different techniques, minimizing LF's harmful impacts. At this stage, the readiness of the existing emergency response system becomes evident, with coordination and rapid action being crucial for effectively controlling the fire and mitigating its consequences. The suppression or extinguishing phase is the moment in which the success of the entire prevention and preparedness process is measured, which means that without prior planning, preventive and preparatory measures and activities, the control phase will not be successful. This includes deploying all resources to control and contain landscape fires and providing assistance to affected communities. Coordinated and rapid responses are the main prerequisite for effective control and control of the landscape fires.

Table 3. *The main gaps identified at the suppression stage*

Gap 3.1 Limited access to water sources for aerial LF suppression

Currently, there is no adequate database on water sources nor a database for specific supply points for helicopter units with adequate infrastructure. For the purpose of using aerial units, it is essential that sources are infrastructurally secured and that a protocol is established for effective coordination between air and ground fire-fighting units during the aircraft water loading process.

The root causes for this gap can be traced to several factors. One key issue is the lack of a comprehensive database on water sources, which makes it difficult to identify and manage the available water resources for firefighting purposes.

Additionally, there is a lack of specific databases for refuelling points for air-helicopter units, which are critical for rapid response in firefighting efforts. Without clearly mapped refuelling points and the necessary firefighting infrastructure, aerial units may face delays or difficulties when attempting to refill with water, reducing their effectiveness during high-intensity fire operations.

Another cause is the insufficient infrastructural preparedness of water sources. For aviation units to be effective, water sources must be secured with the necessary infrastructure to support fast and efficient refuelling. The lack of these facilities at strategic locations increases the response time and limits the utility of aerial firefighting resources.

Finally, there is a lack of a coordinated protocol between ground and aerial firefighting units when it comes to filling aircraft with water. Without an established system for effective communication and coordination, operational efficiency is compromised, leading to delays in water access and potentially leaving firefighting efforts under-resourced during critical moments.

Desired state: *All suitable water resources for LF suppression* ***are mapped out*** *at the national level, ensuring continuous monitoring of water supply points, water levels, and entry/access points for water collection and replenishment for aircrafts (scooping/dipping). In addition, an appropriate information system* ***has been established****, with all the necessary infrastructure and equipment for rapid aircraft replenishment, ensuring maximum efficiency during the suppression phase.*

Gap 3.2 Lack of specialized vehicles and equipment for LF suppression

In practice, the competent institutions are not able to fully implement the regulations and strategic planning documents, due to insufficient technical equipment and lack of financial resources.

One of the primary reasons is the lack of sufficient funding and investment in firefighting technology and equipment. Many firefighting agencies face budget constraints, which prevent them from regularly updating or replacing outdated tools.

In addition, slow procurement processes within the public sector can hinder the timely acquisition of modern technology. Bureaucratic inefficiencies and lengthy approval procedures often delay the replacement or upgrade of outdated equipment.

Inadequate training on new technologies can also be a significant barrier. Even if modern equipment is available, without proper training for firefighting personnel, the equipment may not be utilized to its full potential. This is especially true when it comes to the maintenance in general and maintenance of equipment.

Another contributing factor is the lack of research and development in the firefighting sector. Firefighting agencies may not be actively involved in innovations or the development of advanced tools and technologies, leaving them to rely on older, less effective equipment.

Desired state: *Fully modernized firefighting units with advanced and up-to-date vehicles and equipment have been achieved.*

1.4 POSTFIRE MANAGEMENT

Recovery and restoration of fire-affected areas are equally important for the recovery of ecosystems, minimizing erosion and reducing the risk of future fires. Fire management includes a variety of rehabilitation programmes and techniques, monitoring strategies, and community involvement. This phase usually involves a series of activities aimed at restoring ecosystems, mitigating after fire hazards, supporting community recovery and minimizing the risk of future fires at the area level.

This stage includes the following:

✓ **Assessment and monitoring**

Conducting assessments to determine the extent of damage to ecosystems, infrastructure and the community, as well as monitoring environmental conditions and post-fire recovery processes.

✓ **Hazard mitigation:**

Identifying and mitigating hazards after fires, such as soil erosion, landslides, floods as well as implementing measures to control erosion, lay sedimentary barriers and stabilize slopes.

✓ **Restoration:**

Measures and activities related to the restoration of burned areas by afforestation and treatment of burned areas.

✓ **Removal of burnt wood mass:**

Due to the high risk of the appearance of harmful insects after burning the earth, they are treated or removed for a certain period of time.

✓ **Recovery of infrastructure**

Repair and restoration of fire-damaged infrastructure, including roads, bridges, utility lines and buildings, to facilitate the recovery of affected communities and support economic recovery.

Fire management is an integral part of LFM and aims to facilitate the recovery and resilience of ecosystems, communities and areas after the fire. By implementing more effective post-fire management strategies, participants can reduce the long-term negative effects of fires and promote sustainable land management practices in fire-affected areas.

Table 4. *The main gaps identified at the post-fire management stage*

Gap 4.1 Lack of adequate methodology for assessing damage after landscape fires

The damage caused by landscape fires is both extensive and long-lasting. To effectively implement remediation measures and determine the scope of recovery, it is essential to have adequate data on all types of damage incurred during fires. The quality of this data directly affects the pace and effectiveness of ecosystem restoration and the recovery of affected communities.

One significant cause is the lack of standardized frameworks or guidelines for damage assessment in the aftermath of landscape fires. Without a unified methodology, damage assessments may be inconsistent, incomplete, or inaccurate, hindering the ability to properly evaluate the full extent of the damage and to prioritize recovery efforts.

Another cause is insufficient collaboration between relevant institutions. Damage assessments often require input from various sectors, including forestry, environmental protection, agriculture, and local government. However, if these institutions do not work together effectively, the necessary data may not be gathered, and assessments may lack comprehensiveness.

Additionally, there may be limited capacity or expertise in damage assessment, with personnel lacking the training or tools needed to evaluate the environmental, economic, and social impacts of landscape fires. This lack of capacity can lead to delays in damage reporting and an inadequate understanding of the long-term consequences of the fire.

The absence of data collection systems or up-to-date databases for tracking environmental and forest conditions before and after a fire can also hinder accurate assessments.

Lastly, insufficient funding for research and the development of damage assessment methodologies can be a key barrier.

Together, these root causes contribute to the lack of an adequate methodology for assessing damage after landscape fires, which in turn impedes effective recovery and restoration efforts.

Desired state: *A standardized methodology for assessing all types of damage caused by landscape fires, ensuring the collection of accurate, reliable data, has been established and used by practitioners.*

Gap 4.2 Lack of scientific research on the management of landscape fires and burnt areas

Scientific research should bring together different types of experts, assess the effects of fires, monitor the trajectories of ecosystem restoration and evaluate the effectiveness of fire restoration techniques.

One cause for this gap is insufficient funding for research. Landscape fire management and the restoration of burnt areas may not be seen as a high priority for government or research institutions, leading to limited financial resources allocated to scientific studies in this field. This lack of investment in research hinders the development of new knowledge, techniques, and technologies for managing fires and post-fire recovery.

Another root cause is the lack of interdisciplinary collaboration. Landscape fire management often involves a range of disciplines, including ecology, forestry, environmental science, and climate studies.

Limited access to data can also be a contributing factor. In many regions, there may be insufficient data on fire behaviour, the impacts of fires on ecosystems, or the effectiveness of different fire management strategies.

Additionally, political and institutional barriers can prevent scientific research from being prioritized. Fire management might not be integrated into broader national or regional research agendas, particularly if it is not viewed as a central concern in policy discussions. As a result, landscape fire management may not receive the attention or resources needed for scientific investigation.

Finally, lack of trained researchers or experts in the specific field of landscape fire management and post-fire restoration can further contribute to the gap. If there is a shortage of experts or specialized academic programmes, the necessary research may not be conducted or may not keep pace with evolving challenges related to fire management.

Desired state: *Continuous scientific research dedicated to proper post-fire management, supported by adequate funding, interdisciplinary collaboration, and comprehensive data collection has been established. This research has driven the development of effective and evidence-based LFM.*

Gap 4.3 Lack of systemic post-fire analysis and record keeping of previous landscape fires

The gap arises from the absence of a structured approach to analysing past landscape fires and learning from those incidents. As a result, valuable lessons are often not documented or integrated into fire management practices, causing repeated mistakes and vulnerabilities in subsequent fire management efforts. This lack of reflection and adaptation leads to inefficiencies and missed opportunities for improving fire prevention and response strategies.

One root cause is the lack of institutional processes or frameworks for conducting post-incident analyses. Without a formalized system in place to review and assess previous fires, critical lessons may not be identified or shared among relevant stakeholders.

Another potential cause is insufficient communication and coordination between firefighting agencies, government bodies, and other involved parties.

Additionally, there may be limited resources or time constraints that prevent thorough evaluations of past fires. When fire-responsible institutions are focused on immediate operational challenges, there may be little capacity to invest in detailed analyses of past incidents or implement necessary changes.

Desired state: *A structured system for reviewing and analysing post-fire incidents has been implemented to identify root causes, lessons learned, and best practices. Mechanisms for sharing these insights across relevant agencies and stakeholders have been put in place to improve fire prevention, preparedness, and landscape fire suppression efficiency.*

2. IMPLEMENTATION FRAMEWORK

Considering the complexity of the approach, and the broad range of objectives within the LFM programme, it is clear that the implementation framework should be comprehensive. It should account for all the factors and challenges involved in fire management at the landscape level. The implementation framework should demonstrate the synergy between the identified deficiencies and assigning responsibility while also outlining specific, time-bound measures with the estimation of implementation costs. Since the GAP analysis is forward looking, focused on overcoming current system weaknesses to enhance future performance, it is essential to develop a high-quality, effective action plan. This plan should be designed to achieve the desired goals with a strong emphasis on prevention, preparedness, suppression, and post-fire management.

The implementation framework emphasizes the importance of cooperation between government agencies, emergency services, communities. In this way, the following objectives of the implementation framework are to be achieved:

- Increase the country's resilience to landscape fires
- Reduce impact on ecosystems and communities
- Promotion of sustainable land management practices
- Encouragement of effective spatial planning practices
- Development of an effective fire management system based on the principles and approach of landscape fire management

The table with the implementation framework shows all measures set by priority level to the following groups:

1) Priority I: these are the most urgent and critical measures that need to be addressed first.
2) Priority II: important actions following the initiation or completion of priority measures.
3) Priority III: measures that can be implemented at a later stage or after the higher priority measures have already been addressed.

This implementation framework includes the following actors:

- Ministry Agriculture, Forestry and Water Management (MAFW)
- Ministry Internal Affairs (MIA)
- Ministry of Ecology, Sustainable Development and Northern Development (MESDND)
- Ministry of Tourism (MT)
- Ministry of Finance (MF)
- Ministry of Justice (MJ)
- Forest Administration (FA)
- Protection and Rescue Directorate (DPR)
- Statistical Office of Montenegro (MONSTAT)
- Institute of Hydrometeorology and Seismology (IHS)
- Real Estate Administration (REA)

- The North Atlantic Alliance (NATO)
- Non-Government Organization (NGO)
- National Parks (NP)
- Farmer's Association (FA)
- Association of Olive Growers (AOG)
- Community of Municipalities (CM)
- State Administration Bodies (SAB)
- State Inspection (SI)
- University of Montenegro (UM)

IMPLEMENTATION FRAMEWORK

Priority I

Priority II

Priority III

No.	GAP IDENTIFIED	IMPLEMENTATION PERIOD	MEASURES-ACTIONS TO BE TAKEN	RESPONSIBLE INSTITUTIONS	BUDGET (EUR)
1			PREVENTION		
1.1	Inconsistent existing legislature for Landscape Fire Management (LFM)	Up to 5 years	1.1.1 Review of the current legislature 1.1.2 Adaptation of current legislature (LFM-wise)	Government of Montenegro, Ministries	/
1.2	Lack of public awareness of the Landscape Fire Management (LFM)	Up to 1 year	1.2.1. Development and implementation of a comprehensive plan for a long-term LFM campaign	Ministries, Media, MIA – DPR, VFU, the Scientific community, Media	50,000
1.3	Absence of LFM principles in the education system	Up to 1 year	1.3.1. Introduction of LFM in primary and secondary education 1.3.2. Preparation of educational materials for primary and secondary education	Ministries, SAB Municipalities, Media	20,000

1.4.	Absence of national landscape fire risk map	Up to 5 years	1.4.1 Adopting of a National methodology for the creation of LF risk map 1.4.2. Creation of a national LF risk map	Government of Montenegro, IHS, MAFW, MFHG, REA	30,000 300,000
1.5	THE INADEQUATE WASTE MANAGEMENT SYSTEM: UNDERMINING LANDSCAPE FIRE PREVENTION AND RISK MITIGATION	Up to 5 years	1.5.1 Preparation of a national waste management system, taking LFM into consideration 1.5.2 Conducting public awareness-raising campaigns	MTESDDN, MAFW, Municipalities, SI	50,000 30,000
1.6	Inadequate implementation of the existing Strategy for the Development of Agriculture and Rural Areas	More than 5 years	1.6.1. Analysis of weaknesses in implementation of the existing strategy for the development of agriculture and rural areas 1.6.2 Increase of the budget: in support of livestock production; development of rural infrastructure; Creation of employment opportunities; development of agriculture and tourism	Government of Montenegro, EUF, Municipalities, MAFW	10,000,000 EUR
2			PREPAREDNNESS		
2.1	Insufficient number of specially trained forces for LF suppression	Up to 5 years	2.1.1. Establishing a national LF training centre 2.1.2 Preparation of programmes and training materials for LFM	MIA – DPR Municipalities	1,000.000
2.2	Inadequate infrastructure that hinders the access to high-risk LF areas	Up to 1 year	2.2.1. Development of a methodology for the construction of roads in line with LFM principles 2.2.2 Development of a plan for building a network of roads in accordance with LFM Principles	Government of Montenegro, MAFW, MFHG	According to 2.2.2

2.3	Insufficient inclusion of LFM principles in the state and private owned forests (including fire risk reduction)	More than 1 years	2.3.1 Analysis of current state, requirements and recommendations 2.3.2 Development of forest management plans and implementation of forest management practices in line with the LFM principles/ approach (including fire risk reduction)	Government of Montenegro, MAFW, MFHG	50,000 /
2.4	Insufficient number of voluntary firefighting organizations	Up to 5 years	2.4.1. Establish financial funds, and support to establish and sustain voluntary firefighting associations and their activities. 2.4.2 Implementation of public awareness raising campaigns on the importance of voluntary firefighting	Government of Montenegro, EUF, Municipalities, MIA-DPR	/ 50,000
2.5	Insufficient building of fire-resilient heterogeneous re/ afforestation	Up to 5 years	Development of a National plan for a/reforestation with LFM approach included	MAFW, FA, SI,	50,000
2.6	Absence of national-level fuel map	Up to 5 years	2.6.1. Developing a national fuel classification 2.6.2. Developing a fuel mapping methodology 2.6.3. Preparation fuel map of the national level	MAFW, FA, DPR, NP, UM, Science institutions	1. 20,000 2. 40,000 3. 300,000
2.7	Lack of knowledge about landscape fire management (LFM) among farmers	More than 1 year	2.7.1 Development of a programme for improving farmers' knowledge of LFM, with a special focus on the management of agricultural and rural lands 2.7.2 Organisation of trainings in line with the programme (2.7.1)	Science institutions, UM, DPR	30,000 50,000

2.8	Inefficiencies in the public procurement system	Up to 5 years	2.8.1 Analysis of the current state and carrying out recommendations	Government of Montenegro, MF, MIA-DPR, CTPR	20,000
3			SUPRESSION		
3.1	Limited access to water sources for aerial firefighting	Up to 5 years	3.1.1. Mapping of all suitable water resources at the national level 3.1.2 Permanent monitoring of their state	Ministries, CTPR, MIA-DPR	100,000 100,000
3.2	Lack of specialized vehicles and equipment for LF suppression	More than 1 year	3.2.1 Analysis of current state and requirements 3.2.2 Procurement of specialized vehicles for LF Suppression	MIA – DPR, MF, Municipalities, FU	50,000 600,000
4			POST-FIRE MANAGEMENT		
4.1	Lack of adequate methodology for assessing damage after landscape fires	Up to 5 years	Development of an adequate post-fire assessment methodology	Ministries, Municipalities, MONSTAT, FU; CTPR, SAB	40,000
4.2	Lack of scientific research on the management of landscape fires and burned areas	Up to 5 years	Establishing grant programmes, research fellowships, and competitive funding opportunities to incentivize researchers to pursue studies in this field.	Government of Montenegro, Ministries, UM, RI	500,000
4.3	Lack of systemic post-fire analysis and record keeping of previous landscape fires	More than 1 year	4.3.1 Developing legal regulations for mandatory post-fire incidents analysis 4.3.2 Creation of a dedicated service specifically focused on LF investigation and forensics, tasked with determining the cause, origin, and spread of landscape fires through scientific analysis and evidence collection 4.3.3 Forestry management to carry out post-fire analysis (LFM principles included), drawing conclusions and lessons learnt for future improvements of the service/system.	CTPR, DPR	4.3.2) 300,000 EUR

3. MONITORING AND EVALUATION

The monitoring and evaluation framework serves as a fundamental tool to monitor progress and ensure the effective implementation of the identified measures to address the shortcomings in the fire management system in the landscape of Montenegro. This systematic approach allows for a continuous assessment of achievements, challenges and necessary adjustments throughout the implementation process. In addition, such analysis ensures an appropriate level of implementation of the proposed measures in the implementation framework within the planned timeframe.

The monitoring process includes the following:

✓ **Competent authority**

The Ministry of Agriculture, Forestry, and Water Management (MAFW) is responsible for all monitoring and evaluation activities, including developing monitoring indicators, to ensure that the implementation process is in line with the strategic objectives set out in this document. In addition to the MAFW, the competent authority includes CTPR, DPR, NP and FA.

✓ **Frequency of meetings**

Two meetings per year are planned to assess the implementation process. One meeting is planned before the fire season, and the other after the fire season has ended. These meetings offer valuable insight into the progress of planned activities, enable stakeholders to discuss key performance indicators, analyses challenges and identify areas that need require adjustment or additional support.

✓ **Evaluation framework**

Once the evaluation goals are clearly defined, the assessment focuses on efficiency, effectiveness, impact and sustainability of the project. A comprehensive and high-quality level of evaluation is ensured by the participation, through a participatory process, involving all stakeholders, state and state administration bodies, local self-governments, the non-governmental sector, the scientific community, international partners. This collaborative approach ensures thorough analyses and data collection, which form the basis for providing further recommendations and guidelines for the implementation of planned measures.

The evaluation framework uses three sets of key performance indicators:

1. Implementation progress indicators: They monitor the rate of completion of planned activities, adherence to deadlines and efficient use of allocated budgets.
2. Efficiency measures: These assess how effectively implemented measures achieve the desired outcomes and contribute to the desired conditions identified in the gap analysis.
3. Sustainability indicators: These evaluate the long-term sustainability of the implemented measures and their integration into existing systems.

CONTINUOUS IMPROVEMENT

The actions taken in the framework of the gap analysis will be periodically reviewed and updated, based on the above-mentioned monitoring and evaluation activities in order to maintain relevance to new challenges.