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REPORT

Co-operation in North-west Azerbaijan and Eastern Georgia

Scoping study on addressing shared climate-related security challenges and strengthening resilience in the South Caucasus through fire risk reduction

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Scoping study on addressing shared climate-related security challenges and strengthening resilience in the South Caucasus through fire risk reduction

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Executive summary

Fires pose a major risk to the landscape of the South Caucasus region. With climate change, this risk is likely to increase as temperatures become warmer, precipitation levels change, and heatwaves and droughts become more frequent and intense – conditions that are conducive to the occurrence and spread of fires. Uncontrolled and undesired fires pose environmental, economic, social and health risks, and therefore undermine human and livelihood security. Given that these risks are likely to be shared by communities across multiple jurisdictions in border regions, co-operation is crucial for addressing the risks in a holistic and sustainable manner.

Scoping study and methodology

This scoping study aims to assess the current context of landscape fire management and wildfire risk reduction in two pilot municipalities[1]: Dedoplistskaro in Georgia and Zagatala in Azerbaijan. On the basis of this assessment, it then collects and develops ideas for co-operation activities between the two pilot municipalities, and identifies what is required to ensure their success. These activities will contribute to the overall objective of promoting climate resilience and reducing climate-related security risks through joint landscape fire management and wildfire risk reduction in North-west Azerbaijan and Eastern Georgia.

The study builds on the findings of the OSCE-adelphi report "Regional Consultation for the South Caucasus" and follow-up consultations for Azerbaijan and Georgia, which identified disaster risk reduction (DRR) as a top priority for transboundary co-operation on addressing climate-related security risks in the region. It draws heavily on insights from follow-up stakeholder consultations, which took place through online and physical meetings and interviews and were instrumental in narrowing the focus down to the priority actions areas of landscape fire management and wildfire risk reduction within the broader scope of DRR. Additional desk research supplemented the preparation of the study.

Context analysis

During the consultation process, stakeholders outlined the following challenges to landscape fire management, wildfire risk reduction, and transboundary co-operation in the context of Dedoplistskaro and Zagatala:

- **Communication and exchange between the countries exist, but there is room for improvement;**
- **Climate change and geographic conditions such as sloping terrains make fires more intense, severe and difficult to respond to and control;**
- **Early warning and response must be improved and expanded. Given that human and financial resources are limited, regional fire danger rating / early warning systems should be tested with a view to application between the countries.**

Stakeholders also noted the following opportunities:

- **Awareness-raising activities have been shown to bring noticeable positive impacts;**

[1] While local administrative units are called "municipalities" in Georgia, the equivalent administrative unit level in Zagatala would be "district". However, for simplicity's sake, in cases where both types of administrative units are mentioned in the same context, the term "municipalities" will be used.

- **A region-wide early warning approach could be put in place;**
- **Biodiversity protection harbours co-benefits for fire prevention and response.**

A number of internationally funded projects and local and national-level initiatives in Azerbaijan and Georgia have contributed to different aspects of landscape fire management and DRR. These projects partly address the fire-related security risks and challenges faced by Dedoplistskaro and Zagatala. However, on the basis of the findings from expert consultations conducted in the framework of this report, the extent of co-operation on landscape fire management and wildfire risk reduction still has scope for improvement and expansion, both between the municipalities and between Azerbaijan and Georgia at the national level.

Ideas for co-operation activities

To enhance co-operation, the consultation process generated several ideas for co-operation activities for both Dedoplistskaro and Zagatala.

Municipal-level prevention and response: Activities could include training, the engagement of women and youth and awareness-raising. Harnessing volunteer firefighters is crucial to address gaps in personnel, particularly in remote and rural areas in the two countries. Volunteers play an important role in patrolling and warning, in raising awareness among local populations and tourists and ultimately in supporting with firefighting efforts. As key community actors, women also have an important role to play in wildfire prevention and awareness-raising. Finally, it is necessary to address misconceptions regarding the use of fires in agriculture.

National-level co-ordination: The establishment of a co-operation framework at the national level in both countries would be an important step towards enhancing co-ordination across municipalities, sectors and borders. Relevant agencies could combine efforts to co-ordinate on regulatory frameworks around issues such as standards for volunteer firefighters or post-harvest burning practices, with ministries providing equipment and dealing with dissemination, exchange of risk information and best practices, and early warning. Co-ordination efforts such as these within and between countries should be institutionalized, rather than occurring just in the aftermath of a disaster. Finally, the establishment and strengthening of early warnings systems tailored to the needs of different groups should be explored, potentially also including other countries in the region.

Biodiversity protection: In both countries, there is a growing interest, especially within the Ministry of Environmental Protection and Agriculture (Georgia) and the Ministry of Ecology and Natural Resources (Azerbaijan), in leveraging biodiversity protection measures for wildfire and forest fire prevention and response, as they bring many co-benefits. In terms of prevention, limiting and restricting the entrance of visitors to natural and protected areas can help safeguard sensitive ecosystems from fires caused by touristic activity. On the response side, the availability of water reservoirs can greatly reduce response times, which in turn helps reduce fire risk. Reservoirs also benefit wildlife by offering water to animals, particularly during the dry seasons.

The results of this study will serve to inform a joint co-operation strategy and implementation plan to address the identified challenges related to landscape fire management and wildfire risk reduction in the two pilot municipalities of Dedoplistskaro and Zagatala. These will subsequently be narrowed down into specific co-operation activities, to be implemented by local partners and actors. At a later stage, a pilot project will be implemented together with local partners and actors who will also be engaged as the main stakeholder group for future activities. Overall, the proposed activities aim to reduce climate-related security risks and promote climate resilience in North-west Azerbaijan and Eastern Georgia.

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List of Abbreviations

BMZ	Federal Ministry for Economic Cooperation and Development (Germany)
CENN	Caucasus Environmental Non-Governmental Organizations Network
CSO	civil society organization
DG ECHO	Directorate-General for European Civil Protection and Humanitarian Aid Operations
DRR	disaster risk reduction
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GEF	Global Environment Facility
GFMC	Global Fire Monitoring Center
GEO	Georgia's Environmental Outlook
ha	hectare
IRCCR	improved resilience of communities to climate risks
MODEX	Module Exercises
MoU	Memorandum of Understanding
NACRES	Centre for Biodiversity Conservation & Research
NEAP-4	Fourth National Environmental Action Program of Georgia for 2022-2026
OSCE	Organization for Security and Co-operation in Europe
PPRD	Prevention, Preparedness and Response to Disasters
RCP	Representative Concentration Pathway
REC	Regional Environmental Centre for the Caucasus
RFMC	Regional Fire Monitoring Center for South-Eastern Europe and Caucasus
SDC	Swiss Agency for Development and Cooperation
SIDA	Swedish International Development Cooperation Agency
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
VIIRS	Visible Infrared Imaging Radiometer Suite
VPAs	Vashlovani Protected Areas

1 Introduction

Fires pose a major risk to the cultural and natural landscapes of the South Caucasus. Historically and recently, the majority of fires in the region have been caused by human activities, particularly in the context of agricultural and pastoral land use. With climate change, the frequency, intensity and severity of fires could increase as temperatures become warmer, precipitation levels change, and heatwaves and droughts become more frequent and intense – conditions that are conducive to the occurrence and spread of fires.

Uncontrolled and undesired fires – in the following referred to as "wildfires" – often pose environmental, economic, social and health risks and therefore undermine human security. The land degradation caused by wildfires, in turn, can compound the risks of landslides, mudflows and floods, affecting the livelihoods and food security of people, especially those who are already marginalized. Knowing where wildfire may have disproportionate impacts can help in efforts to shape adaptation measures accordingly, and in a conflict-sensitive way (Eriksen, 2013). Moreover, in order to cope with these pressures, people may revert to maladaptation practices which can further endanger the fragile environment, such as illegal logging, or take up criminal activities that exacerbate insecurity, such as drug production or wildlife trade (Rüttinger, Munayer, van Ackern, & Titze, 2022). In situations where these security challenges are shared across multiple jurisdictions, solutions require joint co-operative efforts.

In the South Caucasus, there has been a long-standing history of co-operation with regard to fire management and capacity-building, including activities facilitated by the OSCE in close partnership with the Global Fire Monitoring Center (GFMC). These efforts have included national and regional training courses, workshops, and the development of national fire management policies and strategies, engaging various stakeholders from multiple administrative levels and sectors.

This scoping study aims to assess the current context of transboundary co-operation around landscape fire management and wildfire risk reduction in two pilot municipalities in Azerbaijan and Georgia. On the basis of this assessment, it then collects and develops ideas for co-operation activities between the two pilot municipalities, and identifies what is required to ensure their success. In turn, these activities will contribute to the overall objective of promoting climate resilience and reducing climate-related security risks through joint landscape fire management and wildfire risk reduction in North-west Azerbaijan and Eastern Georgia.

The next two sections include a brief description of the project under which the scoping study was prepared, as well as of the process that went into its preparation. Chapter 2 provides a background on fires and fire management in Azerbaijan and Georgia, followed by an outline of climate projections and security implications, as well as a description of the two selected pilot municipalities. Chapter 3 proceeds with a context analysis, followed by Chapter 4, which outlines ideas for co-operation activities in the area. Chapter 5 provides a stakeholder mapping survey, and Chapter 6 concludes the scoping study.

1.1 Project background

In 2020, the OSCE, in partnership with adelphi, embarked on the extrabudgetary project "Strengthening responses to security risks from climate change in South-Eastern Europe, Eastern Europe, the South Caucasus and Central Asia" (Project Number: 1102151). This project aims to:

1. enhance the understanding of how climate-related security risks impact South-Eastern Europe, South Caucasus, Central Asia and Eastern Europe;
2. increase co-operation among regional stakeholders to jointly address climate-related security risks; and
3. increase awareness and capacities for an integrated approach on climate change and security among main stakeholders.

This scoping study contributes to all of the above aims, with a special focus on the project's second aim in the South Caucasus region.

1.2 Scoping study and process

This study builds on the findings of the OSCE-adelphi report "Regional Consultation for the South Caucasus" for Azerbaijan and Georgia, which identified DRR as one of the top priorities for transboundary co-operation aimed at addressing the climate-related security risks in the region (Rüttinger, van Ackern, & Foong, Regional Consultation for the South Caucasus: Azerbaijan and Georgia: Co-operation opportunities for addressing the security implications of climate change, 2021). In addition, this scoping study draws on insights from the following activities conducted as part of the project:

- **Online consultation process to prioritize topics for co-operation:** Conducted between March and June 2021, the consultation process engaged with Project Focal Points appointed in the two countries and experts from relevant ministries via online meetings, surveys and interviews. Their engagement was essential in narrowing down and prioritizing the topics identified in the regional consultation report. From these discussions, landscape fire management and wildfire risk reduction emerged as priorities within the broader topic of DRR, forming the basis of the scoping study;
- **Expert contributions and consultations to identify pilot municipalities:** A number of municipalities that could serve as pilots for the subsequent phase of the project were identified through preparatory work conducted by local and ministerial experts and through several online meetings and exchanges between March and September 2023. Through this process, the municipalities / local administration of Dedoplistskaro in Georgia and Zagatala in Azerbaijan were selected as pilots for transboundary co-operation on community-based landscape fire management and wildfire risk reduction at the border areas in North-west Azerbaijan and Eastern Georgia;
- **Bilateral workshops:** In October 2023, a consultation took place in Tbilisi to discuss risks, challenges and lessons learnt associated with fires, fire prevention, and firefighting measures; participants included representatives from Azerbaijan's Ministry of Emergency Situations and Ministry of Ecology and Natural Resources, Georgia's Emergency Management Service and Department for Relation with Regions of the Ministry of Environmental Protection and Agriculture, the Municipality of Dedoplistskaro, the GFMC, and Georgia's Environmental Outlook (GEO). During the workshop "Co-operation to strengthen climate resilience through fire risk reduction", participants also outlined potential

activities and measures for co-operation on addressing wildfire risks, building on past and present projects and initiatives in this field;

- **Consultations in pilot municipalities[2]:** In April 2024, representatives from the selected municipalities in Azerbaijan and Georgian participated in consultation meetings in Zagatala and Dedoplistskaro. The meetings aimed at complementing the results of the consultation held in the October 2023 in Tbilisi, particularly focusing on identifying the key challenges for local stakeholders in the area of fire management and response, as well as opportunities for cross-border co-operation;
- **Desk research and further contributions by experts aimed at complementing consultations:** Contributions to the preparation of the scoping study were also made by findings from other relevant projects and studies conducted on fire management in Azerbaijan and Georgia and identified through desk research by the project team and from other expert contributions, and by follow-up meetings with local and national stakeholders.

Looking ahead, this scoping study will serve as the basis for the project's next steps, which include consultations with a broader circle of stakeholders on joint activities, including cross-border co-operation, on landscape fire management and wildfire risk reduction in the pilot municipalities. Its results will inform the development of a strategic framework for co-operation and the implementation of pilot activities. These processes have the ultimate objective of reducing climate-related security risks and promoting climate resilience in North-west Azerbaijan and Eastern Georgia.

Landscape in the Daba village in the municipality of Borjomi, Georgia, after the 2008 wildfires. While the slopes show clear fire damage, the valley shows signs of natural restoration, which should be supported by reforestation efforts. © GFMC

[2] In Zagatala, the consultation was attended by representatives of the municipality, fire station and Regional Forestry Center. In Dedoplistskaro, those attending included representatives of the municipality, local and national forestry agencies, emergency services, the local Rural Development Agency, the Ministry of Environmental Protection and Agriculture, the Agrarian and Environmental Association, the Association for Tourism Development, NGOs such as the Women and Youth Initiative Group and the Association of the Friends of Vashlovani Protected Area, and by community members such as farmers.

2 Background information

This chapter provides an overview of fires and fire management in Azerbaijan and Georgia, followed by an outline of the region's climate projections and their security implications, with a specific focus on fires. In the final section it describes the two selected pilot municipalities: Dedoplistskaro in Georgia and Zagatala in Azerbaijan.

2.1 Fires and fire management in Azerbaijan and Georgia

The South Caucasus region has witnessed several major wildfires in the past decade. For example, in 2014, record temperatures in Azerbaijan during the summer led to droughts and subsequent forest fires, with a total of 58.8 hectares of forests burned, according to the State Statistics Committee (Ministry of Ecology and Natural Resources of Azerbaijan, 2015). In August 2022, severe heat and strong winds burned 5,000 hectares of forest and surrounding land, farms and fields in Zagatala, as well as in the Northern districts of Siyazan, Shabran, Khachmaz and Guba in Azerbaijan. In the same month, forest fires were reported near the village of Kvabishkevi in the Borjomi municipality, Georgia, requiring the mobilization of up to 250 fire rescuers.

However, in general, fires are not a natural part of forest ecosystems in the South Caucasus region. This leaves the ecosystems highly vulnerable to the impacts of fires, particularly in forests that are also affected by pests that cause drying of trees and faster spreading of fires (Ministry of Environmental Protection and Agriculture of Georgia, 2021). Given their slow natural regeneration rates, forest ecosystems are particularly liable to be severely affected by wildfires (Rucevska, 2017).

For the most part, fires in the region have been caused by human activities, driven largely by agricultural and pastoral land use. In the Shiraki Valley in Georgia, for example, agricultural burning practices are common. Fire is still used by farmers to clean post-harvest arable fields because of a lack of machinery and finances for incorporating vegetation residuals into soil. There is also widespread belief among the population that fires will reduce infestations by insects and pathogens on agricultural crops (GFMC, 2015).

Box 1: Definition of fire-related terms

According to the GFMC, two key terms are currently used:

Landscape fire: A fire burning in the vegetation of natural and cultural landscapes, e.g., natural and planted forest, organic terrain (such as peatlands), shrub, grass, pastures, agricultural lands, and peri-urban areas, regardless of ignition sources, damages, or benefits.

Wildfire: Any unplanned or uncontrolled fire in vegetation of natural, cultural, industrial and residential landscapes, which regardless of ignition source may require (i) suppression response, or (ii) other action according to agency policy, e.g., allowing the fire to burn freely as long as it meets land management objectives.

In this scoping study, the term "fire" is used to refer to both wildfires and landscape fires.

Several other factors explain why fires in the region have been damaging. Assessments of environmental and security risks have shown that the extent of damage caused by wildfires can be attributed to limited capacities and effectiveness of fire management agencies and to

the systems designed to deal with fire prevention and response. In Georgia, the abandonment of intensive land cultivation has resulted in a higher availability of unused and combustible vegetation and reduced fragmentation, thereby increasing the risk of fires (GFMC, 2015). Above all, the impacts of climate change are likely to exacerbate these risks further (see Chapter 2.2).

At the same time, however, the region has a long history of co-operation in the field of fire management. In addition to several DRR-related projects[3] involving regional and international organizations, countries have also co-operated at a bilateral level in combating fires. For example, during the 2017 fires in the Borjomi-Kharagauli Nature Reserve in Georgia, Azerbaijan is reported to have sent a helicopter from its Ministry of Emergency Situations to assist in the firefighting operations.

2.2 Climate projections

The risks posed by wildfires are much greater under warmer and drier conditions, which reduce fuel moisture and increase fuel flammability, thereby raising the potential for fire ignitions and spread rates (Rucevska, 2017). In the South Caucasus, average annual temperatures are expected to rise in the coming decades, by at least 1.2°C under a low emissions scenario[4], and by as much as 4.9°C under a high emissions scenario[5] by the end of the century. Along with temperature rise, projections also indicate a growing probability of heatwaves and severe droughts. Precipitation projections, however, are associated with significant levels of uncertainty associated with their estimations (Ministry of Environmental Protection and Agriculture of Georgia, 2021).

Climate change is thus a key driver of concern regarding the risks posed by wildfires in the region. Indeed, severe fire seasons in the past have coincided with prolonged periods of heatwaves and low precipitation (Rucevska, 2017). This was the case in Georgia, where large-scale fires in the Borjomi Gorge in 2017 coincided with a very hot summer and drying of vegetation cover in the same year (Ministry of Environmental Protection and Agriculture of Georgia, 2021). Similarly, droughts are believed to have exacerbated the 2014 forest fires, which damaged 59 hectares of forest across Azerbaijan (Ministry of Ecology and Natural Resources of Azerbaijan, 2015).

It should also be noted that, in turn, fires can accelerate the rate at which climate change is occurring. In particular, the loss of forests as a result of fires can hamper their key functions to act as carbon sinks, while at the same time releasing large amounts of carbon dioxide into the atmosphere, thus affecting the carbon cycle and exacerbating global warming (Clarke, et al., 2022).

2.3 Fire-related security risks

Depending on their magnitude and intensity, wildfires pose direct threats to human health and safety, for example by causing injuries and the potential loss of human life. Smoke particulates can lead to respiratory harm, cardiovascular diseases and neurological disorders,

[3] See chapter 3 and Rüttinger, van Ackern, & Foong, 2021

[4] Based on the Representative Concentration Pathway (RCP) scenario 2.6 for Azerbaijan, with baseline period 1986-2005.

[5] Based on the RCP scenario 8.5 for Georgia, with baseline period 1986-2005.

subsequently increasing the pressure on public health systems (Schwela, Goldammer, Morawska, & Simpson, 1999).

Wildfires can have devastating consequences on livelihoods and socio-economic stability. Wildfires in the South Caucasus region can affect biodiversity and degrade ecosystem services through their impact on plant and animal mortality as well as changes in habitat conditions.

Water catchments are also negatively impacted by wildfires, as increased soil erosion, soil composition and slope instability affect the quantity and quality of water resources over the long term. For communities that are dependent on these natural resources, livelihood security is thus at stake (Goldammer, 2013).

Moreover, wildfires can cause direct damage to constructions and infrastructure, such as those related to energy and power transmission, thereby threatening the provision of essential services. Meanwhile, damage to roads can disrupt transport and supply chains, and the costs resulting from this damage and loss of economic activity can take a toll on the livelihoods and economic well-being of local communities (Ministry of Environmental Protection and Agriculture of Georgia, 2021).

In the context of border regions, the security risks posed by fires and, more broadly, climate change are likely to be shared by communities across multiple jurisdictions, given their geographical and socio-economic interconnectivity. Co-operative landscape fire management and wildfire risk reduction between border communities and respective governments are therefore of paramount importance, as they offer opportunities to address these risks in a holistic and sustainable manner.

2.4 Pilot municipalities

Building on extensive consultations with stakeholders from governmental and local entities, national and international experts, and representatives of civil society, two municipalities were identified as pilots for the subsequent phase of the project. For the selection of the municipalities, factors such as closeness to the Azerbaijan-Georgia border, increasing fire risk and fire incidence, and capacities for cross border cooperation were taken into consideration.

2.4.1 Dedoplistskaro (Georgia)

Kakheti. © Teimuraz Popiashvili

Situated in the Kakheti region in the eastern part of Georgia, Dedoplistskaro hosts the Vashlovani Protected Areas (VPAs), which consist of a nature reserve, a national park and three natural monuments with restricted access to the public. It also hosts the Chachuna and Iori Managed Reserves, which protect the banks of the Iori River. The municipality, mostly located between 500 and 800 metres above sea level, has a dry subtropical climate with hot dry summers and relatively cold winters. The area is prone to severe water shortages in the even of low levels in the Alazani and Iori rivers (UNDP, 2020).

The main economic activity in the Dedoplistskaro municipality is agriculture. The total area of agricultural lands in the municipality is 141,754 ha. Livestock farming is well developed, accounting for about two thirds of the area's agricultural land. Excessive grazing is an acute environmental issue. Other sectors of

economy of the municipality are tourism, mining and processing industries (limestone), trade, and construction.

The municipality hosts three designated Emerald Network sites[6] and has territories with the status of Biosphere Reserve granted by UNESCO. Azerbaijan and Georgia have been co-operating on the reintroduction of Goitered Gazelle in the VPAs. In total, 184 gazelles have been relocated from Azerbaijan and released in the protected area sites of Dedoplistskaro. Forest resources are scarce in the Dedoplistskaro municipality, which is situated in one of Georgia's driest regions. Its total forest area is 1500 hectares, mainly the floodplain and coastal forests (Galland, 2019).

While fires are not common in the municipality, agricultural burning practices are widespread in the Shiraki Valley, sometimes leading to uncontrollable wildfires. Approximately 10,000 hectares of arable land are burned intentionally every year in Dedoplistskaro (GFMC, 2015).

In 2015, fires exacted a tremendous toll on windbreaks. An area of more than 33,490 hectares of arable land was burned (Westerberg, Costa, & Ghambashidze, 2017). According to GlobalForestWatch.org, between 16 November 2020 and 13 November 2023 Dedoplistskaro experienced a total of 142 Visible Infrared Imaging Radiometer Suite (VIIRS) fire alerts.

Climate change is likely to have considerable impacts on water resources, with projections of a 9–14% reduction in streamflow of the Alazani River and a 5–9% reduction in streamflow of the Iori River between 2020-2050, affecting water availability for farming and households.

2.4.2 Zagatala (Azerbaijan)

Zagatala is located in the economic region of Sheki-Zagatala in North-west Azerbaijan, in the Qanikh-Ayrichay valley on the slopes of the Great Caucasus Ridge. The region is rich in natural resources, hosting one of the Caucasus's major ore deposits, and its picturesque natural landscapes make it a tourism hotspot. Besides mining and tourism, agriculture is another major activity in the region, mainly consisting of wheat, tobacco, fruits and vegetables, wine, tea, potatoes, rice and sunflower.

Zagatala. © Lala Azizli/Unsplash

The city of Zagatala is located at 535 metres above sea level; it contains not only plain areas but also dense forests and a mountainous terrain which make fire management and response operations a challenge. It is also home to the Zagatala Nature Reserve, which extends over 28,800 ha in altitudes between 660 and 3,645 metres above sea level. The district shares 80 km of border with Georgia, 73 km of which are covered by forest.

Overall, forest fires have been increasing in the municipality. While 57 VIIRS fire alerts have been recorded between 2013-2017, the following five-year period (2018-2023) saw 92 VIIRS fire alerts. Furthermore, fires were responsible for 13 hectares – 15 per cent – of tree cover loss in Zagatala between 2001 and 2023.

[6] The Emerald Network is an ecological network made up of Areas of Special Conservation Interest. Its implementation was launched by the Council of Europe as part of its work under the Bern Convention. See: https://www.coe.int/en/web/bern-convention/emerald-network

3 Context analysis

This chapter outlines the current situation of both Dedoplistskaro and Zagatala in the context of landscape fire management and wildfire risk reduction, as well as transboundary co-operation around these issues. The first section of the chapter presents the challenges and opportunities for co-operation over wildfire risk reduction at regional and local level. It is followed by an overview of relevant projects funded by international and regional organizations related to fire management and, more broadly, DRR, as well as recent and important initiatives at the local and national levels.

This chapter draws on expert contributions, consultations with ministerial and local stakeholders, including civil society, as well as additional desk research.

3.1 Mapping of challenges and opportunities

Stakeholders from both Azerbaijan and Georgia noted the following challenges for fire management and for co-operation over wildfire risk reduction at regional and local level:

- **Communication and exchange between the countries exists, but there is room for improvement.** While the countries already exchange information in instances where fires occur or there is a risk thereof on a national level, ongoing communication exchange on fire-related issues would make a greater contribution to achieving better and speedier responses. Also, border municipalities could establish additional communication channels to improve and support co-ordination of responses and hence their effectiveness even further. There is also a need to address language barriers between stakeholders in the two countries, for example by using multi-language communication systems, or ones that embed translation technologies;
- **Climate change makes fires more recurrent and, with complex geographic conditions such as sloping terrains, more difficult to control.** Changing weather and precipitation patterns in the South Caucasus have prolonged the duration of the fire season, which used to be only in high summer but more recently has extended over a much larger period between early spring and late autumn. This increases the need for more effective monitoring systems which are able to detect wildfires and forest fires in all seasons. Potential changes in the water flow of the Iori and Alazani rivers, shared by Georgia and Azerbaijan and crucial for use in fire response, are largely unknown owing to the lack of monitoring and data. Meanwhile, pressures including increasing use of water for hydropower plants, irrigation and domestic use combine with climate change to suggest a potential scenario of water shortages in the region in the near future. Also, the predominance of forested, mountainous areas characterized by steep slopes around both municipalities complicates response, as it makes access for fire response more difficult;
- **Early warning and response must be improved and expanded, but human and financial resources are limited.** As early warning systems are costly, it is crucial to work with available resources and look into existing systems in other parts of the world that can be adapted to the context of the South Caucasus region. Also, the potential of local communities has yet to be tapped into, including the increased involvement of women and youth to support fire prevention, monitoring and response. Both countries would profit from recruiting and training of volunteer firefighters – in particular Georgia, where stakeholders pointed out that previous recruitment efforts did not achieve the expected results. In 2016 and 2017 Azerbaijan established volunteer groups in a cross-ministerial effort that included capacity-building on emergency response, technical training on handling equipment, and

awareness-raising activities, including responding to wildfires. In July 2023, Azerbaijan's Ministry of Emergency Situations launched the "Emergency Volunteers" programme, which includes training on fire response.

In addition to challenges, stakeholders also noted the following opportunities for co-operation:

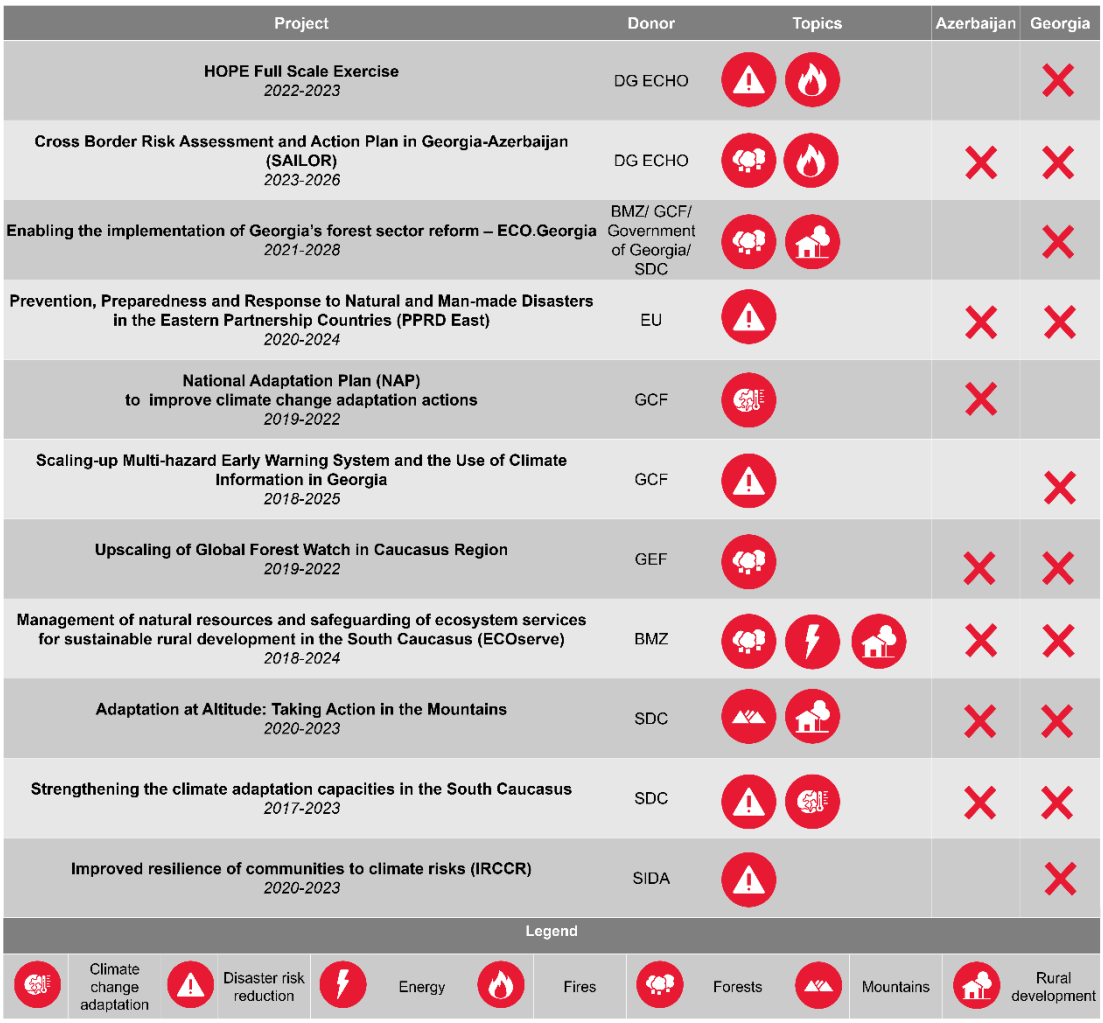
- **Awareness-raising activities have been shown to bring noticeable positive impacts.** In Georgia, alongside more stringent law enforcement, communication campaigns through different media outlets and in various formats targeting the general population are considered to have had a positive impact on fire prevention, since only a small number of fires were observed in the 2023 fire season despite high temperatures and lack of rain. Thousands of multilingual warning signs have been deployed in touristic areas across Azerbaijan and Georgia as well, alerting to the dangers of smoking and lighting fires in forested areas. In both countries, evidence shows that the great majority of wildfires and forest fires can be attributed to human causes such as intentional burning of agricultural waste, accidents and negligence. This indicates that awareness-raising activities have a crucial role to play in preventing fires in the region, and also provide an entry-point for the increased engagement of local communities, with women and youth (including volunteers) as agents of change supporting with dissemination and outreach;
- **A bilateral early warning approach can be put in place.** Currently, countries have their own national-level fire detection systems. Ideally, both countries can share a single or an integrated system that allows for cross-border early warning and information exchange, including documentation of risks and events to help inform prevention measures. The hydrometeorological services from Azerbaijan and Georgia have signed a Memorandum of Understanding (MoU) on the exchange of hydrometeorological and geological information, and already share climate and natural disaster data on an ongoing basis. These efforts would benefit from insights from examples and best practices in developing early warning systems for fire monitoring and response across the world;
- **Biodiversity protection harbours co-benefits for fire prevention and response.** In both countries, biodiversity protection measures and nature-based solutions have been shown to also have positive impacts on fire prevention and response. For example, the creation of natural parks, reserves and protected areas restricts tourist access to sensitive areas, making them less vulnerable to accidental fires, as has been observed in both Azerbaijan and Georgia. While some areas are completely restricted and only allow entrance for scientific purposes, charging entrance fees to unrestricted areas would help limit the flow of visitors and fund firefighting equipment and training for local communities. Additionally, the availability of water reservoirs in border areas can be used both for rapid response to fires on the local level, and for consumption by local wildlife in dry seasons.

3.2 Mapping of projects and initiatives

3.2.1 Internationally funded projects

The most relevant projects funded by international and regional organizations related to fire management and DRR, implemented either in Georgia or in Azerbaijan, or in both countries, are mapped in Figure 1. At the time of writing, these projects are still running or have just been completed in the past 1–1.5 years.

Figure 1: Mapping of key projects and initiatives.



Six projects have a strong focus on DRR in general: (1) the European Union (EU) project "Prevention, Preparedness and Response to Natural and Man-made Disasters in the Eastern Partnership Countries (PPRD East)"; (2) the Green Climate Fund (GCF)-funded project "Scaling-up Multi-hazard Early Warning System and the Use of Climate Information in Georgia"; (3) the Swiss Agency for Development and Cooperation (SDC)-funded project "Strengthening the Climate Adaptation Capacities in the South Caucasus"; (4) the project "Improved resilience of communities to climate risks (IRCCR)", funded by the Swedish International Development Cooperation Agency (SIDA); and (5) the EU-Funded "Cross Border Risk Assessment and Action Plan in Georgia-Azerbaijan" or "SAILOR" project, which gives continuity to the PPRD EAST III Initiative.

Further projects focusing on forests, natural resource management, climate change, rural development and mountains are the Global Environment Facility (GEF)-funded United Nations Environment Programme (UNEP) project "Upscaling of Global Forest Watch in Caucasus Region", the project "Enabling the implementation of Georgia's forest sector reform" or "ECO.Georgia", funded by the German Federal Ministry for Cooperation and Development (BMZ) and GCF, as well as by the Government of Georgia and SDC, the BMZ-funded project "Management of natural resources and safeguarding of ecosystem services for sustainable rural development in the South Caucasus", the project "Mapping Forest Fire Risks in Georgia" funded by the US Forest Service and implemented by NACRES or "ECOserve", and the SDC-funded project "Adaptation at Altitude".

While the majority of the above-mentioned projects encompass elements of DRR, they do not have a specific focus on landscape fire management and wildfire risk reduction. In this regard, the OSCE and GFMC have for many years been engaged in a number of projects and activities that have specifically focused on building national capacities and promoting regional co-operation on fire management in the South Caucasus. Since 2006, the OSCE and GFMC have organized national and regional workshops, seminars and training to enhance capacities and develop policies and strategies on wildfire management across the region.

At the national level, Georgia's Ministry of Environmental Protection and Agriculture is implementing a forestry sector reform, supported by the GCF and BMZ (project ECO, Georgia, see figure 1) and aiming to "mitigate greenhouse gases through improved, nature-based management of the country's forests and improvement of energy efficiency to reduce the demand for fuelwood". In Azerbaijan, a National Forest Program with a Forest Policy Statement and Action Plan for 2015-2030 – prepared by the Ministry of Environment and Natural Resources with the support of other national public institutions, academia, representatives of NGOs and local communities and the Food and Agriculture Organization (FAO) – is currently under way (Minister of Ecology and Natural Resources of Azerbaijan, 2013). The Program aims to harmonize forest management policies into the government policy instruments, promote structural changes, and identify challenges and entry-points for the development of an institutional and legal framework for national forest management.

All in all, it is evident that there have been a number of internationally funded projects that contribute to aspects of landscape fire management and wildfire risk reduction and partly have regional elements. However, on the basis of findings from expert consultations and stakeholder interviews, **bilateral co-operation on fire-related topics and solutions is currently limited, at both national and local levels**. Future measures and activities on landscape fire management and wildfire risk reduction could therefore build on these earlier efforts and utilize the wealth of resources that have been developed from these processes.

Box 2: Shifting the focus from firefighting to creating wildfire-resilient landscapes

In the early to mid-twentieth century, the regional climate, fire-controlling capacities and traditional land use in the South Caucasus supported favourable farming conditions with a limited wildfire risk. However, recurring climate change impacts, coupled with land-use change, are now affecting the region's natural and cultural landscapes. The dwindling of the rural workforce is resulting in unsustainable agricultural land management and abandoned fields, which in turn are becoming increasingly encroached upon by highly flammable vegetation.

The GFMC is promoting a proactive approach towards managing forests, agricultural lands and other open-land ecosystem, including protected areas, to contain and prevent the spread of wildfires over large areas, thus making them easier to control. The creation of wildfire-resilient natural and cultural landscapes requires the active involvement of civil society in the prevention of wildfires and the protection of communities and of private and public land, including forests and agricultural land. This can only be achieved if civil society is actively engaged – it is therefore important that State authorities include civil society as responsible partners in both voluntary and compulsory approaches.

The GFMC has developed resources providing guidance for developing approaches in co-operative, integrated fire management on community-based fire management, on the defence of villages against wildfire, and bringing in useful examples from the Global South, which harbours countries with a long tradition on community-based integrated fire management. Furthermore, the FAO's recently updated Integrated Fire Management Voluntary Guidelines offer comprehensive advice, revealing the need to address the root

causes of wildfires and for civil society to be actively involved in the prevention and mitigation of wildfires.

3.2.2 Local and national-level initiatives

In addition to the above-mentioned projects, there are several important initiatives at the local and national levels to strengthen landscape fire management and wildfire risk reduction in both countries.

- As part of the OSCE-GFMC project "Enhancing National Capacity on Fire Management and Wildfire Disaster Risk Reduction in the South Caucasus", national round tables to develop a National Fire Management Policy were held in Georgia between 2009 and 2014, and in Azerbaijan in 2011 (GFMC, 2024).
- The Forest Code of Georgia was revised in 2020, and now includes recommendations from the national round tables on fire management held between 2009 and 2014. Among its provisions, the Forest Code outlines the role of a forest management body in ensuring observance of fire safety rules and in implementing fire preventive measures (Legislative Herald of Georgia, 2020).
- Azerbaijan is currently testing a software designed to map touristic paths in order to track possible emergency situations such as fires or avalanches that may arise owing to touristic activity in remote areas. As a joint effort between the Ministry of Emergency Services and the State Tourism Agency, the software is currently being tested and is predicted to become fully operational soon.
- In 2019, the Government of Georgia published Resolution No. 403 "On the approval of the charter of volunteers in the field of civil security" regarding the amendment of Resolution No. 577 of the Government of Georgia of 27 November 2018. The resolution calls for the Emergency Situations Management Service of the Ministry of Internal Affairs to provide fire-rescue equipment to volunteer fire-rescue groups (Legislative Herald of Georgia, 2019).
- In 2016 and 2017, Azerbaijan established volunteer groups in a cross-ministerial effort that included capacity-building on emergency response, technical training on handling equipment, and awareness-raising activities, notably on responding to wildfires.
- In July 2023, Azerbaijan's Ministry of Emergency Situations launched the "Emergency Volunteers" programme, which includes training on fire response.
- In recent years, the Kvemo Kartli Forestry Service in Georgia has been hiring "fireman rangers" during the fire seasons. Their role is to patrol forest areas that are the responsibility of the Forestry Service and to monitor any possible signs of fire danger. If fires are detected, the "fireman rangers" inform the Kvemo Kartli Emergency Service and initiate fire suppression work to localize the fire before the arrival of the Emergency Service crew. To support them in their roles, the "fireman rangers" receive fire weather forecasts.
- EU Module Exercises (MODEX) workshops have been organized for staff of the Kvemo Kartli Emergency Situations Management in Georgia regarding forest fire management.[7]
- The Ministry of Internal Affairs and Ministry of Defence of Georgia are currently working on establishing a brigade of reservists who will be called on duty in the event of emergencies. This group is intended to serve on a voluntary basis.

[7] Financed by the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO), the EU MODEX is part of an exercise series within the EU Civil Protection Mechanism. See: https://www.eu-modex.eu/Red/about/.

- The Emergency Management Service of Georgia is planning to support the municipality of Dedoplistskaro in preparing a municipal-level emergency management plan divided into four core phases: prevention, preparedness, response, and recovery. The first series of workshops is planned for November/December 2024, while the emergency management plan is expected to be ready by mid-2025.
- In September 2022, the Government of Georgia adopted the Fourth National Environmental Action Program of Georgia for 2022-2026 (NEAP-4). The document calls for forest fire management to adopt a comprehensive approach covering aspects of prevention, readiness, and response. To improve disaster management systems, the NEAP-4 includes activities that aim to strengthen infrastructure and technical capacities of emergency services. Other key activities include developing Georgia's volunteer system with a target of achieving at least 2,000 registered volunteers by the end of 2026 (Ministry of Environmental Protection and Agriculture of Georgia, 2022).

These initiatives are important building blocks for improving landscape fire management and wildfire risk reduction; however, they lack transboundary elements.

3.3 Synthesis

Fires pose a major risk to the landscape of the South Caucasus region. With climate change, the threats posed by fires is likely to increase as temperatures become warmer, precipitation levels change, and heatwaves and droughts become more frequent and intense – all conditions that are conducive to the occurrence and spread of fires. Uncontrolled and undesired fires often pose environmental, economic, social and health risks and therefore undermine human and livelihood security. Given that these risks are likely to be shared by communities across multiple jurisdictions in border regions, co-operation is crucial to addressing these risks in a holistic and sustainable manner.

In this context, Dedoplistskaro and Zagatala face the following similar challenges:

(1) Communication and exchange between the countries exist, but there is room for improvement;

(2) Climate change and geographic conditions make fires more frequent and more difficult to respond to;

(3) Early warning and response must be improved and expanded, but human and financial resources are limited.

However, there are also some opportunities for co-operation, particularly around:

(1) awareness-raising activities to prevent the occurrence of wildfires and forest fires;

(2) the establishment of a region-wide early warning approach, building on ongoing efforts between Azerbaijan and Georgia; and

(3) investment in biodiversity protection measures, which can have a positive impact for both fire prevention and response.

Several ongoing and recently completed projects and initiatives in Azerbaijan and Georgia that are related to DRR, fire management and prevention can be built upon and complemented. These projects partly address the identified fire-related security risks as well as challenges. However, the extent of co-operation on landscape fire management and wildfire risk reduction still has scope for improvement and expansion, both between Dedoplistskaro and Zagatala and at the national level between Azerbaijan and Georgia. Chapter 4 presents a set of ideas for co-operation activities that seek to fill these gaps.

4 Ideas for co-operation activities

This chapter lays out the ideas for co-operation activities for both Dedoplistskaro and Zagatala that resulted from the consultation process, complemented by desk research.

4.1 Municipal-level prevention and response

An important area for co-operation between Dedoplistskaro and Zagatala would be that of strengthening fire prevention and response at the municipal level. Activities to this end could include training and awareness-raising activities, with an emphasis on the engagement of women and youth. Training sessions could serve to prepare professionals to better respond and react to forest fires and wildfires, including identifying and monitoring fire hotspots and their geography and being trained on device and equipment use, as well as becoming acquainted with cross-border co-ordination protocols. Exercises and simulations, including the use of tactical back fires, are particularly helpful, as they demonstrate exactly how to act in practice in emergency situations. Such training events would include professionals at all levels and extend beyond aerial and ground firefighting brigades to other professionals involved in first response, such as forest and park rangers, border police officers, health care providers and emergency responders. Subsequently, training would expand to include volunteer firefighting brigades, possibly including further disciplines related to fire management and response such as first aid, search and rescue, and humanitarian activities. Also, training sessions for children and persons with disabilities on the use of evacuation routes, emergency exits and contact persons are important to increase their safety in case of fire. Children can also be agents of dissemination, as learned behaviour often cascades into families.

Harnessing volunteer firefighters such as young people, farmers, shepherds, hunters, community members and the like would also be crucial to fill in gaps in personnel, particularly in remote and rural areas. Volunteers play an important role in patrolling and reporting, as well as raising awareness among local populations and tourists and, ultimately, supporting with firefighting efforts. Volunteers should undergo the same training sessions and be held to the same safety standards as professionals. Azerbaijan has had positive experiences with engaging youth for the recruitment of volunteer firefighters, establishing competitions and reward systems that target the younger public. The country's Ministry of Emergency Responses has been running a programme for emergency volunteers since June 2023. The programme includes a competitive selection process and theoretical and practical training sessions in several disciplines, as well as the issuance of certificates. Azerbaijan also hosts a union of volunteer organizations, which might provide lessons on volunteer engagement and co-ordination. Similar ideas to increase the incentive base for youth to join as volunteers should be discussed and shared across the two municipalities, such as promoting public recognition and the status of young people as landscape guardians, but also the provision of tangible incentives such as insurance, certificates, awards, media appearance and facilitated access to higher education. Also, Georgia has had positive experiences in engaging community firefighters in Borjomi, including training activities, study tours and work with state schools. In the past, Azerbaijan has attended an international exchange for volunteers in Italy, organized by Italy's Red

Cross and Civil Protection Department. Such exchanges on best practices could be replicated between Azerbaijan and Georgia.

Communications is a further entry-point for co-operation between stakeholders on the local level. Maintaining direct communication channels between local stakeholders involved in fire monitoring and response would help reduce reaction time in relation to fire outbreaks. Media outlets can be used for raising awareness, but also for amplifying fire and evacuation warnings. It is important that every form of communication is made in both the Azerbaijani and the Georgian language so as to allow for broader dissemination between communities across the border and to include Azeri communities in Georgia and Georgian communities in Azerbaijan.

As key community actors, women have an important role to play in prevention, management of fire hazards, protection of national and cultural assets, and awareness-raising. As women often have administrative responsibilities in public institutions such as schools, post offices, public offices and the like, they are well positioned to support with the co-ordination of activities. They can also be the recipients of training sessions and support with dissemination of knowledge in their respective institutions. Also, women may form intra- and inter-community communication channels for the reporting of localized fires, and can support awareness-raising and educational activities among farmers, schools and households in rural areas. Particularly among farmers it is necessary to address misconceptions regarding the use of fires in agriculture.

4.2 National-level co-ordination

There is also a need for a co-operation framework to be established at at the national level, with the aim of enhancing co-ordination across municipalities, sectors and borders. This undertaking would also entail simplifying the procedure for border crossings in the event of disasters. Although there is already a good level of co-ordination between Azerbaijan and Georgia, mainly consisting of ministries informing their counterparts of fires near border areas, this could be further expanded and improved. The foundations for bilateral co-operation were laid in 2017 when Azerbaijan supported Georgia in responding to the Borjomi area fires. The existence of a mutual assistance agreement between the two countries allowed co-operation to be fast and efficient, and it can serve as a basis for an expanded agreement. Since 2022, there has been an agreement in place between Georgia and Azerbaijan allowing for movement in border areas in exceptional cases upon mutual consent, but it does not specify provision for co-operation in the case of forest fires.

For example, relevant stakeholders could combine efforts to co-ordinate on regulatory frameworks around issues such as standards for volunteer fire-fighters or post-harvest burning practices, with ministries providing equipment and dealing with dissemination, risk information and best practice exchange, and early warning. On account of the transboundary nature of co-operation required to address fire risks, the exchange of materials and equipment between parties should be on a contractual basis – that is to say, a legal basis should be defined, both for prevention (long-term) and response (short-term), detailing the scope and conditions of the cross-border exchange of materials and equipment. Here it is of paramount importance that border police officers should be involved in all parts of the process to ensure they are able to support fire management and response efforts in border areas during emergency situations, particularly by avoiding delays at the border.

Exchange between countries on fire prevention and response should be on a regular basis, including the planning of regular activities beyond the response scope, such as prevention, capacity-building, and awareness-raising approaches. In both Azerbaijan and Georgia, the bodies responsible for emergency response offer continuous support to forestry departments with regard to fires in forest areas. For example, Azerbaijan's Ministry of Environment and Natural Resources operates district forestry centres assigned with fire prevention and response activities, which then cascades into the municipalities, establishing clear responsibilities both around mitigation and in case of emergencies – all being co-ordinated in co-operation with the Ministry of Emergency Situations. In Georgia, a local emergency headquarters is established immediately after information about an ongoing forest fire is shared via a unified emergency number. These headquarters are composed of territory representatives from the Emergency Management Service and other relevant authorities (including the National Forestry Agency). Such examples of vertical and horizontal co-operation and exchange within countries can provide lessons for developing co-ordination approaches also between countries. On this point, hydrometeorological services of both Azerbaijan and Georgia already have good relations when it comes to co-operating on this issue, for example in sharing climate and natural disaster-related data. This positive context can be leveraged to improve data-sharing over fire risks and shortening response time.

The potential for cross-regional early warnings systems on fire risks should be explored by relevant national and local stakeholders, also including other countries in the region. The deployment of region-wide early warning systems presupposes a high level of co-ordination and co-operation between a wide range of stakeholders within and between countries. Revisiting the 'Fire Danger Rating System for the South Caucasus', which was developed in the context of the OSCE-ENVSEC-GFMC project 'Enhancing National Capacity on Fire Management and Wildfire Disaster Risk Reduction in the South Caucasus', could provide an opportunity for swift realization.

4.3 Biodiversity protection

Biodiversity protection measures can also offer important co-benefits for wildfire and forest fire prevention, and for response. In terms of prevention, limiting and restricting the entrance of visitors to natural and protected areas can help safeguard sensible ecosystems from fires caused by touristic activity. While some areas are inaccessible to visitors, being available only for scientific research and similar purposes, other areas can offer tuition-based entrance taking into account socio-economic factors in local communities. This system makes it possible to control the flow of visitors, with the additional benefit of collecting funds that can be used to enhance fire prevention and response through training or the acquisition of equipment such as early warning and monitoring systems.

A further key prevention activity is that of addressing the widespread slash-and-burn practice still used by farmers in Azerbaijan and Georgia to dispose of agricultural waste and clear land post-harvest. Despite prohibition and penalties, burning agricultural waste is often less costly than disposing of it in other ways. However, agricultural waste has enormous potential in terms of improving soil biodiversity and water retention, both boosting soil fertility and making it more resilient to droughts and fires, as well as serving as biofuel for energy production. Yet, techniques for utilizing agricultural waste for soil improvement or energy require technical knowledge, equipment and human resources. Furthermore, as

slash-and-burn is a commonly ingrained habitual practice among farmers, awareness-raising on risks and alternatives is essential. In this respect there is a strong need for co-operation between countries on identifying the risks in and opportunities for addressing the practice, looking for alternatives that are adequate for the local climate and crop types, and exploring avenues to mainstream alternative practices for handling agricultural waste.

On the response side, water reservoirs have an important role to play, especially in remote border areas. The local availability of water can greatly reduce response times by facilitating water supply for fire suppression. Reservoirs also benefit wildlife and biodiversity by offering water to animals and insects, particularly during the dry seasons.

Box 3: Resources for landscape fire management and wildfire risk reduction

Throughout the consultation process, stakeholders highlighted a number of resources and guidelines that could be especially relevant for the development and implementation of activities listed in Chapter 4. These include:

- **The report "**Wildfires in Dedoplistskaro Municipality Shiraki Valley, Georgia: Rationale and Proposal for a Fire Management Concept**"** (GFMC, 2015), developed by the GFMC-GIZ Georgia Mission Integrated Fire Management III in the frame of the GIZ Programme "Sustainable Management of Biodiversity, South Caucasus" and in co-operation with the ENVSEC / GFMC project "Enhancing National Capacity on Fire Management and Wildfire Disaster Risk Reduction in the South Caucasus".
- **EuroFire Competency Standards and Training Materials**: Developed by the GFMC in the framework of the EU-funded EuroFire project (2006-2008), these materials include competency standards and training modules that aim to enhance knowledge, skills and understanding of basic wildfire and prescribed fire management techniques. These materials have been translated into the Azerbaijani and Georgian languages. For Georgia in particular, in 2014 a resource book was published specifically for a training course for firefighters, volunteers and private and public land managers in the Dedoplistskaro municipality, with the aim of enhancing the safety and efficiency of firefighting in forests and other vegetation types in the country (GIZ; OSCE; GFMC, 2014).
- **GFMC guidelines "Defence of villages, farms and other rural assets against wildfires"**: Developed and published by the GFMC and partners in 2013, this set of guidelines serves as a practical technical document designed as a support tool for the protection of people and rural communities from wildfires. It also aims to serve as a basis for exchanging expertise and concepts amongst OSCE participating States to further expand capacities in rural fire management. While the document was prepared for South-Eastern Europe as a pilot region, its guidelines have been replicated in other OSCE regions, namely, Eastern Europe and Central Asia.[8] The guidelines could therefore serve as a useful guidance and blueprint for fire-related activities aiming at regional co-operation and capacity building in the South Caucasus region (Goldammer, 2013). Additional fire management guidelines developed by GFMC and international organizations are available on the GFMC website.

[8] The GFMC guidelines "Defence of villages, farms and other rural assets against wildfires" have been developed and published in Ukrainian (https://gfmc.online/wp-content/uploads/Village-Defense-Guidelines-UKR.pdf) and Mongolian (https://gfmc.online/wp-content/uploads/Village-Defense-Guidelines-MON.pdf).

5 Stakeholder mapping

To develop and implement activities successfully and in an inclusive manner, stakeholders at different governance levels need to be involved along with local and regional civil society organizations (CSOs) such as the Regional Environmental Centre for the Caucasus, the Regional Fire Monitoring Center for South-Eastern Europe and Caucasus (RFMC), the Centre for Biodiversity Conservation & Research (NACRES) and the Caucasus Environmental Non-Governmental Organizations Network. Figure 2 gives an overview of key stakeholders.

Figure 2: Mapping of key stakeholders.

Level	Azerbaijan		Georgia	
International	EU, GFMC, UNDP, UNDRR and other international actors			
Regional	RFMC REC Caucasus CENN NACRES			
Governmental	**Ministry of Emergency Situations**	**Ministry of Ecology and Natural Resources**	**Ministry of Environmental Protection and Agriculture**	**Ministry of Internal Affairs**
	State Fire Protection Service	Forestry Department	Agency of Protected Areas National Environmental Agency National Forestry Agency	Emergency Management Agency and Service
Provincial	Zagatala District Fire Station Zagatala Regional Forestry Center		Department for Relations with Regions Kakheti Forestry Service	
Municipal	Zagatala Municipality		Dedoplistskaro Municipality	
	District representatives		Rural Development Agency	
Civil society	Local villagers and farmers		Women and Youth Initiative Group Association of the Friends of Vashlovani Protected Area Association for Tourism Development in Dedoplistskaro	

Core stakeholders to be involved in cross-border activities for fire prevention and response are the representatives of the administrative bodies of Dedoplistskaro and Zagatala. For Dedoplistskaro, activities would require the involvement of stakeholders from the Department for Relations with Regions of the Administration of the Government of Georgia. For Zagatala, it would be important to involve the district's representatives, as well as its fire station and regional forestry centre.

In both Dedoplistskaro and Zagatala, local villagers and farmers would also need to be involved in landscape fire prevention activities. For example, they could serve as volunteers for activities concerning initial wildfire suppression. In general, it is also crucial to ensure the involvement of youth representatives and to establish a balanced gender representation.

There are 132 CSOs operating in the Kakheti region of Georgia, a number of which work on issues related to youth engagement, community development and education. Some of these organizations can play an important role in supporting awareness-raising activities on fire prevention and response. For example, farmers' associations can be involved in information exchange and awareness-raising activities to address the use of fires in post-harvest contexts. The Association of Women Farmers (AWF) is active in the representation of women farmers

within legislations and initiatives at both regional and national levels, and their scope of work can be leveraged in order to include more women in fire prevention and response approaches. In Zagatala, half of the district's representatives are women, many of whom occupy high posts in key public institutions such as schools or the post office and can thus support in cascading information to the wider community.

At the national level, relevant authorities include, on the Azerbaijan side, the Ministry of Emergency Situations and the State Fire Protection Service, which plays an important role in fire-related activities. However, when it comes to forest fires, the Ministry of Ecology and Natural Resources – in particular its Forestry Department, which is responsible for the forestry centres of the districts – can also play a key role on monitoring and first response. On the Georgian side, relevant authorities include the Ministry of Environmental Protection and Agriculture and its various agencies responsible for protected areas, the environment, and forestry, as well as the Ministry of Internal Affairs and its Emergency Management Agency and the Emergency Management Service. These authorities need to be consulted and invited to participate in the project's forthcoming activities.

At the regional level, a key stakeholder in addition to the CENN and the REC Caucasus is the Regional Fire Monitoring Center (RFMC) for South-Eastern Europe and the South Caucasus. There is also a wider community of international donors and implementing agencies that are financing and/or implementing various projects in the region; they should be involved in the development and implementation of activities, so as to ensure a good level of co-ordination of all activities in the region, and to achieve synergies where applicable.

Mountains in the South Caucasus region. © Vladimir Vishnyakov/Unsplash

6 Conclusions

Climate change creates conditions that are conducive to the occurrence and spread of fires, which are already posing a major risk to security in the South Caucasus region. Across borders, uncontrolled and undesired fires present environmental, economic, social and health risks, negatively impacting socio-economic stability and livelihood security. These shared challenges in border regions thus call for joint co-operative landscape fire management and wildfire risk reduction between border communities and respective governments, as co-operation offers opportunities to address these risks in a holistic and sustainable manner and also contributes to good-neighbourly relations and broader security and stability in the region.

Extensive consultations have shown that the pilot municipalities of Dedoplistskaro in Georgia and Zagatala in Azerbaijan face several shared challenges related to fires and fire management. These include insufficient communication and exchange between countries and municipalities, while climate change, water scarcity and unfavourable geographic conditions make fires more frequent and complicate response, in addition to the lack of financial resources to expand on and improve early warning and response.

Several ongoing and recently completed projects and initiatives partly address fire-related security risks and the identified challenges. These projects and initiatives, and in particular the activities organized by the OSCE and GFMC on fire management in the South Caucasus, are important for building synergies when developing new activities. However, at present there is no co-operation between Dedoplistskaro and Zagatala on fire management and wildfire risk reduction, and co-operation at the national level between Azerbaijan and Georgia is limited.

Consultations and a literature review led to the identification of several shared activities calculated to enhance co-operation. These include (1) boosting municipal-level prevention and response by conducting capacity-building and awareness-raising activities, as well as engaging women and youth both for benefiting from and for leading on such activities; (2) expanding national-level co-ordination by engaging relevant stakeholders for the creation of regulatory frameworks for co-operation, and expanding co-operation with ministries responsible for early warning, equipment handling and risk information; and (3) leveraging biodiversity protection measures to generate co-benefits for wildfire and forest fire prevention, through, for example, further improvement in the management of protected areas, the mainstreaming of alternative methods for handling agricultural waste, and providing water reservoirs both for fire response and for wildlife.

Furthermore, co-operation activities between Dedoplistskaro and Zagatala, and more broadly between Azerbaijan and Georgia, could serve as a guiding example of fire management governance along and across borders. One such example of interest is the development of the FAO-led “Global Fire Management Hub”, to which the GFMC has been transitioning since 2023 (GFMC 2023), and which could foster the intent of the GFMC in generating international support for developing a voluntary or legal instrument on integrated fire management at the global level, tentatively called the “Global Landscape Fire Framework” (GFMC 2023b).

On the basis of the results of this study, the “Global Landscape Fire Framework” will proceed to fill the identified gaps by establishing a joint co-operation strategy and implementation plan, including a list of initial joint project concepts. These will serve to propose a shared vision for the co-operation strategy, as well as to narrow down and refine the suggested co-operation activities. At a later stage, at least one pilot project will be implemented together with local partners and actors who will also be engaged as the main stakeholder group for future activities. In sum, these activities are expected to reduce climate-related security risks and promote climate resilience in North-west Azerbaijan and Eastern Georgia.

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