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Co-operation in Northern Armenia and Southern 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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Co-operation in Northern Armenia and Southern Georgia

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

Beatrice Mosello, Adrian Foong, Lukas Rüttinger and Pia van Ackern (adelphi)

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Executive summary

Fires pose a major risk to the landscape of the South Caucasus region. With climate change, this risk will likely 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 shared by communities across multiple jurisdictions in border regions, co-operation is crucial for addressing these risks in a holistic and sustainable manner.

Scoping study and methodology

This scoping study aims to assess the current context of landscape fire management, wildfire disaster risk reduction (DRR), and transboundary co-operation in two pilot municipalities: Bolnisi in Georgia and Sarchapet in Armenia.[1] Based on 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, in turn, 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 Northern Armenia and Southern Georgia.

This study builds on the findings of the OSCE-adelphi report "Regional Consultation for the South Caucasus" for Armenia and Georgia, which identified DRR as one of the top priorities for transboundary co-operation to address climate-related security risks in the region. In addition, this scoping study draws heavily on insights from stakeholder consultations, which involved online meetings and interviews. Additional desk research supplemented the preparation of this 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 Bolnisi and Sarchapet:

- **There is a strong prevailing misbelief that agricultural burning improves crop productivity;**
- **Firefighting equipment and related infrastructure are perceived as inadequate;**
- **Addressing fires in border areas in a timely manner is complicated by a lengthy procedure in which permission is required from the national security services of both countries.**

Stakeholders also noted the following opportunities:

- **There is a growing interest, especially among the youth, in volunteer fire services;**
- **Awareness-raising activities on fire prevention, management, and response have made noticeable progress;**
- **Co-ordination and co-operation between the municipal, regional, and ministerial levels within the respective countries have improved.**

[1] While local administrative units are called 'municipalities' in Georgia, the equivalent administrative unit level in some areas in Armenia would be 'communities'. However, in cases where both types of administrative units are mentioned in the same context, the term 'municipalities' will be used for simplicity.

There have been a number of internationally funded projects and local and national level initiatives in Armenia and Georgia that contribute to aspects of landscape fire management and DRR. These projects partly address the fire-related security risks as well as challenges faced by Bolnisi and Sarchapet. However, based on the findings from expert consultations and stakeholder interviews, the extent of co-operation on landscape fire management and wildfire risk reduction between Bolnisi and Sarchapet, as well as between Armenia and Georgia at the national level, is limited and not the focus of the projects that are currently being implemented.

Ideas for co-operation activities

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

Awareness-raising and training: Target groups could include farmers to enhance sustainable land and fire management practices. Another target group could include young people, with the aim of building their awareness, knowledge, and interest in fire management. Training activities, along with the provision of basic equipment, would help ensure that local communities are adequately prepared for fires. All activities could involve participants from both Armenia and Georgia simultaneously, to enable exchange of experiences and skills as well as to foster good relations.

Co-ordination at local level and between forestry, emergency, and border security services: There is a need to establish a co-operation framework between municipalities and communities, as well as among forestry, emergency, and border security services within and between Armenia and Georgia. Co-operation could take different forms, from a looser network to more formalized structures. Activities could include procedures for exchanging information, knowledge, and experiences, as well as the provision of infrastructural and technical support.

Community fire prevention, management and response: There is a need to conceptualize and establish volunteer groups dedicated to fire-related activities. Volunteer groups should focus on recruiting the youth. To establish volunteer groups, co-operation frameworks are needed that spell out their roles, particularly in terms of how they fit within the larger scope of work of the forestry, emergency, and border security services. There is also a need to establish a system for co-ordination with volunteer groups across the border, and to enable information exchange.

Based on the results of this study, this project will proceed to establish a joint co-operation strategy and implementation plan to address these gaps. These will subsequently be narrowed down into specific co-operation activities, which will form the basis for a pilot project to be implemented by local partners and actors. Overall, all the proposed activities aim to reduce climate-related security risks and promote climate resilience in Northern Armenia and Southern Georgia.

Contents

1 Introduction **1**

1.1 Project 2

1.2 Scoping study and process 2

2 Background information **4**

2.1 Fires and fire management in Armenia and Georgia 4

2.2 Climate projections 5

2.3 Fire-related security risks 5

2.4 Pilot municipalities 6

3 Context analysis **8**

3.1 Mapping of challenges and opportunities 8

3.2 Mapping of projects and initiatives 9

3.2.1 Internationally funded projects 9

3.2.2 Local and national level initiatives 11

3.3 Synthesis 13

4 Ideas for co-operation activities **14**

5 Stakeholder mapping **17**

6 Conclusions **19**

7 Bibliography **20**

List of Figures

Figure 1 Mapping of key projects 10
Figure 2 Mapping of key stakeholders 17

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
GCF	Green Climate Fund
GEF	Global Environment Facility
GFMC	Global Fire Monitoring Center
ha	Hectare
IRCCR	Improved resilience of communities to climate risks
MODEX	Module Exercises
MoU	Memorandum of Understanding
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
SNCO	State Non-Commercial Organization
SUV	Sport Utility Vehicle
UCPM	Union Civil Protection Mechanism
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development

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 subsequent impacts of wildfires, such as landslides, mudflows, and floods, may become an additional burden for people, especially those who are already marginalized. In this way, they negatively impact socio-economic stability and livelihood security, thereby putting further pressures on societies. 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 regards 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 trainings, workshops, and the development of national fire management policies and strategies, engaging various stakeholders from multiple administrative levels and sectors.

This scoping study[2] aims to assess the current context of landscape fire management, wildfire disaster risk reduction (DRR), and transboundary co-operation in two pilot municipalities in Armenia and Georgia.[3] Based on 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 Northern Armenia and Southern Georgia.

The next two sections include a brief description of the project under which this scoping study was prepared, as well as the process that went into its preparation. Chapter 2 provides a background on fires and fire management in Armenia and Georgia, followed by an outline of climate projections and security implications, as well as a description of the two selected pilot municipalities. Chapters 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 and Chapter 6 concludes the scoping study.

[2] Previously referred to as ‘pre-feasibility study’ in earlier stages of the project, the term ‘scoping study’ was used as it provides a clearer definition of the objectives and content of this paper, based on feedback from stakeholders.

[3] While local administrative units are called ‘municipalities’ in Georgia, the equivalent administrative unit level in some areas in Armenia would be ‘communities’. However, in cases where both types of administrative units are mentioned in the same context, the term ‘municipalities’ will be used for simplicity.

1.1 Project

The OSCE, in partnership with adelphi, embarked in 2020 on an extra-budgetary financed project "Strengthening responses to security risks from climate change in South-Eastern Europe, Eastern Europe, the South Caucasus and Central Asia" (Project Number: 1102151).[4] 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.
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.

1.2 Scoping study and process

This study builds on the findings of the OSCE-adelphi report "Regional Consultation for the South Caucasus" for Armenia and Georgia, which identified DRR as one of the top priorities for transboundary co-operation to address the climate-related security risks in the region. In addition, this scoping study draws heavily on insights from the following activities conducted as part of the project:

- **Online consultation process to prioritize topics for co-operation:** Conducted between July and September 2021, the consultation process engaged with Project Focal Points and experts from relevant ministries via online meetings 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 this 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, as well as through several online meetings and exchanges, including at the local level, which occurred between December 2021 and February 2022. Bolnisi in Georgia and Sarchapet in Armenia will serve as pilots for transboundary co-operation on community-based landscape fire management and wildfire risk reduction at the border areas in Northern Armenia and Southern Georgia.
- **Consultation with stakeholders at local level:** In May 2022, consultations in the form of in-depth and in-person interviews were carried out with stakeholders operating in the respective pilot municipalities. These consultations helped gain deeper insights into the topic of landscape fire management and wildfire risk reduction in the respective municipalities, as well as identify ideas for potential activities and measures for co-operation.

[4] For more information on the project, see: https://www.osce.org/node/521965.

- **Consultation with ministerial stakeholders:** In May 2022, representatives from the Ministry of Environmental Protection and Agriculture and the Emergency Management Service under the Ministry of Internal Affairs of Georgia were consulted. This was followed by a consultation with representatives from the Ministry of Environment, Ministry of Internal Affairs, and Ministry of Foreign Affairs of Armenia in November 2022. The consultations served to deepen the understanding of risks, challenges, and learnings associated with fires, fire prevention, and firefighting measures, as well as to discuss potential activities and measures for co-operation, while also outlining past and present projects and initiatives that new activities could build on.
- **Desk research and further contributions by experts to complement consultations:** The findings of other relevant projects and studies that were conducted on fire management in Armenia and Georgia, identified through desk research by the project team and expert contributions, also contributed to the preparation of this scoping study.

Looking ahead, this scoping study will serve as the basis for the project's upcoming activity, that is, a consultation with a broader circle of stakeholders on joint activities on landscape fire management and wildfire risk reduction in the pilots. Its results will inform the development of a strategic framework for co-operation and joint adaptation. These processes have the ultimate objective of reducing climate-related security risks and promoting climate resilience in Northern Armenia and Southern Georgia.

2 Background information

This chapter provides an overview of fires and fire management in Armenia 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 goes on to describe the two selected pilots: Bolnisi in Georgia and Sarchapet in Armenia.

2.1 Fires and fire management in Armenia and Georgia

The South Caucasus region has witnessed several major incidences of wildfires in the past decade. For example, in Armenia, "unprecedented" levels of forest fires were recorded in 2015 and 2017, which covered a combined area of around 3,600 ha (Ministry of Environment 2020). In 2019, large-scale forest fires were recorded on the Armenian side of the Georgia-Armenia border area near Mount Lalvar.[5] Meanwhile in Georgia, large-scale fire events occurred in the summer months of 2017 in the Borjomi municipality, causing significant damage to the Borjomi Gorge ecosystem (Ministry of Environmental Protection and Agriculture, Georgia 2021). In August 2022, forest fires were reported near the village of Kvabishkevi in the Borjomi municipality, requiring the mobilization of up to 250 fire rescuers (Kartozia 2022).

However, in general, fires are not an intrinsic part of forest ecosystems in the South Caucasus region (GFMC 2015; Harutyunyan et al. 2011). This leaves forest ecosystems in the region 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, Georgia 2021).

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 to incorporate vegetation residuals into soil. There is also widespread belief that fires will reduce infestations by insects and pathogens on agricultural crops (GFMC 2015).

Box 1: Definitions

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

Landscape fire: A fire burning in 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 burning 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 freely burn 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 have shown that the extent of damages caused by wildfires can be attributed to limited capacities and effectiveness of fire management agencies and systems to deal with fire prevention and response (OSCE and ENVSEC 2012). In Georgia, the abandonment of intensive land cultivation has resulted in a higher availability of unused and combustible vegetation and

[5] Based on stakeholder interviews conducted in Sarchapet in May 2022.

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, the region has a long history of co-operation with regards to fire management. In addition to several DRR-related projects involving regional and international organizations (Rüttinger et al. 2021) (see also Chapter 3), countries have also co-operated at a bilateral level in combatting fires. For example, during the 2017 and 2022 fires in the Borjomi municipality, Armenia supplied firefighting equipment to Georgia to help the country combat the fires (Agenda 2017; First Channel News 2022).

2.2 Climate projections

The risks posed by wildfires are much greater under warmer and drier conditions, as they reduce fuel moisture and increase fuel flammability, thereby raising the potential for fire ignitions and spread rates (UNEP 2022). In the South Caucasus, average annual temperatures are expected to rise in the coming decades, by as much as 5°C in Armenia under a high emissions scenario[6] and 2.1-3.7°C in Georgia under a low/moderate emissions scenario[7] 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 uncertainties associated with their estimations (Ministry of Environment 2020; Ministry of Environmental Protection and Agriculture, Georgia 2021).

Climate change is thus a key driver of concern regarding the risks posed by wildfires in the region (Rucevska 2017). Indeed, severe fire seasons in the past have coincided with prolonged periods of heatwaves and low precipitation. This was the case in Armenia in 2010, when the observed number and total area of forest fires increased during an extremely hot and dry year (Harutyunyan et al. 2011). Also in Armenia, unprecedented large-scale forest fires in 2015 and 2017 coincided with years of extreme hot summers and unusually dry weather (Asbarez 2017; Ministry of Environment 2020). Similarly, in Georgia, 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, Georgia 2021).

It should also be noted that fires can, in turn, 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 in acting 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 (UNEP 2022).

2.3 Fire-related security risks

Depending on their magnitude and intensity, wildfires pose direct threats to human health and safety, for example through injuries and the potential loss of human life. Smoke particulates can cause respiratory harm, cardiovascular diseases, and neurological disorders, subsequently increasing the pressure on public health systems (UNEP 2022).

Wildfires can also have devastating consequences on livelihoods and socio-economic stability. As the South Caucasus region does not feature fires as an intrinsic part of its forest ecosystems (GFMC 2015; Harutyunyan et al. 2011), the occurrence of wildfires in the region can affect biodiversity and degrade ecosystem services through their impact on plant and

[6] Based on METRAS model, Representative Concentration Pathway (RCP) 8.5 scenario, and baseline period 1961-1990.

[7] Based on RegCM model, RCP4.5 scenario, and baseline period 1971-2000.

animal mortality as well as changes in habitat conditions (Goldammer 2013; UNEP 2022). Forest ecosystems are particularly vulnerable to wildfires, given their slow natural regeneration rates (Rucevska 2017). 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 (UNEP 2022). For communities that are dependent on these natural resources, their livelihood security is thus at stake.

Moreover, wildfires can cause direct damage to constructions and infrastructure, such as those related to energy and power transmission (Ministry of Environmental Protection and Agriculture, Georgia 2021), thereby threatening the provision of essential services. Meanwhile, damages to roads can disrupt transport and supply chains, and the costs resulting from these damages and loss of economic activity can take a toll on the livelihoods and economic wellbeing of local communities (UNEP 2022).

If wildfires occur in a politically sensitive area, this might become an additional source of contention between countries and have a negative impact on the overall security situation in the region (Goldammer 2011). Considering the history of conflicts in the South Caucasus, the occurrence of fires on terrain contaminated by unexploded ordnance and land mines adds to the threats faced by both firefighting personnel and local communities (GFMC 2015).

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

Following an extensive process of expert contributions and consultations at both the ministerial and local levels, two municipalities were identified as pilots for the subsequent phase of the project.

2.4.1 Bolnisi (Georgia)

Situated in the Kvemo Kartli region and bordering Armenia to the south, Bolnisi largely consists of plains with a hilly northern edge. Forests cover almost half of Bolnisi's area (GFW n.d.), but none of these are considered as protected areas. Main economic activities include industries, particularly of copper and gold mining, as well as agriculture (Kvakhadze 2022). Agriculture employs 68% of the population, and takes up a total area of 28,575 ha, including arable land and pastures (Bolnisi Municipality 2018). The majority of its population, which numbered approximately 56,000 as of 2021, is rural (Geostat n.d.).

In Bolnisi, fires have predominantly been caused by human activities; fires burning on open, non-forested landscapes are largely a result of fires that are used for clearing agricultural lands, whereas forest fires are mostly caused by negligent fire use by hunters, shepherds, and visitors in forested areas. Regardless of the origin, fires have damaged buildings and other types of infrastructure in Bolnisi in the past, particularly houses and straw-bale constructions.[8] While there is a general declining trend in fire-related tree cover loss in Bolnisi from 2001 to 2021 (GFW n.d.), assessments show that the risk of wildfires in Kvemo Kartli is high (GFDRR n.d.).

[8] Based on stakeholder interviews conducted in Bolnisi in May 2022.

Climate change is likely to compound the risks posed by fires, given the projections of warmer temperatures and increasing probability of heatwaves and droughts for the whole country. These impacts can make conditions in Bolnisi and the surrounding region more conducive to the occurrence and spread of fires, and subsequently increase the security risks posed by fires.

2.4.2 Sarchapet (Armenia)

With a population of 4,334 in 2021, Sarchapet is located in the Tashir district of the Lori province, which borders Georgia to the north. Sarchapet includes eight settlements: Sarchapet, Norashen, Privolnoye, Petrovka, Artsni, Apaven, Dzoramut, and Gogavan (ARMSTAT 2021). As a whole, Lori is considered to be Armenia's greenest area – its largely mountainous forests cover 27% of its total area, and are important for soil and water protection, climate regulation, and for harboring a rich species diversity (Demirchyan et al. 2011). Main economic activities in Lori include the mining and manufacturing industries, as well as agriculture, particularly of grain, potato, vegetables, and animal husbandry products (ARMSTAT 2021).

Fires, particularly forest fires, in and around Sarchapet are largely of anthropogenic origin, stemming from the prevailing tradition of burning agricultural plant residues in fields, pastures, and meadows to improve crop productivity. Burning mainly occurs on agricultural areas that are not privately owned. While fires have only caused minimal damage and casualties in the past in the area around Sarchapet, the risk remains high – for example, accumulated fodder, which is usually placed near houses and barns, can endanger entire villages.[9] Assessments also show that the risk of wildfires in Lori is high (GFDRR n.d.).

As climate projections indicate warmer temperatures and more severe droughts across Armenia by the end of the century, fire hazards in Sarchapet are likely to be elevated further. In other words, the impacts of climate change could make conditions in Sarchapet and its surrounding region more conducive for fires to occur and spread, thereby increasing the security risks posed by fires.

[9] Based on stakeholder interviews conducted in Sarchapet in May 2022.

3 Context analysis

This chapter outlines the current situation of both Bolnisi and Sarchapet in the context of landscape fire management, wildfire risk reduction, and transboundary co-operation. The chapter is structured as follows: the first section presents the challenges and opportunities for such co-operation. 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 heavily from the findings of the in-person interviews conducted with stakeholders operating in Bolnisi and Sarchapet. For Bolnisi, interviews were also carried out with stakeholders from the broader Kvemo Kartli Forestry Service and Emergency Services, as these services cover Bolnisi. For Sarchapet, stakeholders from the Tashir district were also interviewed, given that Sarchapet falls under the supervision of the Tashir Fire and Rescue Squad, Rescue Service, and Forestry Branch. Expert contributions, consultations with ministerial stakeholders, as well as additional desk research were used to supplement the information provided by the consultations.

3.1 Mapping of challenges and opportunities

Stakeholders from both Armenia and Georgia noted the following challenges:

- **There is a strong prevailing misbelief that agricultural burning improves crop productivity.** In particular, farmers in both locations stated that using fires to clear agricultural land and crop residues are beneficial for crop growth and removing parasites and pests. Furthermore, in Bolnisi, farmers often choose to clear land with fires as it is the cheapest method available to them.
- **Firefighting equipment and related infrastructure are perceived as inadequate.** Given the rough terrain and thick vegetation at the Armenia-Georgia border area, more specialized equipment is required to reach hard-to-access areas. Stakeholders from Armenia also noted that there have been difficulties in bringing firefighting equipment into certain remote areas due to the lack of road infrastructure.
- **Addressing fires in border areas in a timely manner is complicated by a lengthy procedure in which permission is required from the national security services of both countries.** Additionally, stakeholders pointed out that the issue of accessing and crossing border areas also affects people displaced by fires, particularly with regards to providing them with temporary base camps to support evacuation processes.

In addition to challenges, stakeholders also noted the following opportunities:

- **There is a growing interest, especially among the youth, in volunteer fire services.** Stakeholders from Armenia, for example, mentioned the lack of dedicated task forces and inadequate levels of participation from civil society and volunteer groups in engaging in fire-related activities, although such groups have so far responded quickly and readily in times of need. Hence, there is a consensus among stakeholders that the respective local communities, and particularly the youth within them, are willing and supportive of establishing volunteer groups in each village to work specifically on fire-related activities, including wildfire prevention and preparedness. In Georgia, plans to develop the country's volunteer system is enshrined in a number of national action programs and legislations (see Section 3.2.2). Furthermore, Georgian stakeholders noted that specialized training must be provided to ensure that volunteer groups have the right skills and a clear understanding of their roles in fire prevention and suppression.
- **Awareness-raising activities on fire prevention, management, and response have made noticeable progress.** Stakeholders from Bolnisi have reported a decline in the number of land use fires in recent years, which they attributed to awareness-raising activities carried out by various governmental bodies. For example, the work by the agriculture unit of the Ministry of Environmental Protection and Agriculture of Georgia provides farmers in the area with various types of advisory services, particularly on fire use on agricultural lands and how to prevent fire spread. In Sarchapet, school classes include lessons on fire safety, civil defense, and how to act during emergency situations. However, the habit of using fires for clearing land remains strong among farmers, and stakeholders stress the need to continue with awareness-raising activities.
- **Co-ordination and co-operation between the municipal, regional, and ministerial levels within the respective countries have improved.** Stakeholders from Bolnisi remarked that working relations between the municipality and the emergency and forestry services of Kvemo Kartli have improved considerably in recent years despite the limited presence of a formal co-ordination platform. Furthermore, Bolnisi has maintained an effective co-operation with the Ministry of Internal Affairs of Georgia with regards to fire services, and the Ministry has stepped up its provision of equipment for emergency services in recent years. In Armenia, stakeholders noted that the Tashir Forestry Branch of the "Hayantar" State Non-Commercial Organization (SNCO) works closely with the Tashir Fire and Rescue Squad and Rescue Service, particularly in maintaining an active network of foresters who report on and respond to emergency situations. Furthermore, stakeholders from the various villages in the Tashir district noted the prevailing friendly relations between populations across the border.

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 are mapped in Figure 1. At the time of writing, these projects are still running or have just been completed in the past year.

Figure 1: Mapping of key projects.

Project	Donor	Topics	Armenia	Georgia
HOPE Full Scale Exercise *2022-2023*	DG ECHO		✕	✕
Management of natural resources and safeguarding of ecosystem services for sustainable rural development in the South Caucasus (ECOserve) *2018-2024*	BMZ		✕	✕
Enabling the implementation of Georgia's forest sector reform – ECO.Georgia *2021-2028*	BMZ/ GCF/ Government of Georgia/ SDC			✕
Prevention, Preparedness and Response to Natural and Man-made Disasters in the Eastern Partnership Countries (PPRD East) *2020-2024*	EU		✕	✕
National Adaptation Plan (NAP) to advance medium and long-term adaptation planning *2019-2022*	GCF		✕	
Scaling-up Multi-hazard Early Warning System and the Use of Climate Information in Georgia *2018-2025*	GCF			✕
Upscaling of Global Forest Watch in Caucasus Region *2019-2022*	GEF		✕	✕
Addressing climate change through enhanced capacity for wildfires management in Armenia *2017-2021*	RUS/ UNDP		✕	
Adaptation at Altitude: Taking Action in the Mountains *2020-2023*	SDC		✕	✕
Strengthening the climate adaptation capacities in the South Caucasus *2017-2023*	SDC		✕	✕
Improved resilience of communities to climate risks (IRCCR) *2020-2023*	SIDA			✕

Legend											
Climate change adaptation	Disaster risk reduction	Energy	Fires	Forests	Mountains	Rural development

Five projects have a strong focus on DRR in general: (1) the HOPE Full Scale Exercise project funded by the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO) through the Union Civil Protection Mechanism (UCPM) and involving Armenia and Georgia; (2) the European Union (EU) project "Prevention, Preparedness and Response to Natural and Man-made Disasters in the Eastern Partnership Countries (PPRD East)", involving Armenia and Georgia; (3) the Green Climate Fund (GCF)-funded project "Scaling-up Multi-hazard Early Warning System and the Use of Climate Information in Georgia"; (4) the Swiss Agency for Development and Cooperation (SDC)-funded project "Strengthening the Climate Adaptation Capacities in the South Caucasus", which also involves Armenia and Georgia; and (5) the project "Improved resilience of communities to climate risks (IRCCR)", funded by the Swedish International Development Cooperation Agency (SIDA) and involving Georgia.

Further projects focusing on forests, natural resource management, 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, and the SDC-funded project "Adaptation at Altitude".

While the above-mentioned projects encompass elements of regional exchange, 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 a number of national and regional workshops, seminars and trainings to enhance national capacities and develop policies and strategies on wildfire management in both Armenia and Georgia, through projects such as the "**Enhancing National Capacities on Fire Management and Wildfire Disaster Risk Reduction in the South Caucasus**" project (2009-2017) (GFMC 2022).

At the national level, Georgia's Ministry of Environmental Protection and Agriculture is implementing a forestry sector reform, supported by the GCF and BMZ, while Armenia was engaged in a recently completed Russian Federation-United Nations Development Programme (UNDP) project, focusing on revising and updating its policy and legislation documents regarding forest and wildfire management. Armenia further included wildfire management, risk analysis, and modelling as components of its National Adaptation Plan.

Several organizations from the United States of America have also been actively engaged with fire-, forest-, and DRR-related activities in the South Caucasus. The United States Forest Service has worked with governmental and non-governmental stakeholders from both Armenia and Georgia on sustainable forest and wildfire management through trainings and consultations (United States Forest Service n.d.).[10] Furthermore, the United States Agency for International Development (USAID) has included the cross-cutting theme of "improving disaster prevention, preparedness, and response" as part of its programming strategy for Armenia for 2020-2025, although with a limited focus on fire (USAID 2020).

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, based on the findings from expert consultations and stakeholder interviews, **bilateral co-operation on fire-related topics and solutions both at national and local levels is currently limited** and not the focus of any of the existing projects. 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.

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.

Initiatives in Armenia

- 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 were conducted in Armenia between 2011 and 2013 to develop its National Fire Management Policy (GFMC 2022).
- On 22 January 2015, the Government of the Republic of Armenia published Decision No. 45-A "On Approval of the National Fire Management Policy and its Implementation Strategy and Plan of Actions for Plant Covered Areas in Forests, Specially Protected Nature Areas, Agricultural Lands and Settlements" (Government of the Republic of Armenia 2015).

[10] For example, a training on forest firefighting was conducted in the summer of 2022 at the Khosrov Forest State Reserve in Ararat in Armenia, with support from the United States Forest Service (FPWC 2022).

- In an effort to curb illegal logging, the Tashir Forestry Branch has recently piloted a project that utilizes sensors to detect sounds related to illegal logging activities, which could also be used for early detection of wildfires and forest fires. The first sensors are planned to be tested in the town of Tashir.

Initiatives in Georgia

- 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 conducted in Georgia between 2009 and 2014 (GFMC 2022).
- The Forest Code of Georgia was revised in 2020, and 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).
- 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 recent years, the Kvemo Kartli Forestry Service has been hiring 'fireman rangers' during the fire seasons. Their role is to patrol forest areas that are under the responsibility of the Forestry Service, and to monitor any possible signs of fire danger. If fires are detected, the 'fireman rangers' would then 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.[11]
- 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.
- 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, Georgia 2022).

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

[11] Financed by the DG ECHO, the EU MODEX is part of an exercise series within the EU Civil Protection Mechanism. The main objectives for participants of this training module are to "train self-sufficiency, interoperability, procedures and coordination as well as to use the exercise as a learning opportunity" (EU MODEX n.d.).

3.3 Synthesis

Fires pose a major risk to the landscape of the South Caucasus region. With climate change, the threats posed by fires will likely 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 shared by communities across multiple jurisdictions in border regions, co-operation is crucial in addressing these risks in a holistic and sustainable manner.

In this context, Bolnisi and Sarchapet face the following challenges: (1) there is a strong prevailing misbelief that agricultural burning improves crop productivity; (2) firefighting equipment and related infrastructure are often inadequate; and (3) addressing fires in border areas in a timely manner is complicated by a lengthy procedure in which permission is required from the national security services of both countries.

There are several ongoing and recently completed projects and initiatives in Armenia and Georgia that are related to DRR, fire management and prevention to build upon and complement. These projects partly address the identified fire-related security risks as well as challenges. However, the extent of co-operation between Bolnisi and Sarchapet on landscape fire management and wildfire risk reduction, as well as at the national level between Armenia and Georgia, is currently limited and not the focus of currently implemented projects. 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 Bolnisi and Sarchapet that stakeholders raised during the consultation process, complemented by desk research.

4.1 Awareness-raising and training

Awareness-raising and training were highlighted as important activities on which Bolnisi and Sarchapet could co-operate. Target groups could include farmers, with the goal of enhancing their knowledge of land management, ensuring safe and sustainable fire use, and addressing the commonly held misconception of burning as being beneficial for crop and grass growth.

Another target group could be the youth, as they could benefit from a better understanding of fire hazards and what they could do to support fire prevention and control. Specific activities could include conducting interviews targeted to young people living in the villages, designed in a way that builds their awareness, knowledge, and interest in fire management, and more broadly in land management and climate action. Targeted interviews could also be used to gauge the level of awareness of young people on topics related to climate, environment, and civil protection, particularly with regard to wildfire prevention, preparedness, and defense. The interviews could also be structured so as to understand their requirements to enable them to engage in fire-related activities.

Meanwhile training activities, along with the provision of basic equipment to localize fires, would help ensure that local communities are adequately prepared for fires. Training would also be highly beneficial and, according to stakeholders from Georgia, highly recommended for local volunteer groups if these are to be established and operationalized (see Section 4.3). The recently adopted NEAP-4, which includes activities that aim to strengthen the infrastructure and technical capacity of Georgia's emergency services, could serve as an important guide. For Armenia, support in the provision of equipment and tools for volunteer groups is especially needed to strengthen their capacities.

Awareness-raising and training activities could be held with participants from both Armenia and Georgia simultaneously, so as to offer an opportunity to exchange experiences and skills, for example in land and fire management, as well as to foster good relations. To support awareness-raising activities and trainings, civil society organizations (CSOs) operating in the region, particularly those in Bolnisi, could be engaged, while for Sarchapet, awareness-raising activities fall under the responsibility of the Lori Fire and Technical Safety Inspectorate (see also Chapter 5).

4.2 Co-ordination at local level and between forestry, emergency, and border security services

Throughout the consultation process, stakeholders pointed out the need to establish a co-operation framework at the local level between municipalities and communities, as well as among the forestry, emergency, and border security services within each country. Stakeholders also suggested that a similar co-operation framework could be established between countries, with the ultimate goal of enhancing co-ordination across municipalities, sectors and borders. Such efforts would ideally also simplify the procedure for border crossings in the event of disasters. Co-operation could take different forms, from a looser network to more formalized structures, backed by, for example, a Memorandum of Understanding (MoU) or a signed agreement, and include a simplified procedure for border crossings in the event of disasters. Such co-ordination activities or structures could also include procedures for exchanging information (communication channels by radio or cell phones), or establishing platforms to share knowledge and experiences on DRR, and more specifically on landscape fire management and wildfire risk reduction and fire prevention.

The fire and forestry services of both countries could also co-operate in providing infrastructural and technical support. This could include the construction and maintenance of roads, supply of Sport Utility Vehicles (SUVs), sensors, and water reservoirs (e.g. near the villages of Sarchapet and Privolnoye in Lori). Roads, for example, can act as fire barriers while also enhancing access to hard-to-reach areas.

The activities above are particularly relevant in the case of co-operation between Armenia and Georgia, considering the varying levels of forestry and firefighting capacities between the two countries. As noted by stakeholders, a more comparable level of firefighting capacities between both countries is crucial for co-operation on fire management to be effective and efficient.

4.3 Community fire prevention, management and response

Stakeholders highlighted a growing interest in the conceptualization and establishment of volunteer groups dedicated to fire-related activities. It was suggested that volunteer groups could focus on recruiting the youth, given their interest and willingness in getting involved in such activities. Activities of such groups could include, for example, year-round monitoring of forests for fires, and active engagement in fire prevention and response, as well as in defending local assets against wildfires.

To establish volunteer groups, it would be necessary to draft a co-operation framework that spells out the roles of the groups in fire-related activities, and how their roles fit within the larger scope of work of the forestry, emergency, and border security services. Related to this, there is also a need to establish a system in which volunteer groups can co-ordinate with those from across the border and exchange information, for example on early warning and alert systems.

Finally, as noted by Georgian stakeholders during the interview process, it is imperative to provide specialized training for volunteer groups to ensure that they have the right skills and a clear understanding of concepts and roles in fire prevention and suppression. This activity could draw on the ongoing initiative by the Ministry of Internal Affairs and Ministry of Defence of Georgia in establishing

a brigade of reservists, the activities of the NEAP-4 that aim to enhance Georgia's volunteer system, as well as legislative amendments that call for fire-rescue equipment to be provided for volunteer fire-rescue groups (see Section 3.2.2). Interviewed stakeholders remarked that if such a brigade is applied at the village level, and if sufficient training is provided, such a volunteer group could be highly beneficial. Similarly, for Armenia, support in the provision of equipment for volunteer groups is especially needed to strengthen capacities in fire-related activities.

Box 2: 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:

- **EuroFire Competency Standards and Training Materials**: Developed from 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 (GFMC n.d.). These materials have been translated into the Armenian and Georgian languages.[12] For Georgia in particular, a resource book was published specifically for a training course for firefighters, volunteers, and private and public land managers in the Dedoplistskaro municipality in 2014, with the aim of enhancing the safety and efficiency of firefighting in forests and other vegetation types in the country (GIZ et al. 2014).
- **GFMC guidelines 'Defence of villages, farms and other rural assets against wildfires'**: Published by the GFMC 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 within OSCE participating States to further expand capacities in rural fire management. While the document was prepared for the South-Eastern Europe region as a pilot region, its guidelines have been replicated in other OSCE regions, namely in Eastern Europe and Central Asia (GFMC 2019).[13] 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 et al. 2013).

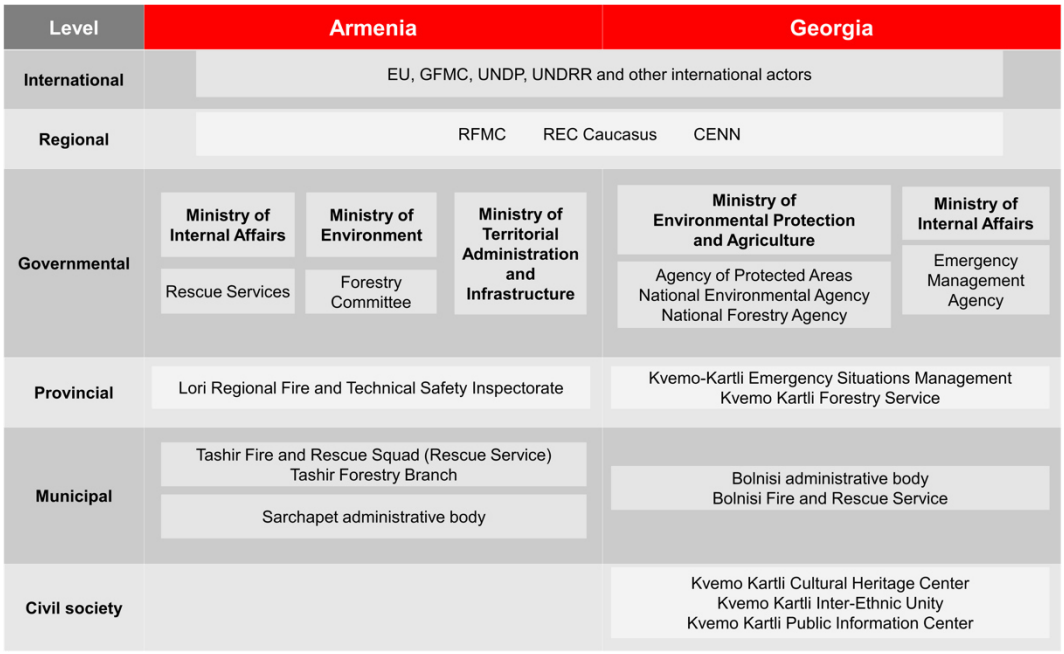
[12] For the full list of translated competency standards and training materials, see https://gfmc.online/eurofire/ef_arm.html (Armenian) and https://gfmc.online/eurofire/ef_geo.html (Georgian).

[13] 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 CSOs such as the Regional Environmental Centre for the Caucasus (REC Caucasus), Regional Fire Monitoring Center for South-Eastern Europe and Caucasus (RFMC), and Caucasus Environmental Non-Governmental Organizations Network (CENN). Figure 2 gives an overview of key stakeholders.

Figure 2: Mapping of key stakeholders.



The core stakeholders are the representatives of the administrative bodies of Sarchapet and Bolnisi. For Sarchapet, activities would require, in addition to the Lori Regional Fire and Technical Safety Inspectorate, the engagement of stakeholders from the Tashir district level. Specifically, the Tashir Fire and Rescue Squad (Rescue Service) and Tashir Forestry Branch are important stakeholders in this regard, given that Sarchapet falls within their operational control. For Bolnisi, its Fire and Rescue Service plays an important role in fire-related activities. However, such activities would also require the engagement of the broader Kvemo Kartli Forestry Service and Emergency Services, as their services cover Bolnisi.

At the local level, in both Bolnisi and Sarchapet, local villagers and farmers would 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, as well as to establish a balanced gender representation.

CSOs operating in Bolnisi could be particularly important in supporting awareness-raising activities on fire prevention and response. The Kvemo Kartli Cultural Heritage Center and Kvemo Kartli Inter-Ethnic Unity have extensive experience in working with ethnic minorities in Bolnisi, as well as in awareness-raising activities in general, although they have limited experience on climate change, environmental and forest-related topics. Meanwhile, local CSOs have been collaborating with experienced national and regional level environmental CSOs on various environmental topics. For example, the Kvemo-Kartli Public Information Center has collaborated with CENN[14] on activities involving youth from both Armenia and Georgia. There are however no registered CSOs in Sarchapet.

At the national level, relevant authorities include, on the Armenian side, the Ministry of Internal Affairs and its Rescue Services, the Ministry of Environment and its Forestry Committee, and the Ministry of Territorial Administration and Infrastructure. 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. These authorities need to be consulted and invited to participate in the project's next activities.

At the regional level, in addition to CENN and REC Caucasus, a key stakeholder is the RFMC, which is the Regional Center for the South-Eastern Europe and the South Caucasus regions. 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 engaged 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.

[14] Caucasus Environmental Non-Governmental Organizations Network (CENN) is a regional development organisation working to protect the environment through fostering sustainable development and green growth throughout the South Caucasus. For more information, see: http://www.cenn.org/about.

6 Conclusions

Climate change creates conditions that are conducive to the occurrence and spread of fires, which are already posing a major risk in the South Caucasus region. Across borders, uncontrolled and undesired fires present environmental, economic, social, and health risks, undermining human security and 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 neighborly relations and broader security and stability in the region.

Extensive consultation activities have shown that the pilot municipalities of Bolnisi in Georgia and Sarchapet in Armenia face several shared challenges related to fires and fire management. These include the prevailing misbelief that agricultural burning improves crop productivity, inadequate firefighting equipment and related infrastructure, as well as lengthy procedures that hamper timely firefighting in border areas.

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, the extent of co-operation between Bolnisi and Sarchapet on landscape fire management and wildfire risk reduction is limited, which is also the case at the national level between Armenia and Georgia.

To enhance co-operation, several shared activities were identified based on consultations and a literature review. These include: (1) awareness-raising among farmers, residents and youth on prevention and control of fires, with participants from Armenia and Georgia attending simultaneously; (2) co-ordination at local level and between forestry, emergency, and border security services, ranging from looser networks to more formalized structures; and (3) community-level fire prevention and response, which could include, for example, the establishment and training of volunteer groups.

Furthermore, co-operation activities between Bolnisi and Sarchapet, and more broadly between Armenia and Georgia, could serve as a guiding example of fire management governance along and across borders. Such an example 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 2023).

Based on the results of this study, this project will proceed to fill the identified gaps by establishing a joint co-operation strategy and implementation plan. 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, 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. In sum, these activities aim to reduce climate-related security risks and promote climate resilience in Northern Armenia and Southern Georgia.

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