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NetTour4Change



HERZEGOVINA-NERETVA CANTON

Identification and assessment of the main Mediterranean and sub-Mediterranean tourism- related issues concerning climate change mitigation and adaptation in HNC

The Consortium:

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Mediterranean
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Junta de Andalucía
Consejería de Turismo,
Cultura y Deporte



ΠΕΡΙΦΕΡΕΙΑ ΚΡΗΤΗΣ
REGION OF CRETE



Hellenic Society
for the Protection
of Nature



Ministarstvo poljoprivrede,
šumarstva i vodoprivrede RSZ



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Project Overview

The Mediterranean region is one of the most vulnerable hotspots in the current biodiversity and climate crises, warming 20% faster than the global average and being the second biodiversity hotspot in the world. The increase of severe climate events is also likely to influence the choice of destinations and time to travel for its over 510 million inhabitants. The effects of climate change will put additional pressure on already strained ecosystems and vulnerable economies and societies, with Tourism being one of the most affected economic sectors.

The recent Transition Pathway for Tourism and the Glasgow Declaration are building a global momentum for Climate Action in Tourism, but policymakers and destinations need support to better develop efficient climate mitigation and adaptation policies using ecosystem-based approaches and improved multi-level governance structures, including robust planning and ensure the long-term engagement of the private sector and citizens. Indeed, ecosystem-based management is considered a good practice to effectively deal with these threats as it considers the different stakeholders and factors affecting ecosystems and the mechanisms involved to find solutions.

NaTour4CChange builds on and capitalises on successful experiences at the Mediterranean and global level to test solutions for increasing the resilience of coastal and sub-coastal destinations in the Mediterranean. The project will aim to set common methods to allow participating regions to assess their tourism-related climate adaptation and mitigation priorities, and take climate action via plans and strategies, supported by cooperative governance.

In pilot destinations, cross-sector teams will deliver specific tourism Climate Action Plans - CAP, focusing on climate adaptation, where Nature-based Solutions (NbS) will be tested to ensure their feasibility. At the same time, innovative destination marketing and communication approaches will engage private stakeholders, visitors, and residents in climate action.

The project will also ensure cross-fertilisation among participating regions and destinations, to achieve common methods and to compare the different tested plans and solutions, leading to lessons, best practices, and policy.



Glossary

Climate Change Adaptation (CCA) means anticipating the adverse effects of climate change and taking appropriate measures to prevent or minimise the damage they may cause, or to take advantage of the opportunities that may arise.

Climate Change Mitigation (CCM) means making the impacts of climate change less severe by reducing the sources of emission of greenhouse gases (GHG) into the atmosphere or by improving the storage of these gases.

Ecosystem Services (ES) are the benefits that an ecosystem brings to society and that improve people's health, economy, and quality of life.

Ecosystem-based Approaches (EbA) focus on managing biodiversity and ecological systems in a holistic way to maintain and enhance ecosystem services benefits and functions.

Nature-based Solutions (NbS) encompasses all actions that rely on ecosystems and the services they provide to respond to various societal challenges such as climate change, food security, resource management, or disaster risk.



1. INTRODUCTION

1.1. CLIMATE CHALLENGES FOR MEDITERRANEAN TOURISM

Hazards related to climate change like heat waves, forest fires, droughts, and floods, are increasingly emphasize the need for the tourism industry to adapt. Extreme temperatures and related issues are particularly noticeable in Mediterranean destinations. These impacts are expected to change seasonal tourism patterns, shape travellers' destination decisions and are likely to reduce the appeal of warmer tourist destinations while increasing the appeal of cooler regions in summer. Besides, variations in precipitation also pose as a threat, and destinations receiving too much or too little precipitation. It could be said that tourism and climate are inextricably linked, as climate shapes tourism activities in many aspects.

The adverse impacts of climate change on the tourism sector in general are related to:

- reduction in tourist demand in the summer months due to high temperatures and increased UV radiation
- different visitation rates due to extreme weather events
- reduction or loss of attractiveness of ecosystems and biodiversity as the main elements of attraction in tourism
- reduction in water availability and damage to various infrastructure systems (wastewater drainage, solid waste disposal, beach infrastructure, accommodation infrastructure, horticulture of hotel complexes, etc.) and/or their reduced functionality.

Besides, changes in climate patterns could also lead to **positive implications**, such as more favourable climate conditions in the off-season and pre-season can have a positive effect on reducing the impact of seasonality and extending the season.

Recent studies indicate the profound vulnerability of **Nature-based Tourism - NBT¹** destinations, especially in relation to extreme weather events and climate change. Investments in resilient infrastructure and other adaptive measures increase the operational costs of tourism. In some cases, carrying out capital projects for adaptation or mitigation exceeds the capacity of tourism businesses. This increases the vulnerability of the economy, especially for small and medium-sized enterprises and local communities whose livelihoods depend on tourism. Furthermore, promoting responsible travel can be challenging as tourists choose convenience and price over sustainability.

¹

Nature-based tourism is tourism centred on natural attractions like parks, hiking, and wildlife watching. It encourages the conservation of habitats by providing economic incentives for local communities and landowners.

1.2. AREA OF INTEREST, PURPOSE, AND STRUCTURE OF THE DOCUMENT

Area of interest is **Herzegovina-Neretva County (HNC)** as an administrative region located in the southern part of Bosnia and Herzegovina. It is known for its diverse landscapes, including the Neretva River valley and the Adriatic coastline. The county's economy relies heavily on agriculture, tourism, and manufacturing industry. As a main town in HNC, Mostar serving as political, cultural, and economic centres. It features a rich history and cultural heritage, including the famous Stari Most bridge in Mostar, a UNESCO World Heritage site. The region plays a vital role in promoting tourism, especially for its natural beauty and historical sites.

The data collected within this document represent the basis not only for the development of the **Regional Strategy for Climate Change Mitigation and Adaptation in HNC**, but also the **Climate Action Plan** for tourism destination **Hutovo Blato Nature Park** (NP Hutovo Blato), located in the area of the City of Čapljina. NP Hutovo Blato is a Ramsar-listed wetland of international importance since 2001, was designated a nature park in 1995. The Ramsar Convention promotes the wise use of wetlands—especially as bird habitats—through local, regional, and national measures and international cooperation. Including Hutovo Blato in this project is therefore significant not only for its exceptional biodiversity, but also for its socio-economic benefits to the local community and the HNC.

The purpose of this document is to identify and assess key issues and related solutions (measures) linking Mediterranean and sub-Mediterranean tourism with climate issues - **mitigation and adaptation**. It poses as foundation for drafting regional climate-tourism strategy for the HNC with the aim to secure long-term climate resilience and sustainable tourism at regional level. In addition, the document aims to strengthen the climate resilience of the tourism sector of the Hutovo Blato NP pilot site, which are aligned with existing measures in the field of nature protection.

Finally, this document guides the action of regional and local stakeholders to provide an operational framework and approaches for the implementation of one of the possible **Nature-based Solutions - NbSs**.

This document is **Deliverable 2.4.1.** of the NaTour4CChange project - "Managing sustainable tourism in areas of high ecological value: reconnecting tourism and nature to address the climate crisis through an ecosystem-based approach", funded by the Interreg Euro-MED program.

The project partner is the **Ministry of Agriculture, Forestry and Water Management of the HNC**.



The aim of this document (and project) is to provide evidences for design of appropriate **NbS** as effective management tool for climate resilient tourism in ecologically valuable areas (Figure 1.1.), such as NP Hutovo Blato.



Figure 1.1. Defining Nature-based Solutions (Source; IUCN, 2020)²

NbSs tackle a range of significant challenges including climate change mitigation and adaptation by enhancing ecosystem resilience and carbon sequestration. They address biodiversity loss through habitat protection and restoration, supporting species diversity. NbSs could also be applied to combat natural disasters by stabilizing coastlines and preventing erosion. In urban environments, they improve air quality and reduce heat, contributing to healthier living conditions. Additionally, NbSs provide water management benefits by improving water quality and availability and promoting sustainable agriculture. These actions certainly foster social well-being and economic opportunities by creating green jobs and supporting sustainable livelihoods.

The structure of this document follows the logic of presenting the analysis of the situation in the field of mitigation and resilience of tourism to climate change, as well as findings and new knowledge based on the presented data and estimates. Therefore, in the first part (analysis of the situation) the evaluation of the HNC attributes is presented with the results of the vulnerability and climate risk assessment. The second part is dedicated to recommendations how to overcome variety of challenges that can slow down or prevent the success of climate actions.

² Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN

1.3. POLICY FRAMEWORK AND METHODOLOGICAL APPROACH

Relevant strategic, planning and reporting documents and data sources

available at the level of Bosnia and Herzegovina (BiH), Federation of Bosnia and Herzegovina (FBiH), and for the regional (HNC) and local level (NP Hutovo Blato) were analysed, including UN and EU policy framework and data sources:

a) BiH and FBiH documents:

- Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and Herzegovina³
- Draft of the Integrated Energy and Climate Plan of Bosnia and Herzegovina (NECP) for the period up to 2030⁴
- NAP with Proposal of Measures, UNDP BiH, September 2021⁵
- Framework Energy Strategy until 2035⁶
- National Renewable Energy Action Plan⁷
- National Determined Contribution for BiH for the period 2020-2030⁸
- Fourth National Communication and Second Biennial Communication on Greenhouse Gas Emissions in Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, 2021⁹
- Third Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina Under the United Nations Framework Convention on Climate Change, 2022¹⁰
- Bosnia and Herzegovina - Annual Implementation Report 2024 (Energy Community Secretariat)¹¹
- Climate Change Adaptation Plan of Bosnia and Herzegovina¹²
- Strategy for Tourism development of Bosnia and Herzegovina 2022 - 2027¹³
- Strategy and action plan for protection of biological diversity in Bosnia and Herzegovina 2015-2020¹⁴

3

https://unfccc.int/sites/default/files/resource/ENG_CC%20adaptation%20and%20Low%20emission%20development%20Strategy%20BiH%202020-2030.pdf

⁴ <https://kfbih.com/aktuelnosti-iz-komore/pripremljen-nacrt-integriranog-energetskog-i-klimatskog-plana-bosne-i-hercegovine-necp-za-razdoblje-do-2030-godine/>

⁵ <https://unfccc.int/sites/default/files/resource/NAP-Bosnia-and-Herzegovina%20.pdf>

⁶ 19042022_Framework_Energy_Strategy_of_BiH_until_2035_ENG_FINAL.pdf (mvteo.gov.ba)

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https://www.mvteo.gov.ba/data/Home/Dokumenti/Energetika/23092021_NREAP_2016_BH_ENG.pdf

⁸ https://unfccc.int/sites/default/files/NDC/2022-06/NDC%20BiH_November%202020%20FINAL%20DRAFT%2005%20Nov%20ENG%20LR.pdf

⁹ https://unfccc.int/sites/default/files/resource/FNC%20BiH_ENG%20fin.pdf

¹⁰ https://unfccc.int/sites/default/files/resource/TBUR%20BiH_Oct_%202022%20ENG.pdf

¹¹ file:///C:/Users/japan/Downloads/IR2024_BosniaHerzegovina.pdf

¹² <https://unfccc.int/sites/default/files/resource/NAP-Bosnia-and-Herzegovina%20.pdf>

¹³ https://fmoit.gov.ba/wp-content/uploads/dokumenti/hrvatska-FINALNI_FBIH-STRATEGIJA-RAZVOJA-TURIZMA-2022-2027-novembar-2023.pdf

¹⁴ <https://www.cbd.int/doc/world/ba/ba-nbsap-v2-en.pdf>



- Disaster Response Assessment and Roadmap for Bosnia and Herzegovina¹⁵
- Law on Environmental Protection (Official Gazette of the Federation of Bosnia and Herzegovina (No. 15/21)
- Landscape Fire Management Report on the level of the Federation of Bosnia and Herzegovina¹⁶
- project Joint Action to Reduce Increased Risk of Forest Fires to Nature and People in the Context of Climate Change in Bosnia and Herzegovina.

b) HNC documents:

- Herzegovina-Neretva County Development Strategy for the period 2021-2027¹⁷
- Herzegovina-Neretva County Tourism Development Strategy 2011-2021¹⁸
- Federal Hydrometeorological Institute of Bosnia and Herzegovina - announcements¹⁹
- Tourism Development Strategy of the West Herzegovina County for the period 2020 - 2027²⁰
- Rural Development Strategy of Herzegovina-Neretva County 2021-2027²¹
- Development Strategy for Small and Medium-sized Enterprises in the Herzegovina-Neretva County /Canton for the period 2012-2020²²
- Small Business/Economy Development Strategy of HNC County/Canton for the period 2023-2027²³.

c) HNC region and local documents:

- Spatial Plan of the City of Municipality of Čapljina 2023²⁴
- Integrated Development Strategy for Čapljina 2017-2027²⁵
- Management Plan for Hutovo Blato Nature Park²⁶

¹⁵ <https://files.acquia.undp.org/public/migration/ba/Disaster-Response-Assessment-and-Roadmap-for-Bosnia-and-Herzegovina.pdf>

¹⁶ https://lfmwb.net/wp-content/uploads/2025/05/LANDSCAPE-FIRE-MANAGEMENT-REPORT-Federation_BiH.pdf

¹⁷ <https://skupstina-hnk.ba/wp-content/uploads/2022/07/STRATEGIJA-RAZVOJA-HNK-BS.pdf>

¹⁸ [https://www.vlada-hnz-](https://www.vlada-hnz-k.ba/sites/default/files/17.11.strateska_platroma_hnk_2021_2027_nacrt_mm_1.pdf)

[k.ba/sites/default/files/17.11.strateska_platroma_hnk_2021_2027_nacrt_mm_1.pdf](https://www.vlada-hnz-k.ba/sites/default/files/17.11.strateska_platroma_hnk_2021_2027_nacrt_mm_1.pdf)

¹⁹ <https://www.fhmzbih.gov.ba/>

²⁰ [https://environment.ec.europa.eu/strategy/biodiversity-strategy-](https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_enhttps://www.vladazh.com/Dokumenti/ZPP/strategija_razvitka_turizma_upanije_zapadnohercegovake_-_finalna_verzija.pdf)

[2030_enhttps://www.vladazh.com/Dokumenti/ZPP/strategija_razvitka_turizma_upanije_zapadnohercegovake_-_finalna_verzija.pdf](https://www.vladazh.com/Dokumenti/ZPP/strategija_razvitka_turizma_upanije_zapadnohercegovake_-_finalna_verzija.pdf)

²¹ https://mpsv-hnz-k.ba/wp-content/uploads/2021/06/Nacrt-Strategije-ruralnog-razvitka-HN%C5%BD-K_280621.pdf

²² <https://privredahnk.gov.ba/wp-content/uploads/2024/02/DEVELOPMENT-STRATEGY-FOR-SME-IN-THE-HNC-2012-2020.pdf>

²³ <https://privredahnk.gov.ba/wp-content/uploads/2024/02/Nacrt-Strateske-platforme-Strategije-razvoja-malog-i-srednjeg-poduzetnistva-HNK-Z.pdf>

²⁴ <https://capljina.ba/2023/10/27/prostorni-plan-grada-capljina/>

²⁵ <https://capljina.ba/wp-content/uploads/2018/01/Strategija-razvoja-opcine-Capljina-2017-2027.pdf>

²⁶ https://hutovo-blato.ba/wp-content/uploads/2018/08/plan_upravljanja.pdf

- Water Management Plan for the Adriatic Sea River Basin District 2022 – 2027²⁷
- Development Strategy of Mostar for the period 2022-2027²⁸.

d) International and EU documents:

- Paris Agreement²⁹
- Long-term low greenhouse gas emission development strategy of the European Union and its Member States³⁰
- EU Strategy on Adaptation to Climate Change³¹
- EU Biodiversity Strategy for 2030³²
- Copernicus EU³³
- Guidelines for the Implementation of the Green Agenda for the Western Balkans³⁴
- Green Agenda for the Western Balkans³⁵
- Policy Report on the Green Transition in the Western Balkans (Edition 2024)³⁶
- Missed Targets: Insights into the draft NECPs of the Western Balkans³⁷
- Financing Framework for the Sustainable Development Goals in Bosnia and Herzegovina³⁸
- 3rd Environmental Performance Review of Bosnia and Herzegovina, 2018³⁹
- Development of master curricula for natural disasters risk management in Western Balkan countries⁴⁰.

All the above documents recognize the issue of the impact of climate change and necessity of responsible planning, management, and improvements to provide foundation for tourism while respecting the principles of sustainability.

²⁷ <https://avpjm.jadran.ba/plan-upravljanja-vodama/3>

²⁸ <https://www.mostar.ba/storage/2022/11/Strategija-razvoja-Grada-Mostara-2022.-2027.-B.pdf>

²⁹ <https://unfccc.int/process-and-meetings/the-paris-agreement>

³⁰ <https://unfccc.int/documents/210328>

³¹ https://climate.ec.europa.eu/eu-action/adaptation-and-resilience-climate-change/eu-adaptation-strategy_en

³² https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en

³³ <https://insitu.copernicus.eu/state-of-play/data-providers>; <https://cis2.eea.europa.eu/data/list/>

³⁴ https://enlargement.ec.europa.eu/system/files/2020-10/green_agenda_for_the_western_balkans_en.pdf

³⁵ https://enlargement.ec.europa.eu/document/download/75bf7b7b-0ecc-40ba-893a-4d45d4ea6ddb_en?filename=factsheet_wb_green_agenda_en.pdf

³⁶ https://www.westernbalkans-infohub.eu/wp-content/uploads/2024/08/Report_Green-Transition_final.pdf

³⁷ <https://caneurope.org/content/uploads/2023/11/NECPWBReport2023-.pdf>

³⁸ https://zamisli2030.ba/wp-content/uploads/2019/12/BiH_SDG_Financing-Framework-for-gov.-adoption-2023.pdf

³⁹ https://unece.org/sites/default/files/2021-08/ECE.CEP_.184.Eng_.pdf

⁴⁰ https://ec.europa.eu/programmes/erasmus-plus/project-result-content/3f2e79f0-053a-4f91-bff4-44c34fa240cb/Report_on_natural_disasters_in_WB.pdf

The methodology approach for drafting this document relies on desk research of the relevant strategic, planning, reporting documents, data sources available at the level of BiH, FBiH, region of HNC and NP Hutovo Blato at the local level.

Data for climate threats and tourism trends were collected from above mentioned document and **available data sources** (e.g., Federal Hydrometeorological Institute of BiH, Federal Statistical Office). Spatial, and socio-demographic data were also considered. An expert assessment of vulnerability and climate risks was undertaken through **participatory approach** via a questionnaire to finally develop climate risk assessment (Chapter 3). The questionnaire was distributed to decision makers, tourism managers and experts, and the local community (a total of 14 respondents), with the focus on:

1. Tourism infrastructure
2. Tourism offers
3. Protected areas.

Following **guidelines** are also considered:

- Methodological Frameworks for Regions and Destinations for Assessing the main coastal tourism-related Issues Concerning Climate Change” (Deliverable 1.4.1. and 1.4.2. of the NaTour4CChange project),
- Climate Action Planning Toolkit for Mediterranean Regional Authorities and DMOs (Deliverables 1.5.1, 1.5.2 and 1.6.1. of the NaTour4CChange)⁴¹,
- Blueprint for Tourism Climate Action Plans – A Guide for Regional Authorities and Destination Management Organizations (DMOs)⁴²,
- Glasgow Declaration on Climate Action in Tourism⁴³,
- IPCC guidelines for vulnerability and resilience analysis (GIZ⁴⁴ & EURAC⁴⁵)
- UN⁴⁶, EU⁴⁷, EEA⁴⁸ and BiH⁴⁹ documents, and good practices^{50,51}.

⁴¹ <https://natour4cchange.interreg-euro-med.eu/wp-content/uploads/sites/49/n4cc-climate-action-planning-toolkit-1.pdf>

⁴² <https://sustainable-tourism.interreg-euro-med.eu/wp-co>

⁴³ <https://www.untourism.int/the-glasgow-declaration-on-climate-action-in-tourism?utm>

⁴⁴ Zebisch, M.; Renner, K.; Pittore, M.; Fritsch, U.; Fruchter, S.R.; Kienberger, S.; Schinko, T.; Sparkes, E.; Hagenlocher, M.; Schneiderbauer, S.; et al. Climate Risk Sourcebook, 2nd ed.; Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: Bonn, Germany, 2023; pp. 1–201.

⁴⁵ European Environment Agency. European Climate Risk Assessment Executive Summary—EEA Report No. 1/2024, 1st ed.; EEA: Copenhagen, Denmark, 2024; pp. 1–39.

⁴⁶ <https://www.oneplanetnetwork.org/knowledge-centre/resources/climate-action-tourism-sector-overview-methodologies-and-tools-measure>

⁴⁷ <https://climate-adapt.eea.europa.eu/en/mission/the-mission/about-mip4adapt>; <https://climate-adapt.eea.europa.eu/en/mission>

⁴⁸ European Environment Agency: <https://www.eea.europa.eu/en/analysis/publications/european-climate-risk-assessment>

⁴⁹ EEA methodologies for calculating indicators, Anex 1:

<https://unfccc.int/sites/default/files/resource/NAP-Bosnia-and-Herzegovina%20.pdf>

⁵⁰ <https://sustainable-tourism.interreg-euro-med.eu/2025/10/17/implementing-regional-climate-action-plans-for-tourism-start-building-your-action-plan-today/>

⁵¹ <https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/sector-policies/tourism>

2. REGIONAL CONTEXT OF CLIMATE AND TOURISM IN HNC

The spatial, climate and the socio-economic profile of HNC provides essential insight into the regional characteristic and capacities for climate actions – mitigation and adaptation. Understanding geographical, geomorphological, climate and demographical context, including economic trends is critical for assessing the climate impacts on tourism in HNC, as well as the capacity to support resilience of tourism-related activities.

2.1. SPATIAL AND SOCIO-ECONOMIC CHARACTERISTICS OF HNC

2.1.1. SPATIAL CHARACTERISTICS

The HNC administratively belongs to the FBiH⁵². It is situated in the south-western part of FBH, with the seat of the Government and the Assembly in the City of Mostar. The area of HNC includes 9 local self-government units: The City of Mostar, City of Čapljina and City of Konjic, and following municipalities: Čitluk, Jablanica, Neum, Prozor-Rama, Ravno and Stolac (Figure 2.1).

HNC is of strategic importance for FBiH, as it connects the country to the Adriatic Sea. It is distinguished by its rich cultural and natural heritage, with historic cities like Mostar, Stolac, and Počitelj. The Neretva River flows through the region, creating fertile valleys that support agricultural development. Additionally, the coastal area in Neum, with its Mediterranean climate, is ideal for tourism development. The most developed sectors in HNC are agriculture, industry (predominantly processing industry), and tourism.

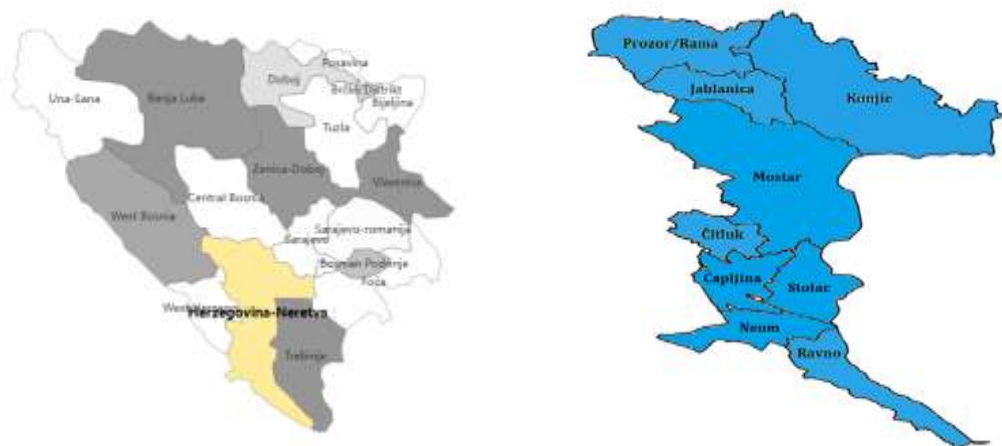


Figure 2.1. Geographical position of HNC in BH (left), and map of the HNC (right)

⁵² Article I. 3 of the Constitution of BiH defines BiH as a state consisting of two entities, the Federation of BiH (FBH/Federation) and the Republic of Srpska (RS).



The landscape of HNC is characterized by a variety of natural features, including plateaus, canyon valleys, wetlands, and rare hydrological phenomena, forming a unique ecosystem. This diversity results from extensive geological development and its position between continental and coastal influences. Located in the Dinaric karst, the area features an underground network of watercourses that shape the environment, with water flowing both on the surface and underground through caves, channels, and sinkholes. The karst landscape produces fertile zones like **Nature Park Hutovo Blato** (NP Hutovo Blato) but also challenges that arise due to the water levels of the rivers that affect this protected area (the Buna and Krupa rivers).

The primary water source is the **Neretva River**, fed by numerous tributaries such as Rama, Grabovica, Drežnica, Buna, Radobolja, Trebižat, Krupa, and Bregava. These waterways form a complex system vital for local life, irrigation, and food production. Accumulations in the HNC, including lakes and reservoirs, play a crucial role in energy production, environmental protection, and tourism, offering extensive ecosystem services. They contribute to flood control—Jablanica Lake protects Mostar—stabilize river flow during droughts and improve water quality by settling pollutants. Large water bodies influence the microclimate, reducing temperature extremes, and support hydropower, decreasing reliance on fossil fuels. These reservoirs also provide water for agriculture, industry, and drinking, stimulating economic growth.

Water resources and landscapes are the basis for the development of tourism and recreation, which includes attractions such as PP Hutovo Blato and Blidinjsko, Boracki and Blatački lakes. They also have cultural and scientific significance, attract researchers and provide habitats for endangered species such as migratory birds and endemic fish species, contributing to the preservation of biodiversity. Overall, the diverse natural and hydrological features of HNC represent the basis for further improvement of energy security, tourism, agriculture while preserving the local identity.

2.1.2. DEMOGRAPHIC DATA

In 2013, the HNK had a population of 222,007, but by 2024 the number had fallen to around 212,100⁵³, because of emigration and migration from rural to urban areas (Table 2.1). The share of the urban population in the HNK is 42.5%. The largest urban centre is Mostar (around 63% of the urban population of the county). Due to its importance for tourism, Figure 2.2. highlights the multi-year population trend in Čapljina. This demographic trend is not satisfactory, as tourism relies on the labour force from the local population pool, which is in significant decline.

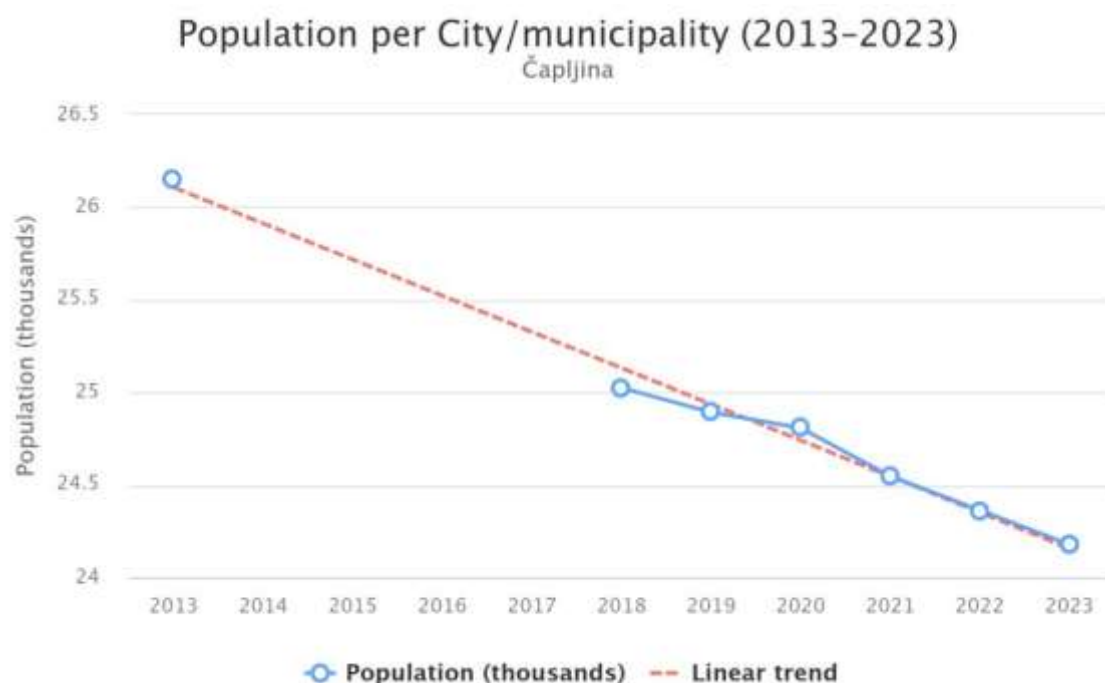
⁵³ Federal Statistical Office: <https://fzs.ba/index.php/demografiska-statistika-statisticki-bilteni/>



Table 2.1. Overview of the population by cities/municipalities of HNC according to the 2013 census and population estimates for 2018-2023

City/ municipa lity	2013	2018	2019	2020	2021	2022	2023	2024
Čapljina	26,157	25,024	24,892	24,807	24,547	24,363	24,178	23,992
Čitluk	18,14	17,955	17,944	17,916	17,843	17,828	17,733	17,700
Jablanica	10,111	9,730	9,658	9,622	9,517	9,440	9,380	9,265
Konjic	25,148	24,140	23,959	23,770	23,445	23,135	22,936	22,82
Grad Mostar	105,794	105,371	105,203	105,074	104,409	103,948	103,685	103,467
Neum	4,653	4,432	4,389	4,369	4,371	4,358	4,342	4,340
Prozor- Rama	14,280	13,643	13,515	13,414	13,271	13,104	12,960	12,823
Ravno	3,219	3,201	3,209	3,197	3,210	3,204	3,218	3,223
Stolac	14,502	14,269	14,201	14,079	13,910	13,747	13,669	13,621
Total	222,004	217,765	216,970	216,248	214,523	213,127	212,101	211,251

Source: Federal Statistical Office, 2024.



Source: Federal Statistical Office of Bosnia-Herzegovina, 2024

Figure 2.2. Declining population trend in the city of Čapljina (source: Federal Statistical Office, Map: Plan Bleu)

2.1.3. ECONOMIC TRENDS AND CONNECTIVITY ISSUES

In 2024, HNC recorded a total of 57,200 employed persons, distributed across several main sectors according to the National Classification of Activities (NKD 2007)⁵⁴. The employment landscape of HNC is notably diverse, reflecting a balanced **mix of industrial, service, and public-sector activities** (Table 2.2.).

The **service sector** dominates the employment structure, accounting for over **70% of total jobs**, which aligns with trends in other Mediterranean and Central European regions transitioning toward service-oriented economies. The wholesale and retail trade sector (18.8%) are the single largest employer, reflecting the canton's strong commercial base and cross-border trade activity.

Table 2.2. Employment structure in HNC by sector

Economic Activity (NKD 2007)	Number of Employees	Share (%)
C – Manufacturing Industry	7,623	13.3
G – Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	10,758	18.8
H – Transportation and Storage	2,969	5.2
I – Accommodation and Food Service Activities (Tourism and Hospitality)	4,578	8.0
O – Public Administration and Defence; Compulsory Social Security	5,099	8.9
P – Education	5,229	9.1
Q – Human Health and Social Work Activities	5,682	9.9
Other Sectors	15,261	26.7
Total Employment	57,200	100.0

Source: Institute of Statistic FBiH⁵⁵

The manufacturing industry employs 13.3% of the workforce, representing a vital but modest component of regional economic output. Although smaller in scale, this sector contributes to export competitiveness and local supply chains, particularly in food processing, metalworking, and construction materials.

Public services, including public administration (8.9%), education (9.1%), and health and social care (9.9%), together account for over a quarter of all employment. This segment provides essential services of social stability, including care for vulnerable populations. The relatively high share of health and social protection activities is particularly relevant in light of demographic

⁵⁴ <https://fzs.ba/wp-content/uploads/2025/07/hercegovacko-neretvanski.pdf>

⁵⁵ Federal Statistical Office: <https://fzs.ba/wp-content/uploads/2025/06/8.4.pdf>; <https://fzs.ba/wp-content/uploads/2025/07/hercegovacko-neretvanski.pdf>

trends showing an ageing population of HNC. These sectors play a critical role in disaster preparedness, emergency response, and community health resilience, and pose as key factors in vulnerability assessment.

The county is located on key traffic routes that connect Bosnia and Herzegovina with Croatia, and therefore with the rest of Europe. Road traffic is developed because the main road routes pass through this county and connect it with other parts of Bosnia and Herzegovina, but also with neighboring countries. The most important road route is the M17 highway that connects Mostar with Sarajevo in the north and with Dubrovnik in the south, across the border with Croatia.

Although the M17 road is crucial for connectivity and the importance of road traffic, it is burdened with **traffic jams** during the tourist season. Therefore, the development of transport infrastructure is crucial for economic growth, tourism and connectivity in general. In accordance with the objectives of the County Spatial Development Plan, the main task is to raise the level of development of the **road network** to the level reached by European countries, due the necessity of inclusion in the BiH in EU transport system.

Rail traffic is not as developed as road traffic. Rail traffic in the region still has a number of limitations but is considered important for the transport of goods and people to the Adriatic coast. The main railway line connects Mostar with Sarajevo. Although Neum has access to the sea, **maritime transport** is not particularly developed due to geographical limitations and the absence of major ports. **Air transport** is increasingly important (Figure 2.3.). Mostar Airport provides direct flights to an increasing number of European destinations.

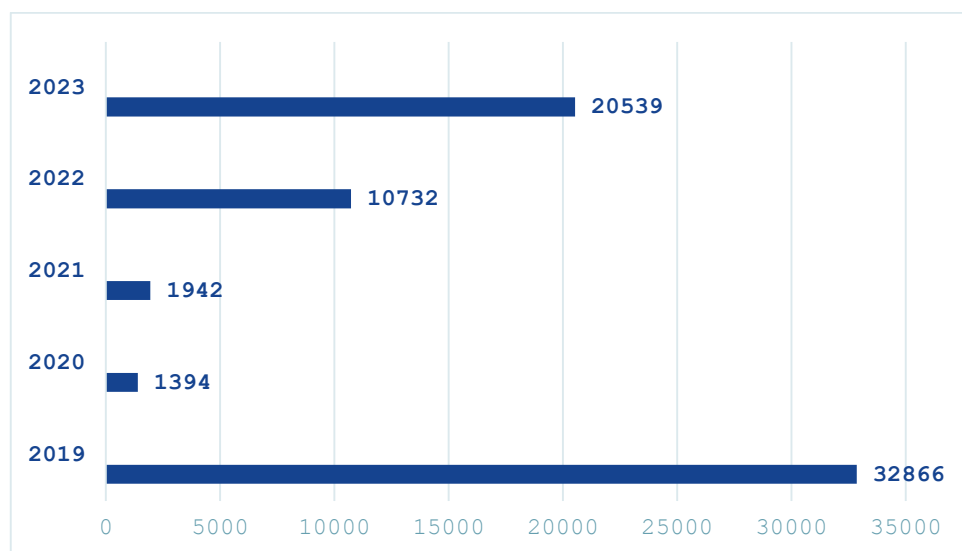


Figure 2.3. Number of passengers at Mostar Airport 2019-2023. (Source: Directorate of Civil Aviation 2024)



2.1.4. TOURISM CHARACTERISTIC AND TRENDS

The tourist potential is based on a combination of natural beauty, cultural heritage, adventure tourism and gastronomic offer. Infrastructure development, promotion of this area and investments in sustainable tourism can enable the HNC to become one of the most attractive destinations for all types of tourists. The oldest traces of human existence in the area of today's HNC were discovered in the Badanj cave near Stolac. This important archaeological site, which was discovered in 1976, dates to 13,000 to 12,000 BC. HNC is located at a strategic crossroads between the Adriatic Sea and the Balkan interior, the Neretva Valley has been a key road and trade artery for centuries, shaping the cultural mosaic of this region. In this mosaic, different civilizations meet, and traces of their influence are visible in the rich cultural and historical heritage: from ancient sites and medieval cities to Ottoman bridges and traditional villages, which testify to the different peoples, beliefs and architectural styles that have shaped this area over the centuries.

On the labour market side, the **share of tourism** in employment is still relatively modest and amounts to **8.0%** in 2024. Observing its growth in last decade, Accommodation and Food Service and other NKD activities related to tourism could be significant contributor to regional income in short or mid-term. **Seasonal employment peaks** in tourism and hospitality sector indicate high vulnerability to climate variability and economic shocks, underlining the importance of resilience planning and workforce diversification. HNC has seen an increase in tourist traffic in recent years, therefore the development of ecological, cultural, rural and cyclo-tourism also contributes to the diversification of the tourist offer. Besides, other well-known destination in **neighbourhood countries** is relatively close to it.

In general, **tourism trends** refer to changes in travel patterns and trends, visits to specific destinations, and tourist movements over time. They can encompass various aspects of tourism, including seasonality, tourist preferences, types of tourism, and demographic changes in the tourist population. Tourism trends in HNC vary throughout the year.

The main factors shaping tourism trends are:

- **Seasonality of tourism** refers to variations in the number of tourists visiting specific destinations or regions at different times of the year. These variations usually follow natural, social, and cultural cycles, and significantly affect the tourism industry. Two seasons stand out in the HNC area – summer and winter. The summer season (June–September) is the busiest tourist season, especially in the coastal parts of the county such as Neum. Cities Mostar, Čapljina and Međugorje also record an increase in the number of visitors during this period. Winter tourism (December–February) is not as developed as summer tourism. Exists in mountainous areas such as Blidinje



(Blidinjsko Lake), which is popular for skiing and other winter sports. In recent years, mountaineering and ecological tourism outside this period have been increasing.

- **Continuity of development of special forms of tourism** refers on rural and ecological tourism, and recently on outdoor tourism. These forms of tourism have been growing in recent years, and visitors are looking for authentic experiences in HNC (Figure 2.3.). Mountain huts, rural hotels and other accommodation, and agro tourism offer a holiday in nature, traditional cuisine, and opportunities for walks, cycling and other activities. An increase in **outdoor** tourism as environmentally friendly activities (hiking, cycling, rafting, kayaking) is also recorded, which includes activities such as rafting on the Neretva, hiking (especially on Prenj, Čvrsnica and Velež), as well as the development of cyclo-tourism.
- **The share of foreign tourists** is quite large, especially from Croatia, the United States, Germany, and Turkey in the summer season, while the winter season mainly attracts visitors from local and regional destinations. The proximity of Croatia as an increasingly important destination also affects tourism in the HNC.
- **Accommodation capacities are still developing**, as evidenced by the increase in the number of beds in recent years, as well as campsites that have been active since 2021 (Table 2.3.). However, it could be said that statistic should provide more recent data to track actual trends and to be capable of timely planning.

Table 2.3. Tourist arrivals and overnight stays by type of facility

Year/Type of accommodation	Tourist arrivals			Overnight stays		
	Total	Domestic	Foreign	Total	Domestic	Foreign
2020	66.637	50.046	16.591	204.237	161.436	42.801
Hotels	63.785	47.650	16.135	197.634	155.588	43.046
Resorts	2.852	2.396	456	6.603	5.848	755
Number of beds	4.510					
2021	116.478	65.716	50.762	273.457	153.863	119.594
Hotels	110.203	60.268	49.935	258.536	141.119	117.417
Resorts	6.157	5.366	791	14.756	12.642	2.114
Camps	118	82	36	165	102	63
Number of beds	4.505					



2022	207.018	84.237	122.781	479.541	184.155	295.386
Hotels	198.289	78.162	120.127	460.093	170.426	289.667
Resorts	8.669	6.030	2.639	19.369	13.669	5.700
Camps	60	45	15	79	60	19
Number of beds	6.228					
2023	246.914	82.843	164.071	537.885	177.825	360.060
Hotels	236.647	75.525	161.122	515.790	160.556	355.234
Resorts	9.266	6.561	2.705	20.419	15.984	4.435
Camps	1.001	757	244	1.676	1.285	391
Number of beds	5.129					

Source: Federal Institute of Statistics, 2024

According to data from the Federal Institute of Statistics (2022), the HNC has recorded a 15% annual growth in the number of tourists in the last decade, with an emphasis on outdoor activities during the summer season (Figure 2.4.). Mostar attracts 80% of visitors, while Neum, the only city in Bosnia and Herzegovina on the coast, records the longest stays (an average of 7 nights).



Figure 2.4. Outdoor tourism, rafting on Neretva River (Source: Tourism BiH⁵⁶)

Regarding to strategic and planning documents⁵⁷ and some analysis⁵⁸, the goal is to carefully **plan and organize the tourist offer**. That implies establishing travel agencies, increasing accommodation capacity, protecting, and preserving national and natural monuments, including education in the field of tourism and hospitality. For other sectors the goal is to simultaneously carry out

⁵⁶ <https://www.tourismbih.com/about/>

⁵⁷ documents are listed in Introduction section

⁵⁸ <https://documents1.worldbank.org/curated/en/635971620703980472/pdf/Bosnia-and-Herzegovina-Tourism-Sector-Diagnostic-Challenges-and-Opportunities-for-Sector-Excellence.pdf>



activities aimed at putting agricultural production, entrepreneurship, and crafts in the service of tourism development. The existing entrepreneurial and industrial potentials should serve the development of environmentally friendly smaller production facilities, more intensive development of crafts, opening smaller facilities and workshops.

The use of **environmentally friendly practices**, with an emphasis on the preservation of cultural and natural resources, can create a foundation for long-term sustainability. Promoting tourism that integrates local agricultural production, and cultural tradition further contributes to economic development, providing visitors with authentic experiences, while supporting and strengthening local communities. For instance, **selective forms of tourism** that have great development potential in HNC are outdoor tourism (hiking, cycling, rafting) and gastro tourism based on local, organically produced food. This form of tourism contributes to the preservation of cultural heritage and local traditions, while supporting sustainability of local community.

For tourism & industry, adaptation will require changes in period of operation, relocation of activities, development of less climate-dependant supply chain. Insurance will have a great role to play for **SMEs**. Adaptation will largely be autonomous, private, and local, although public action may be needed to facilitate the reconversion of regions and economic activities impacted by climate change, to promote solutions favourable to both climate adaptation and to competitiveness, or to provide appropriate support for SMEs for managing climate risks properly.

Ecosystem services (ES) as ecological processes or functions having monetary or non-monetary value to individuals or society at large. There are (i) supporting services such as productivity or biodiversity maintenance, (ii) provisioning services such as food, fibre, or fish, (iii) regulating services such as climate regulation or carbon sequestration, and (iv) cultural services such as tourism or spiritual and aesthetic appreciation.

By integrating tourism and ES management it is possible to ensure synergy between cultural heritage preservation, environmental protection, and economic development, thus creating a sustainable future for the HNC.

2.2. CLIMATE CONDITIONS IN HNC

In HNC there are **three climatic zones**: Mediterranean, sub-Mediterranean and mountain climate. This diversity determines not only the natural ecosystems but also the economic activities and lifestyle of the population. The southern and central parts of HNC, including Mostar, Čapljina, Čitluk, Stolac, Ravno, and Neum, experience a **Mediterranean climate**, dominated by influences from the Adriatic Sea. In these areas, average temperatures range from 12 to 15°C, with hot, dry summers (temperatures reach up to 40°C), and mild, wet winters, and rare snowfall.

The northern parts, including Prozor-Rama, Konjic, and Jablanica, have a transitional climate between Mediterranean and continental influences - **sub-Mediterranean climate**. Higher elevations like Prenj, Vran, Čabulja, and Čvrstica experience **mountain climate** with significant temperature fluctuations (Figure 2.4.). Summer temperatures range from 18–40°C, while winter lows reach -4 to -20°C, with snow cover lasting longer above 1,500 m, making these areas suitable for winter sports and ecological activities. The climate area is characterized by **warm summers** (20°C to 20°C) and less mild winters (0°C to 5°C). The warmest months are July and August, and the coldest are January and December. Due to the relative proximity of the Adriatic Sea, which radiates heat accumulated during the summer in the winter, the average January temperatures are relatively high, 3 - 5 °C, while the summers are dry and hot, with absolute maximum temperatures of 40 - 45°C. According to data provided by Copernicus⁵⁹, in the period from 2025 to 2050 the temperature will increase due to global warming above 1.5 °C according to the RCP 4.5 (business as usual) scenario, which is shown in Figure 2.5.

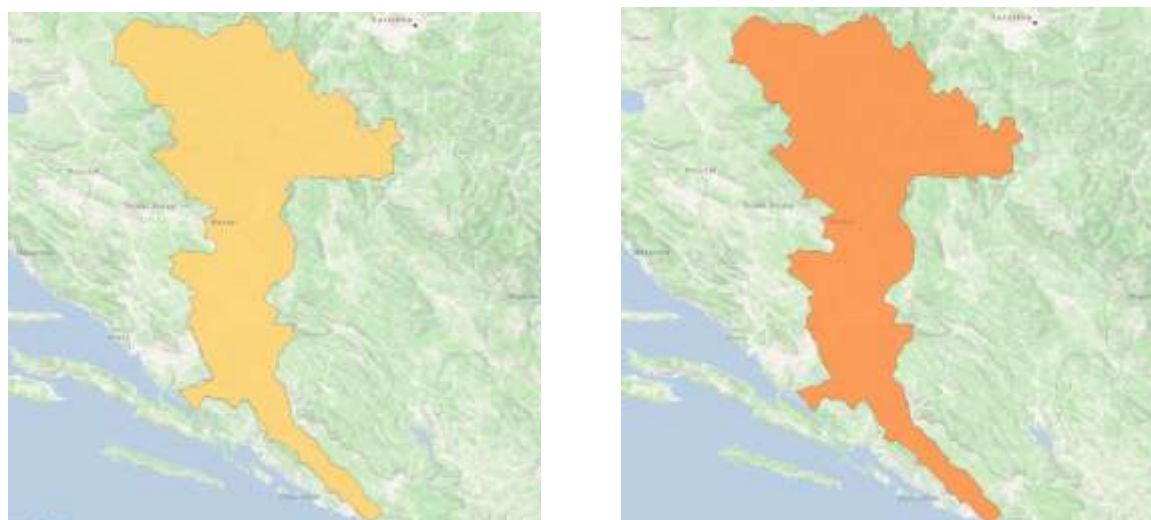


Figure 2.5. Atmospheric surface temperature (AST) in the HNC region in 2025 and projection for 2050 under RCP 4.5 scenario (Data source: Copernicus; Map: Plan Bleu)

According to EDGAR (EC) and World Bank data⁶⁰, during 30-year period from 1992 to 2022 **precipitation** varied in average in BiH from 1,000 mm in 1992, to 1,300 mm in 2002, and 2012. In recent decade, amount of precipitation decreased to 1,000 mm yearly. Precipitation in HNC areas varies from 1,200 mm in mountains to 400 mm in coastal and sub-coastal zones (Figure 2.6.).

⁵⁹ <https://atlas.climate.copernicus.eu/atlas>

⁶⁰ <https://data360.worldbank.org/en/planet/climate-change>

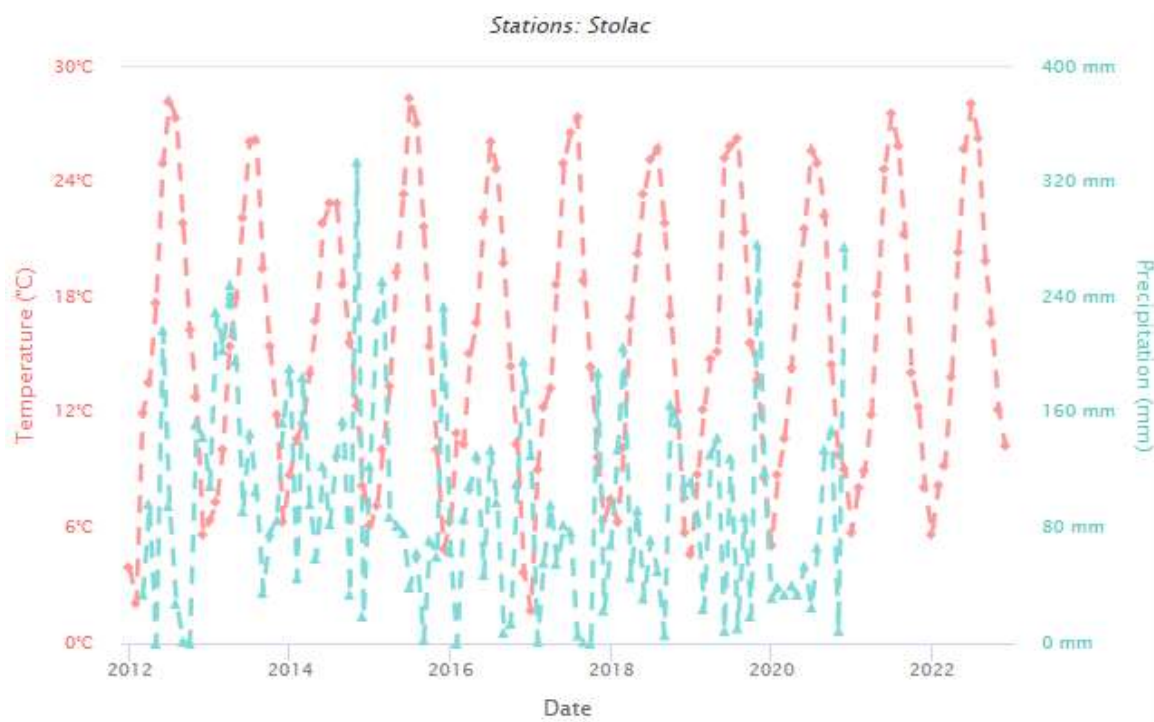


Figure 2.6. Monthly temperature and precipitation evolution (2012-2024) at the hydrometeorological station Stolac (Source: Federal Hydrometeorological Institute; Map: Plan Bleu)

It's important to highlight this significance shift in precipitations compared to the 1991-2020 period, where is detected more water volumes precipitated in winter and oppositely less water precipitated in summer (Figure 2.4.). Snow rarely lasting over 1-2 weeks in lower areas like Mostar, and 1-2 months in mountainous regions such as Konjic and Jablanica, supporting ski tourism. Snow cover lasts on average one to two months. Precipitation occurs throughout the year, with less pronounced maxima in spring and autumn.

Climate is quite sunny with **insolation exceeding 2,000 hours per year**. The average annual cloudiness is between 52% and 69%. Insolation is most pronounced in July and August, while it reaches its minimum in December. A significant increase in **relative humidity** in the ground layers of the atmosphere has already been observed, which is accompanied by an increase in the average global temperature and shifts in precipitation patterns.

The diverse climate zones influence spatial planning and socio-economic activities. The Mediterranean zone is ideal for viticulture and beach tourism, the sub-Mediterranean for mixed agriculture and recreational (active) tourism, and the mountain areas for outdoor activities. In addition, the proximity of surrounding tourist destinations (like Croatian) contributes to the development of tourism in the HNC region, especially in the height of the summer season.

2.3. CLIMATE CHALLENGES AND IMPLICATIONS FOR HNC

2.3.1. CLIMATE CHALLENGES

The HNC is facing to climate change challenges. This area is particularly vulnerable due to its dependence on stable water resources and tourism, which will cause it to experience the cascading effects of global warming (Figure 2.7).



Figure. 2.7. Levels of climate related hazards: water scarcity (left), coastal flood (middle), and river flood (right)⁶¹ in BiH

Impact of rising temperature as driver of increase on droughts and resource depletion, including forest fires. Higher temperatures increase evapotranspiration, reducing the availability of irrigation water, critical for agriculture (e.g., citrus fruits and vegetables).

For instance, mountain stations such as Bjelašnica record that 2023 was the warmest year since the beginning of measurements, which indicates an accelerated melting of snow and a decrease in water supplies. Spring and summer droughts in 2023 affected 70% of agricultural land in Herzegovina, and fruit and vegetable yields were reduced by 40-60%. Prolonged droughts threaten the stability of ecosystems like the NP Hutovo Blato.

Dry summers increase the risk of forest fires (Figure 2.8.) that destroy vegetation, reduce biodiversity, and threaten tourist attractions. In 2023, 120% more fires were recorded than average in last ten years.

⁶¹ <https://thinkhazard.org/en/report/34-bosnia-and-herzegovina>

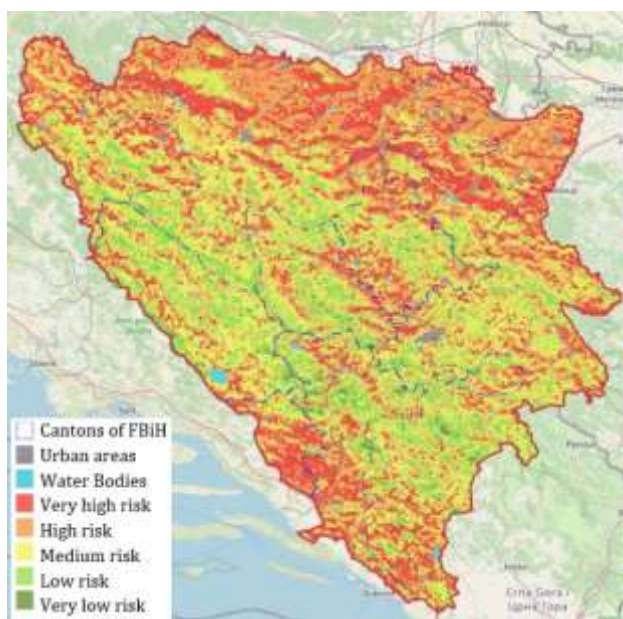


Figure 2.8. Map of locations vulnerable to forest fires in BiH (Source: project Joint Action to Reduce Increased Risk of Forest Fires to Nature and People in the Context of Climate Change in Bosnia and Herzegovina⁶²)

According to most severe scenario of GHG emissions (RCP8.5), projections indicate that by 2035, the average temperature in Bosnia and Herzegovina will have risen by approximately 0.5 °C to 1.5 °C.

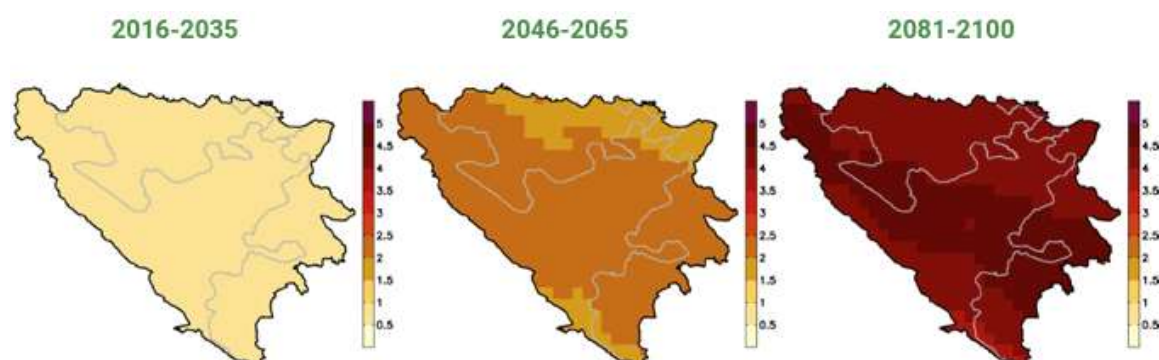


Figure 2.9. Change in the daily mean temperature (°C) relative to the reference period (1986–2005) in BiH, projections according RCP8.5 (Source: NAP BiH)

Between 2036 and 2065, the increase is estimated to range from 1.5 °C to 3 °C, while for the period 2081–2100, the rise could be between 2.5 °C and 5 °C. (Figure 2.9.). Notably, during the June–July–August season (JJA), the maximum daily temperatures are expected to increase by more than 5 °C in most parts of the country.

Considering the evolution of atmospheric surface temperature (AST) in HCN under three RCP scenarios (RCP 2.6, RCP 4.5 and RCP 8.5) for the period 1990–2100, it is evident that the mean air temperature is continuously increasing and

⁶² <https://website-98de14b3.ksw.pcv.mybluehost.me/poweb/pozari.htm>



that in the cases of RCP 4.5 (business as usual) and RCP 8.5 (pessimistic) it increases above 1.5°C (Figure 2.10).

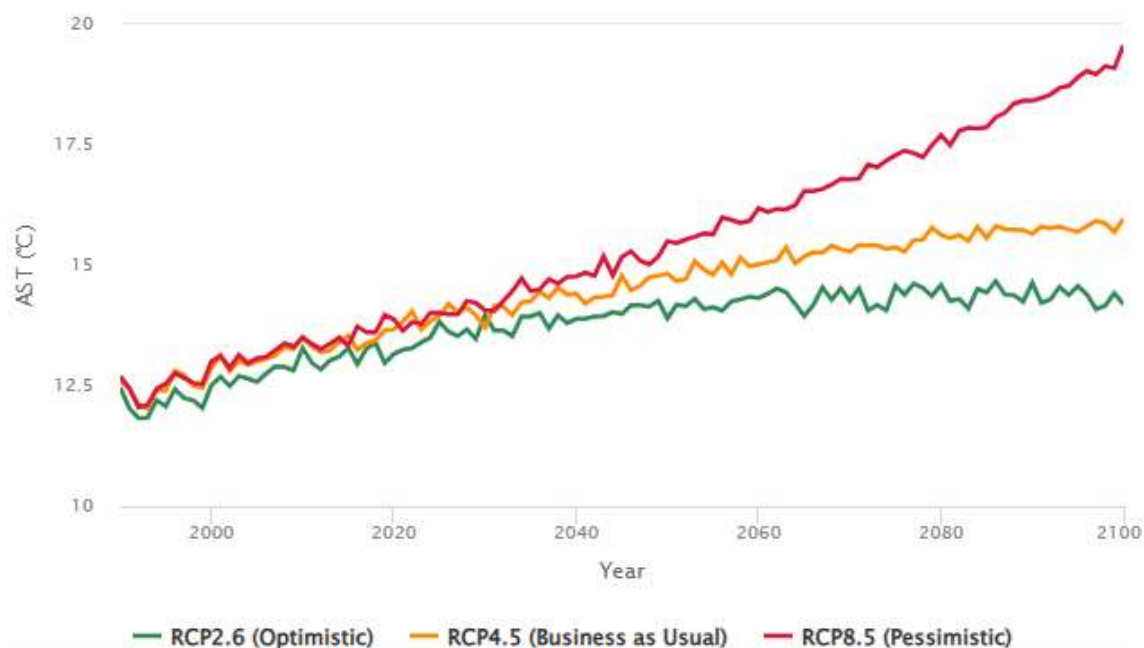


Figure 2.10. Evolution of atmospheric surface temperature (AST) in HCN under three RCP scenarios (Source: Federal Hydrometeorological Institute; Map: Plan Bleu)

According to other relevant analyses regarding climate scenario RCP8.5 or standard summer season (June, July, and August – JJA)⁶³ presented in Figure 2.11., the most pronounced changes were expressed in the southwestern (HNC) and north-western part of BiH. The least changes can be expected in the central, mountainous part of the territory with strong impact on tourism, agriculture, and forestry, including energy sector (hydro-power plants).

⁶³ Trbic, Goran & Popov, Tatjana & Djurdjevic, Vladimir & Milunovic, Igor & Dejanovic, Tihomir & Gnjata, Slobodan & Ivanisevic, Marko. (2021). Climate Change in Bosnia and Herzegovina According to Climate Scenario RCP8.5 and Possible Impact on Fruit Production. Atmosphere. 13. 14. DOI: 10.3390/atmos13010001.

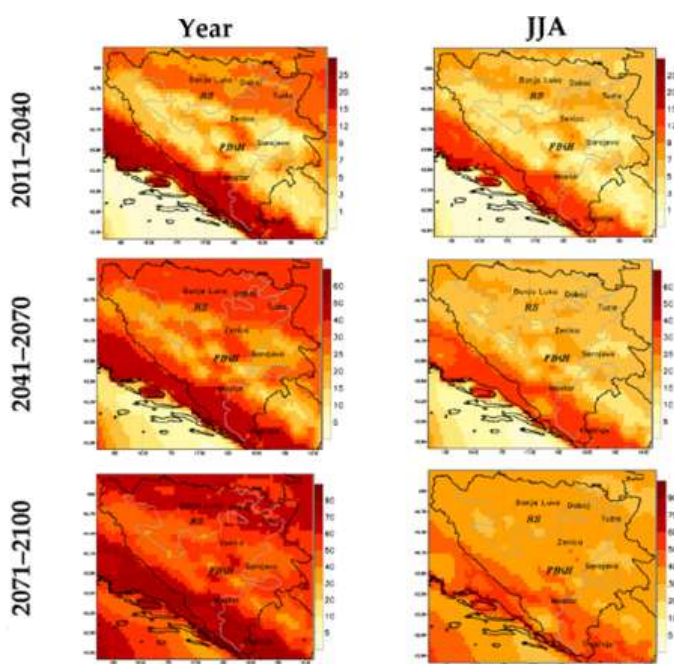


Figure 2.11. Change in annual (year) and seasonal (JJA) temperatures for the future periods 2011-2040, 2041-2070 and 2071-2100 compared to the reference period 1971-2000, according to the future climate scenario RCP8.5

- **Changes in precipitation** patterns and their impact on extreme rainfall and flooding, including reductions in summer precipitation amounts is evident in whole BiH, especially in their southern parts (Figure 2.12.). According to data from Federal Hydrometeorological Institute, although annual precipitation decreases by 10%, individual extreme events could be 30% stronger than in the 20th century.



Figure 2.12. Change in the daily mean precipitation (in %) relative to the reference period 1986-2005 in the RCP8.5 scenario (Source: NAP BiH)

Future changes in precipitation (Figure 2.12.), combined with rising temperatures, will have impacts on water quality and quantity, affecting many sectors. Additionally, flooding disrupts the hydrological balance of wetlands. Water shortages during the summer exacerbate stress on agriculture and wetland ecosystems. For example, heavy rains in May and October 2023 caused floods in the valleys of the Bosna and Neretva rivers, with material damage of

50+ million euros. Intense precipitation in some cases cause soil erosion and **damage natural and cultural values**. For instance, in June 2023 a storm with hail up to 5 cm in size damaged 80% of the vineyards around Mostar.

According to the analyses⁶⁴ for summer season (JJA; RCP 8.5 climate scenario) shown in Figure 2.13., BiH expects significant changes in the distribution and intensity of precipitation during the 21st century. Despite a decrease in total annual precipitation, scenario predict an increase in **extreme rainfall events** (e.g., daily amounts greater than 20 mm). This is a consequence of increased humidity in a warmer climate (which allows for more intense convective storms), and changes in atmospheric pressures, (which promote local flooding). Apart from the foregoing, the climate scenarios also indicate an increase in the number of hail days and warmer winters with a decrease in snow cover. The HNC is expected to see further intensification of climate change and, climate extremes.

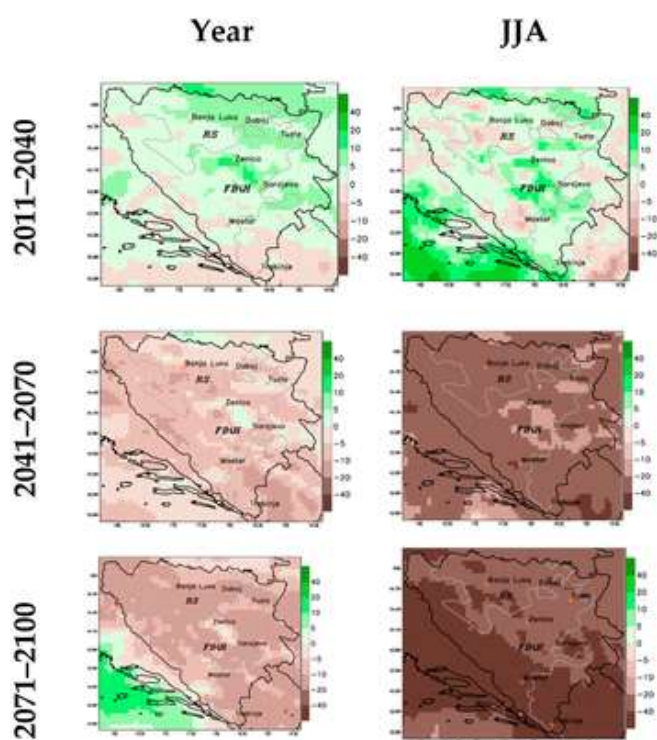


Figure 2.13. Change in annual (year) and mean seasonal (JJA) accumulated precipitation (%), for the periods 2011–2040, 2041–2070 and 2071–2100 compared to the period 1971–2000, according to the future climate scenario RCP8.5

- **Sea level rise and salt intrusion** into freshwater ecosystems, threatens the quality of irrigation water and the adaptability of plant species (e.g., replacement of freshwater plants with salt-tolerant ones). Although the HNC

⁶⁴ Trbic, Goran & Popov, Tatjana & Djurdjevic, Vladimir & Milunovic, Igor & Dejanovic, Tihomir & Gnjata, Slobodan & Ivanisevic, Marko. (2021). Climate Change in Bosnia and Herzegovina According to Climate Scenario RCP8.5 and Possible Impact on Fruit Production. Atmosphere. 13. 14. DOI: 10.3390/atmos13010001.

region is only a small part of the Neum region directly on the coast, the Neretva River connects it to the Adriatic Sea.

- **Changes in bioclimatic zones and pressure on biodiversity** is a consequence of global warming. Temperature changes cause migration of species on north or to higher altitudes, threatening endemic species such (e.g., wading birds and fish in the NP Hutovo Blato). Droughts in HNC have threatened endemic species in the Trebižat River (e.g., soft-mouthed trout).
- **Socio-economic development could be jeopardized** by such climate shifts, especially eco- and cultural tourism. For instance, in 2023. tourism in Neum recorded a 20% drop in overnight stays in August due to the heat. Damage to cultural assets, whether due to extreme weather conditions or erosion, can reduce the attractiveness of touristic attractions. Wetlands, rivers, and natural beauties face the threat of degradation, which can have long-term economic consequences for tourism in the region. These changes may lead to a reduction in visitor numbers and, consequently, a reduction in tourism revenues, which may have negative economic impacts on the local community.

2.3.2. IMPLICATIONS OF CLIMATE CHANGE

Climate change in Bosnia and Herzegovina is manifested by increasingly frequent and intense extreme weather events, which directly threaten ecosystems, infrastructure, and socio-economic stability. Figure 2.14. presents number of warnings due to climate hazards in last ten years. It could be emphasizing that climate shifts regarding change in precipitation patterns corresponded to occurrence of extreme heavy rains that damage people health, assets, and environmental values.

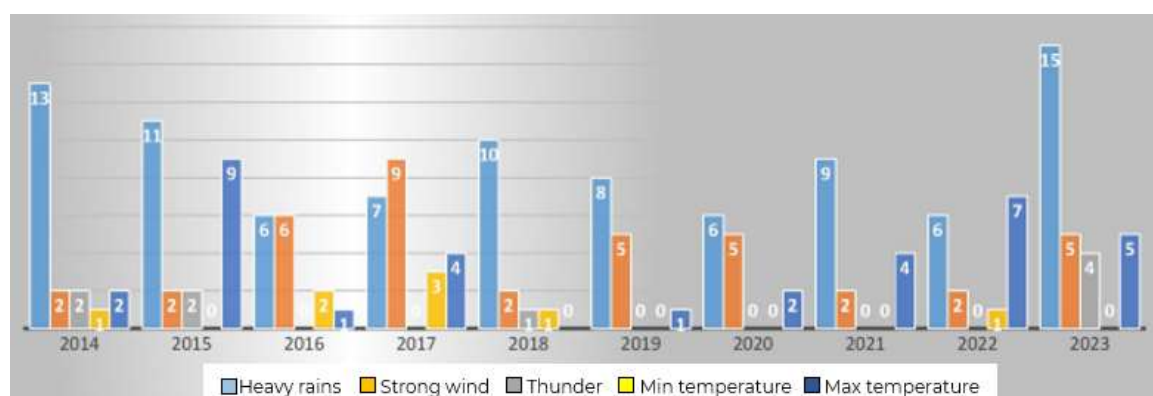


Figure 2.14. Issued warnings for dangerous meteorological phenomena 2014-2023 (Source: Federal Ministry of Health)



Most pronounced implications of climate risks are on these socio-economic and environmental values of HNC, as follows:

Agriculture: The projected rise in temperature, coupled with changes in precipitation and evaporation, is likely to significantly challenge Bosnia and Herzegovina's agricultural systems, particularly in the Mediterranean regions and the northern areas. Elevated temperatures, combined with **reduced water availability** and lower relative humidity during the summer season, threaten crop production. In recent decades, the country has experienced an increase in the frequency of extreme droughts, with notable events occurring in 2000, 2003, 2007, 2012, and 2015. The severe drought of 2000 affected the wider region, causing damage to approximately 60% of the country's agricultural produce. Currently, fruit orchards, which are spread over about **97,000 hectares**, are particularly vulnerable. Additionally, the excessive extraction of groundwater for irrigation has led to **secondary salinization**, a problem that is presently evident in the Neretva Valley in Herzegovina. The rise in extreme weather events like prolonged droughts, heatwaves, and intense rainfall causing floods and landslides. They become increasingly frequent and have already resulted in significant economic losses and environmental degradation.

Watercourses: Groundwater makes up 85% of the total amount of water abstracted for **water supply**. Due to the variations in streamflow, with longer low-water periods, problems can be expected to increase at numerous water supply sources, in terms of both water quantity and quality. Periods of water cuts in water supply systems are increasing in low-water periods throughout the country. The Neretva River has seen a **40% decrease in flow** in the summer months, threatening fish spawning grounds and agricultural irrigation. Fruit producers in HNC are increasingly investing in controlled-climate greenhouses, but high energy costs limit profitability. Regarding vulnerability due to heavy rains and **river floods**, after the 2010 and 2014 it has become clear that areas near rivers are particularly vulnerable. Floods that were previously very rare have now become more frequent and devastating. A project "Strategic Assessment of Flood and Earthquake Risks for Risk-Informed Planning in Bosnia and Herzegovina - **SAFER-BiH**"⁶⁵ is currently underway, implemented by BiH and The United Nations University's Institute for Environment and Human Security (UNU-EHS). The project, initiated at the request of the Ministry of Construction and Spatial Planning of the Herzegovina-Neretva Canton, aims to assess key flood and earthquake risks in BiH and provide recommendations for integrated climate and disaster risk management. It will apply the INFORM Subnational Risk Index at the national level and complement it with a detailed qualitative risk assessment for the HNC.

⁶⁵ <https://unu.edu/ehs/project/strategic-assessment-flood-and-earthquake-risks-risk-informed-planning-bosnia-and-herzegovina>



The **MERLIN project**⁶⁶, Europe's largest freshwater ecosystem restoration initiative, provides a crucial foundation for enhancing the climate resilience of Hutovo Blato. Through the restoration of over 1,500 hectares of habitat⁶⁷, rehabilitation of degraded channels, removal of invasive species, and advanced hydrological research, MERLIN has strengthened the wetland's ecological stability and revealed previously unknown karst inflow pathways. These findings demonstrate that restoration can significantly increase retention capacity, stabilize micro-hydrology, and protect the peat-based carbon stocks that are essential for climate mitigation. However, MERLIN also shows that despite these improvements, the structural vulnerability of Hutovo Blato remains high due to its dependence on hydropower operations and increasing climate pressures, underscoring the need for integrated, basin-wide water management.

Forestry and biodiversity: As a result of global warming, the frequency and intensity of extreme weather events are expected to increase, posing a significant threat to forest ecosystems. Elevated temperatures, climatic conditions such as frost and heatwaves, and shifts in precipitation patterns—including changes between snow and rain, droughts, and floods—can negatively impact certain species and alter the health, structure, and composition of forest communities. These changes may also increase their vulnerability to pests and diseases. For example, heat stress has caused mass dieback of beech trees in **mountain forests**, which in turn raises the risk of soil erosion. Droughts in Herzegovina have threatened **endemic species**, such as the soft-mouthed trout in the Trebižat River. Moreover, mountain ecosystems, like Prenj, face threats from shifting climate zones, which can alter their ecological balance. Most forest ecosystems, already fragile due to **fragmentation** and partial degradation, are increasingly vulnerable to ongoing climate change, which is expected to cause further transformations over the coming decades. Long-term forecasts indicate that climate change might fundamentally alter nearly all forest ecosystems by shifting the distribution and composition of species and communities. These changes influence plant physiology and inter-species relationships, leading to adjustments in their geographic ranges (both horizontally and vertically), as species migrate in response to changing environmental conditions.

Many plant and animal species are at risk from multiple threats such as **habitat loss, invasive species, pollution, and eutrophication**, with climate change acting as a major driver that intensifies these pressures. Additionally, climate change is affecting seasonal cycles, altering the timing and duration of **phenological events**, which in turn impacts the length of growing periods and ecosystem stability. Ecosystems in **karst** landscapes are particularly vulnerable

⁶⁶ <https://project-merlin.eu/>

⁶⁷ <https://neum.online/obnovljeno-skoro-1500-hektara-hutovog-blata-kroz-projekt-merlin/>



to climate change, often compounded by other human activities. **Wetlands** within karst terrains are among the **most sensitive ecosystems**, and climate change is expected to drastically affect biodiversity, with projections indicating that 15–37% of land species could face extinction over the next 50 years. Similarly, freshwater species are expected to experience comparable risks.

Housing: Currently, 61.3% of housing units (dwellings) in BiH are situated in the FBiH. Overall, 44.33% of the housing stock is in urban areas. Climate change impacts the housing sector in two main ways: **directly** (during construction and use) and **indirectly** (through the increased occurrence of natural disasters). Rising temperatures and increased rainfall during the construction season (May–November) may complicate construction activities and cause delays. An increase in the number of days with precipitation exceeding 20 mm can heighten the risk of rainwater filling foundation pits at construction sites. Additionally, the more frequent occurrence of extreme weather events such as windstorms, hail, and thunderstorms can cause various **damages to buildings** under construction, especially to roof structures, as well as damage equipment on construction sites. Conversely, rising winter temperatures may **reduce energy consumption** for heating, decreasing the use of wood, coal, gas, fuel oil, and electricity. An increased frequency of heavy precipitation events has led to a rise in natural disasters such as **floods and landslides**. Among municipalities with the highest floods and landslide risk indices is **Mostar and Jablanica**.

Human health: In BiH and its entities research on the health effects of climate change is very limited. There are no comprehensive, multi-year scientific data or official health statistics that specifically analyse the long-term impacts. Although it is difficult to establish a definitive link between specific weather patterns (biometeorological phases) and the incidence of chronic non-communicable diseases, there is strong evidence to suggest that climate change significantly impacts human health.

Among extreme weather events, **heat waves** are most frequently associated with increased morbidity and mortality, representing a major global public health issue. Severe heat waves can cause critical conditions such as heatstroke and increase the risk of dehydration and related mortality, particularly among vulnerable populations. Heat waves also place additional stress on healthcare systems, and in response, many hotels and other facilities are increasingly investing in air conditioning systems. However, this adaptation raises operational costs by approximately 25 percent, adding economic strain to the tourism and hospitality sectors. Furthermore, rising temperatures are expected to increase pressure on water resources, which over time could **threaten drinking water supplies**.

Other health concerns linked to climate change include **foodborne and waterborne illnesses**, as well as diseases transmitted by **vectors** such as mosquitoes, ticks, rodents, and birds (vector-borne diseases). The interaction

between climate change and human health impacts the socio-economic conditions and living standards of the population especially affecting low-income communities. Underserved and small local communities without adequate primary healthcare facilities are the most vulnerable.

Tourism: Climate plays a crucial role in shaping the tourism sector, particularly because most activities are conducted **outdoors**, with tourists relying on clear, sunny weather during summer holidays and adequate snowfall in the mountains during winter. Popular tourist destinations often include **protected natural areas**, which are closely linked to outdoor recreational activities. Consequently, domestic tourist spots are vulnerable to climate change, especially regarding fluctuating temperatures and changing precipitation patterns. Furthermore, climate change has indirect effects on tourism through other sectors. Reduced agricultural yields and associated higher food prices can negatively influence the **cost of tourism services**. Conversely, some climate change impacts may have positive effects, such as **extending the tourist season** and enabling the development of **new tourism products**.

According to financial reports and economic forecasts, contributions from tourism and the broader travel industry are projected to grow at an average rate of **5.3% annually** from 2018 to 2028, with tourism earnings expected to comprise over 12.6% of GDP. During this period, investments in the tourism sector are also anticipated to increase.

2.3.3. SWOT ANALYSIS FOR TOURISM DECARBONIZATION AND ADAPTATION

Based on the prepared situational analysis, key factors from the internal environment (strengths and weaknesses) and external environment (opportunities and threats) that have a significant impact on the development of tourism in the HNC region, with emphasis on climate change (Table 2.4.).

Table 2.4. SWOT analysis for tourism in climate context

(STRENGTHS)	(WEAKNESSES)
1. Increased interest in ecological and sustainable tourism, as climate change raises awareness of the importance of sustainable development. This may encourage the growth of eco-tourism in HNC, where tourists would prefer destinations that apply environmentally friendly practices, reduce their carbon footprint, and contribute to the preservation of natural resources.	1. An increase in weather extremes is a completely expected scenario as climate change leads to more frequent weather extremes such as floods, droughts, hurricanes, storms, heat waves and fires, which can significantly disrupt tourism and reduce the number of visits to certain destinations. In shorter periods, this can affect tourist safety and destroy infrastructure.
	2. Increased costs, for example in the form of higher insurance costs, reconstruction of



<p>2. Attracting tourists to new areas, which can improve the diversification of the observed pilot area of HNC.</p> <p>3. Innovation in the tourism sector, climate change can certainly drive innovation in sustainable tourism and technology. This includes the development of energy-efficient facilities, sustainable transportation solutions (such as electric vehicles) and the use of technologies to reduce the environmental impact of tourism.</p>	<p>infrastructure after natural disasters or investments in adapting accommodation facilities to new climate conditions.</p> <p>3. Dependence on specific climatic conditions, for destinations that are specifically oriented towards summer tourism (Neum) or winter tourism (Blidinje), becomes vulnerable to changes in climatic conditions, which can reduce the number of visits and affect accommodation capacities.</p>
<p>(OPPORTUNITIES)</p> <p>1. The development of "green" tourism is an opportunity to develop tourism based on environmental preservation, the use of renewable energy sources, sustainable waste management and ecological accommodation.</p> <p>2. Development of new products and services, regarding climate change, in HNC the tourism industry can develop new innovative tourist offers in adaptation to climate change (e.g., sustainable accommodation).</p> <p>3. Encouraging tourism in the off-season, climate change may enable an extended tourist season or enable activities that were previously not considered possible at certain times of the year, thus reducing the problem of seasonality in HNC.</p>	<p>(THREATS)</p> <p>1. Impact on natural resources and ecosystems, climate change can cause loss of biodiversity and destruction of natural resources, which reduces the attractiveness of these destinations for tourists.</p> <p>2. A decline in tourist numbers in popular destinations, heat waves, reduced snow cover in ski resorts, or rising sea levels in coastal areas can make popular destinations unattractive to tourists, leading to a decline in visitor numbers. This can cause economic losses and overburden other destinations.</p> <p>3. Impact on infrastructure and transport, serious problems in transport infrastructure are possible (for example, floods blocking access to tourist destinations) and threaten travel safety (such as weather conditions disrupting air and road traffic).</p> <p>4. Regulation and legal framework: Given global climate policies, the pilot area may face new regulations or taxes on carbon emissions, which may increase the cost of doing business and reduce the competitiveness of the destination. There are also global requirements for emission reductions and environmental standards that may affect access to markets.</p>

Increasing temperatures in the pilot region may lead to more favourable conditions in the pre-season (spring) and post-season (autumn), which could partially alleviate the problem of seasonality. Many countries in the Mediterranean region are already diversifying the main tourism product by developing additional offers, products, and services.



Climate change affects the increase in average air and water temperatures, changes in sea levels, prolongation of dry periods with short extreme precipitation, reduction of the overall water balance, reduced infiltration of water into the ground, etc. In addition to existing products, enriching the offer is crucial by developing selective forms such as creative tourism, eco-tourism, agrotourism, gastrotourism, bird and nature watching, etc. The economic consequences of these changes will depend on the way tourists, tourist destinations and the change in the holiday season for travel.

2.4. TRENDS AND ACTIONS FOR MITIGATION AND ADAPTATION IN HNC

Although a continuous system for monitoring data and information on the progress of decarbonization and climate change adaptation has not been established at the federal, neither at the regional level, data are collected from the BiH level. This ensures an informed assessment of the regional situation and trends that can be taken from such data sources. HNC, as well as whole FBiH, should adopt a **dual strategy** – reducing greenhouse gas emissions and investing in resilience to droughts and floods. Without this approach, economic and environmental losses will be inevitable and natural values depleted. The key is to combine emission reductions with investments in adaptation – from water and nature conservation to energy sector transformation, and tourism sustainability.

2.4.1. CLIMATE ACTION FOR DECARBONIZATION

Regarding decarbonization of society (climate change mitigation), BiH's and its entities commitments are influenced by its obligations under the United Nations Framework Convention on Climate Change (UNFCCC), its EU accession aspirations, and the policy directions of its entities. The country ratified the **Paris Agreement** in 2017 and submitted its updated Nationally Determined Contribution (NDC) to the UNFCCC.

The **Climate Change Adaptation and Low Emission Development Strategy for BiH 2020–2030**⁶⁸ was adopted to address climate change challenges comprehensively. The aim is to transition BiH into a sustainable and advanced green economy by 2030 while significantly reducing emissions. This Strategy submitted to the UNFCCC in 2023 aims for a 50% reduction in emissions by 2050 compared to 2014 levels, and an **80%** reduction by 2050 relative to 1990 levels.

The **Integrated Energy and Climate Plan BiH - NECP** define the targeted GHG emission reduction value for 2030. This value has been derived as a result of

⁶⁸https://unfccc.int/sites/default/files/resource/ENG_CC%20adaptation%20and%20Low%20emission%20development%20Strategy%20BiH%202020-2030.pdf

planning the development of the energy sector, based on decarbonization and adherence to criteria established to achieve carbon neutrality by 2050. In this regard, the following targets shown in Table 2.5. have been set.

Table 2.5. The trajectory to 2030 of reducing CO₂e

Decarbonization aspect	Target/current emissions value
Total CO ₂ e emission with LULUCF in 2030	15.65 MtCO ₂
Total CO ₂ e emission without LULUCF in 2030	22.15 MtCO ₂
Total emission of CO ₂ e with LULUCF in 1990	26.62 MtCO ₂
Emission reduction in 2030 compared to 1990 (with LULUCF)	41.21%
Amount of LULUCF in 2030	6.51 MtCO ₂
Amount of LULUCF in 2018	5.83 MtCO ₂
Increase in LULUCF in 2030 compared to 2018	11.68%
Emissions from the power sector in 2030	8.96 MtCO ₂
Emissions from transport in 2030	3.65 MtCO ₂
Emissions from industry in 2030	1.15 MtCO ₂
Total Share of RES in 2030	43.6 %
The RES share in electricity consumption in 2030	70.1 %
RES share in heating and cooling in 2030	60.8 %
RES share in transport in 2030	8.4 %

(Source: NECP BiH⁶⁹)

The current state and projections of emission reductions without the LULUCF sector are presented in Figure 2.15., broken down by sectors.



Figure 2.15. Trajectory of CO₂e emission reductions without LULUCF in BiH from 2022 to 2030, by sector (Source: NECP for BiH)

Energy-related emissions constitute the majority of greenhouse gas profile, highlighting substantial potential for decarbonization in the electricity, heat, and transport sectors, which are heavily dependent on fossil fuels. Decarbonizing the power sector presents challenges, as the country and its

⁶⁹ https://www.mvteo.gov.ba/data/Home/Dokumenti/Energetika/Nacrt_NECP_BiH_loc.pdf

entities aim to preserve power export revenues. However, the current reliance on coal-fired generation is increasingly problematic. Phasing out coal is a complex issue, requiring consideration of economic, social, and environmental impacts. To ensure energy security and meet decarbonization targets, **BiH and its entities** should attract investment in cleaner energy alternatives. Figure 2.16 shows the increase in energy consumption at the BiH level. Data on energy consumption at the regional level are not available.

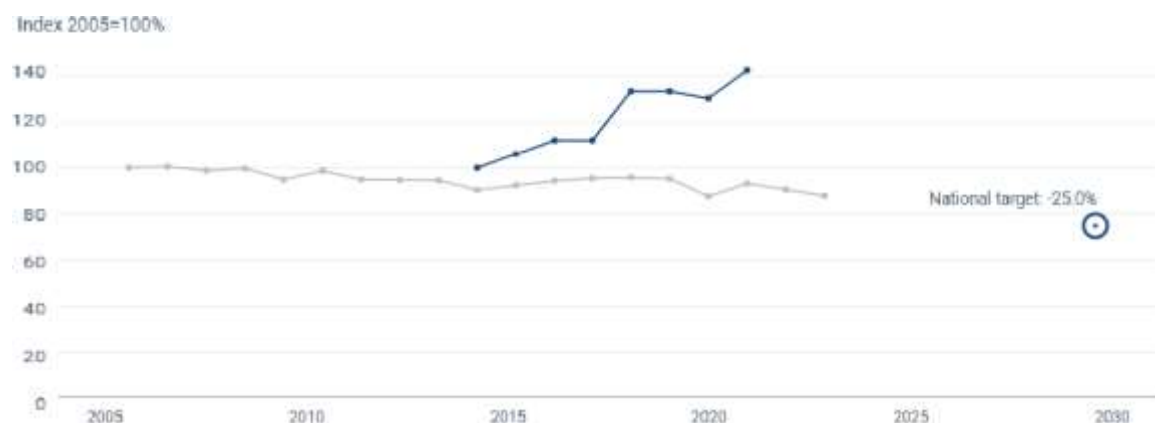


Figure 2.16. Final energy consumption in BiH (Source: EEA⁷⁰)

Regarding energy efficiency, the NECP set the targets for up to 2030: 6.84 Mtoe for primary energy consumption and 4.34 Mtoe for final energy consumption. Recently adopted environmental strategies define measures to improve **energy efficiency**.

At the regional level, consistent emission data for NUTS 2 and NUTS 3 areas are not available. Therefore, GHG **emissions for HNC are not available**.

According to the 2020-2030 Climate Change Adaptation and Low Emission Development Strategy for BiH, and therefore for HNC, the focus areas and objectives within concrete measures and actions were established (Table 2.6.).

Table 2.6. Decarbonization priorities, objectives, on-going measures in HNC

Priorities	Objectives	Measures/Considerations
Efficient Use of Resources	Long-term development aims to reduce harmful emissions and increase renewable energy sources (RES), emphasizing efficient coal exploitation and management of natural resources. Incorporate new technologies and digitalization, to optimize operations.	<ul style="list-style-type: none"> ✓ Implement modern technology and methods in coal activities. ✓ Utilize hydropower and manage natural resources sustainably. ✓ Promote digitization, innovative technologies, and business models for cost

⁷⁰ <https://www.eea.europa.eu/en>

Source: strategic, planning, legal and reporting documents (relevance for HNC)

Adaptation is required across all sectors and governance levels, and actions must address both current climate impacts and protect against future climate risks. However, to effectively upscale actions at the national, regional, and local level, tangible targets are needed to measure progress. The national adaptation framework is developed in the **BiH National Adaptation Plan – NAP⁷¹** enacted in 2021. This document brings a clear division of responsibilities between state and entity institutions for implementation of adaptation activities.

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Disaster risk mapping is in the early stage of preparation. Within the project “The Flood Hazard and Flood Risk Maps Project in Bosnia and Herzegovina”⁷² financed by the Western Balkans Investment Framework, the Hydro-Engineering Institute developed 136 flood hazard maps and 152 flood risk maps. The project was implemented during the 2017–2020 period. Nevertheless, in 2024 flood waters and landslides surged into settlements in Jablanica, Konjic, Fojnica, Kiseljak and Kreševo municipalities (Figure 2.17.).

Teams from Civil Protection, Bosnian Red Cross and the military were promptly deployed to affected areas (Figure 2.15.). Besides, there are no maps for other hazards, such as earthquakes or hurricanes available. The integration of climate and other related risks assessment and in all sectors, especially in **agriculture, forest and tourism** adaptation strategies is nascent. In 2021, the Strategy for Agriculture and Rural Development of Federation BiH for 2021 to 2027⁷³ was developed within consideration of climate impact scenarios on agriculture production.



Figure 2.17. Flood damage in Donja Jablanica (Source: Red Cross of BiH)

Regarding data needed to evaluate adaptation measures on national (BiH), federal (FBiH), and regional (HNC) level the available documents and data sources (see Introduction section) were analysed, and major adaptation measures relevant for HNC are listed in Table 2.7.

⁷² <https://heis.ba/en/projects/flood-hazard-and-flood-risk-maps-project-in-bosnia-and-herzegovina-fhrm>

⁷³ <https://fmpvs.gov.ba/wp-content/uploads/2022/03/04-Strategija%20PRR%20FBiH%202021-2027-%20Drugi%20dio%20-%20NACRT.pdf>

**Table 2.7.** Current adaptation measures for selected vulnerable sectors in HNC

Sector	Adaptation Measures	Stakeholders/Responsible Parties
Agriculture	<ul style="list-style-type: none"> - Switch to more resistant varieties and develop tolerant genotypes - Improve disease and pest monitoring - Incentives for new plantations - Reconstruct and maintain drainage systems - Develop early warning systems - Implement efficient water management (irrigation, reservoirs) - Promote ecosystem-based approaches 	<ul style="list-style-type: none"> ✓ Farmers (natural persons) ✓ Extension Services ✓ Scientific institutions ✓ Ministry of Agriculture, Forestry and Water Management of HNC ✓ Ministry of Agriculture ✓ Water Management and Forestry of Federation BiH ✓ Local communities
Water Resources	<ul style="list-style-type: none"> - Improve riverbed management and canal cleaning - Develop/update flood risk maps - Construct reservoirs for flood protection and irrigation - Conduct water availability and quality assessments - Establish early warning systems - Map/assess state of mountain lakes and ecosystems 	<ul style="list-style-type: none"> ✓ Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (coordination) ✓ Government of Federation BiH ✓ Local water agencies and communities ✓ Scientific institutions
Biodiversity & Forestry	<ul style="list-style-type: none"> - GIS mapping of forest areas - Afforestation with native species - Monitor forest health and replace damaged trees - Study climate impacts on endemic species and biodiversity - Enhance protected areas and conservation - Develop green roofs to reduce heat impact in urban areas 	<ul style="list-style-type: none"> ✓ Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (coordination) ✓ Government of Federation BiH ✓ Forest companies and forestry agencies ✓ Scientific institutions ✓ Local communities
Human Health	<ul style="list-style-type: none"> - Develop legislation for working in extreme climate conditions - Establish statistical monitoring of climate-related health issues - Strengthen public health capacity and emergency response - Raise public awareness about climate health impacts - Study climate-related diseases - Increase the share of the population connected to the water supply network (especially in rural areas) 	<ul style="list-style-type: none"> ✓ Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (coordination) ✓ Public Health Institutes of Federation BiH ✓ Scientific institutions ✓ Local health agencies and communities
Tourism	<ul style="list-style-type: none"> - Promote ecotourism and develop new eco-friendly tourist products - Develop summer tourism and outdoor recreation (rivers, lakes, cycling, hiking) - Increase protected/natural areas 	<ul style="list-style-type: none"> ✓ Ministry of Foreign Trade and Economic Relations (coordination) ✓ Local tourism agencies ✓ Olympic centres



<ul style="list-style-type: none"> - Develop mountain tourism and healthy lifestyle tourism - Develop river and lake tourism (rafting, kayaking, etc.) - Improve water quality monitoring - Promote holistic recreation on rivers, lakes and mountains - Implement sustainable water and energy management practices - Promote circular economy in tourism activities and offers 	<ul style="list-style-type: none"> ✓ Natural parks and protected areas authorities ✓ Scientific institutions and local communities ✓ Water agencies ✓ Local communities and tourism operators ✓ Scientific institutions
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Source: strategic, planning, legal and reporting documents (relevance for HNC)

2.4.3. LIMITATIONS AND SHORTCOMINGS IN THE IMPLEMENTATION OF CLIMATE MEASURES

The BiH and its entities faces a **complex institutional structure**, which makes it difficult to coordinate climate policies and monitoring frameworks. There are also challenges regarding financial and human resources, legislative and reforms gaps, including implementation of climate and other related projects (Table 2.8.).

Table 2.8. Limitations and shortcomings in implementation of mitigation and adaptation measures

Category	Limitations and shortcomings
Institutional Constraints	<ul style="list-style-type: none"> - Complex structure due to Dayton Agreement, causing coordination issues between FBiH and other BiH entities - Unclear responsibilities: undefined roles of ministries (e.g., Ministry of Foreign Trade, Inter-Entity Environment Authority), fragmented responsibilities (e.g., RS Ministry of Physical Planning as UNFCCC focal point) - Weak coordination: lack of vertical and horizontal cooperation, no unified environmental data system - Multi-sectoral challenges: limited integration of climate issues into tourism, agriculture, health; absence of inter-ministerial bodies - Limited private sector and community engagement: laws do not facilitate stakeholder participation, impacting projects like NaTour4CChange
Legal Gaps and Reforms Needed	<ul style="list-style-type: none"> - Absence of climate terminology in laws: regulations lack terms like "climate change," "nature-based solutions," "carbon footprint," hindering climate criteria integration - Marginalization of adaptation: lack of risk assessment methodologies and legal obligations for adaptation plans, limiting project standardization (e.g., NaTour4CChange)
Financial Constraints	<ul style="list-style-type: none"> - Insufficient financial resources: budgets not covering mitigation/adaptation costs; limited entity environmental funds - Dependence on international aid: reliance on GCF, EU programs; limited access due to absence of adaptation plans - Ongoing reforms: partial solutions through RES feed-in tariffs and community energy auctions, but decentralization persist

**Human
Resource
Constraints**

- Lack of qualified personnel: limited capacity in public administration, especially locally; inadequate education in agriculture, tourism
- Knowledge and data gaps in health sector on climate impacts on health, unclear risk monitoring
- Higher education in tourism and agriculture not aligned with climate challenges

Source: strategic, planning, legal and reporting documents (relevance for HNC)

2.4.4. RECOMMENDATIONS FOR IMPROVING THE FRAMEWORK FOR DECARBONIZATION AND ADAPTATION

By integration of knowledge base of EC, Interreg EURO-MED Programme, and particularly NaTour4CChange project, it could be possible to **strengthening the regulatory framework**, financial and human capacities, and knowledge base, including establishment of monitoring and **support projects/initiatives** for climate action in HNC through the following steps:

- **Political commitment** is required to implement and assess the measures outlined in the Climate Change Adaptation and Low Emission Development Strategy for Bosnia and Herzegovina, as well as the National Adaptation Plan (NAP BiH). This commitment should focus on the most vulnerable sectors, such as agriculture, water resources, biodiversity, forestry, human health, and tourism, while integrating both mitigation and adaptation strategies, securing necessary financing, and addressing nature protection concerns.
- **Promoting a multi-level governance structure** and ensure alignment with the EU acquis, especially with European Green Deal and climate neutrality and adaptation legislation framework to ensure compatibility with the future EU approach.
- **Adopting cooperative governance models** (e.g., workshops for entity ministers, local authorities and tourism stakeholders) for policy harmonisation.
- **Strengthening coordination for the development of a standardized and unified monitoring system** on the environment and nature, as well as on pressures and threats (e.g., climate change and pollution) at the national and regional levels, which also encourages institutional networking through regular events.
- **Introducing mandatory climate vulnerability and risk assessments** for tourism and nature conservation/restoration projects in line with EU directives and IPCC methodologies.
- **Integrating NbS** into management documents and legislation and improve nature protection laws to explicitly support NbS (e.g., wetland restoration as flood protection).
- **Defining NbS** in entity strategies as key adaptation tools.



- **Involve tourism** chambers/communities, managers in private sector and the local population in the development of standards for "green certificates" of destinations which, among other natural and socio-economic solutions, include the integration of NbS.
- **Introduce innovative financing** for decarbonization and climate resilient tourism like, public-private partnerships, green bonds, tax incentives for tourism companies investing in NbS or ecosystem restoration (e.g. VAT reduction for eco-accommodation).
- **Design educational tools and capacities** to train climate experts, and stakeholders: local authorities, private sector, residents and visitors to use climate data in planning of tourism and sectors that support tourism activities (e.g., climate vulnerability and risk assessments, GIS tools for monitoring state and climate impacts of natural values, people and assets).
- **Continue with the active involvement** to regional initiatives (e.g. for the Mediterranean region) to access funding and knowledge.

3. REGIONAL CLIMATE VULNERABILITY AND RISKS ASSESSMENT

The IPCC defines climate risk as the potential for harm to human or ecological systems from hazards (climate events), exposure (assets in risk), and vulnerability (susceptibility). Risks can stem from climate impacts or human responses, with diverse values influencing outcomes.

For development climate risk assessment (CRA), hydro-meteorological data, expert analysis and participatory approach via questionnaire for assessment of exposure, sensitivity, and adaptive capacity of the HNC were conducted. According to the IPCC methodology the vulnerability assessment was conducted to develop risk assessment. The questionnaire was distributed to decision makers, tourism managers and experts from public institutions in charge for environment and nature protection, as well as the local community (a total of 14 respondents). Finally, the expert analysis was applied to provide climate risk assessment (Table 3.1.).

Table 3.1. Results of the Climate Risk Assessment for the HNC region

CLIMATE VARIABLES /HAZARDS	THEMATIC AREAS	CLIMATE RISK LEVEL	
		Current climate	Future climate
Extreme air temperatures	Tourist infrastructure	2	3
	Tourists offer	2	3
	Natural areas	2	3
Heat waves (land)	Tourist infrastructure	3	3
	Tourists offer	2	3
	Natural areas	2	3
Drought (reduced water availability)	Tourist infrastructure	2	3
	Touristic offer	1	2
	Natural areas	2	3
Forest fires	Tourist infrastructure	3	4
	Touristic offer	2	3
	Natural areas	4	4
River floods	Tourist infrastructure	2	4
	Touristic offer	1	3
	Natural areas	2	4
Strong winds and storm surges	Tourist infrastructure	2	3
	Touristic offer	1	2
	Natural areas	2	2

Source: Author's research

Legend:

0	No risk / negligible
1 – 2	Low risk level
3 – 4	Medium level of risk
5	High level of risk



According to results from Table 3.1., **natural areas** emerged as the most vulnerable, showing higher medium risk levels for forest fires (4) in current and future climate. Additionally, tourist infrastructure is also jeopardized by forest fires (3) and heath waves (3), during the long-term period of extreme air temperatures and droughts. In future climate, extreme air temperatures and heath waves pose as medium risk (3) for tourist infrastructure, tourism offers (services and activities), and natural areas. Same level of risk is attributed for the future climate to droughts for tourism infrastructure and natural areas. Besides, strong winds and storm surges represent a medium risk (3) for the tourism offers in the future climate. River floods are intensifying, so an increase in risk has been recognized in the future climate for all three observed thematic areas, especially for tourist infrastructure and natural areas (4).

This rising risk is largely driven by **atmospheric warming**, with increasing average and extreme temperatures intensifying heat-related events and exacerbating drought and fire conditions. For example, forest fire risk for tourist infrastructure increases from a current level of 3 to 4 in future projections.

This climate risk assessment underscores the importance of **integrated climate adaptation strategies** that address environmental, social, and economic dimensions. It highlights the interdependence of thematic areas and the need for cross-sectoral coordination. While climate risks are currently at manageable levels, projected changes necessitate urgent and proactive adaptation to maintain the long-term viability of the HNC tourism and ecosystems.

This assessment will inform upcoming action plans and guide climate-resilient development, particularly through NbSs tailored to local vulnerabilities and climate trends.

4. CHALLENGES, OPPORTUNITIES AND RECOMENDADTIONS FOR TOURISM RESILIENCE IN HNC

4.1. CLIMATE CALLENGES FOR TOURISM

In general, climate change threatens traditional forms of tourism in Bosnia and Herzegovina, as it has had significant impacts on the resources on which tourism relies in the last decade. NBT and winter tourism, such as skiing on Bjelašnica, Jahorina, Kupres and Blidinje, are particularly at risk. The HNK region should respond to the following negative impacts and recognize opportunities:

Tourism under climate pressure

The Mediterranean character of the area, the cultural heritage of Mostar and the natural beauty of Hutovo Blato make the region attractive to tourists throughout the year (Figure 4.1.).



Figure 4.1. Old bridge in Mostar (left), and NP Hutovo Blato (right) (Source: Shutterstock and NP Hutovo Blato⁷⁴)

Elevated summer temperatures in lower areas of the HNC (e.g., in Mostar up to +40°C) increases the demand for "escape from the heat". This opens opportunities for tourism development in the mountainous areas of the county, such as Blidinje or Prenj, where temperatures are kept more moderate. However, the lack of infrastructure (trails, accommodation) limits the exploitation of this potential. Rising temperatures also result in higher water consumption. In the last decade, household water consumption from public water supplies has increased⁷⁵, as well as electricity consumption for cooling⁷⁶.

The Neretva River, a key resource for rafting and ecotourism, is threatened by decreasing water levels due to droughts and inexpert management of hydroelectric power plants. In addition, the increased frequency of extreme

⁷⁴ <https://hutovo-blato.ba/>

⁷⁵ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Water_statistics

⁷⁶ <https://www.derik.ba/DocumentsPDFs/DERK-lzvjestaj-o-radu-2024-b.pdf>

weather events (e.g., floods in 2014 and 2024) may damage cultural and natural heritage.

Shifts in tourism seasonality

While winter seasons in the county have always been weak, the trend of "year-round tourism" is becoming more pronounced. Winter cultural events, such as the Mostar Winter Scene, attract 20% more visitors than five years ago. Although the HNC does not have large ski resorts, it is indirectly affected by the reduced interest in mountain destinations in neighbouring regions. Foreign tourists (70% of total arrivals) dominate the county and come mainly for cultural attractions, especially during the spring and summer seasons. During these periods, regional tourists (Croatia, Serbia) increasingly seek active forms of vacation, such as cycling and other activities along the Neretva River.

The increasing popularity of **outdoor activities** and the appeal of scenic **landscapes** are contributing to a shift in tourism seasonality in Herzegovina-Neretva County. Cooler temperatures during certain periods, combined with the region's natural beauty, are attracting visitors throughout the year, rather than just in the traditional summer months. This transformation is encouraging local investments in infrastructure and tourism services aimed at supporting **year-round tourism**. Moreover, as neighbouring Croatia gradually elongates its tourist season, Bosnia is strategically positioning itself to capitalize on this trend, with the goal of becoming a vibrant, all-season destination in the Balkans.

While winter seasons in the HNC have traditionally been weak, the trend of year-round tourism is becoming more pronounced. Winter cultural events, such as the Mostar Winter Scene, now attract 20% more visitors than five years ago, reflecting growing interest in **off-season attractions**. Although Herzegovina-Neretva does not have large ski resorts, it is indirectly affected by the declining interest in mountain destinations in neighbouring regions. Most visitors (70%) are foreigners, primarily arriving for cultural attractions, especially during spring and summer. During these warmer months, regional tourists from neighbourhood countries who increasingly seek active forms of recreation - cycling, hiking, kayaking and rafting activities along the Neretva River.

This evolving climate and tourism pattern not only diversify the local economy but also enhances the potential for sustainable development by **reducing seasonal fluctuations**. The shift toward year-round tourism, driven by both cultural events and outdoor activities, positions the HNC as a promising destination for visitors seeking diverse experiences throughout the year.



📌 Multiple risks to natural resources

The lack of continuous monitoring system on **environmental emissions and pollution** in general (at all levels) makes control and assessment difficult⁷⁷. However, according to EEA data source⁷⁸, BiH's overall greenhouse gas emissions have exhibited a gradual increase over the past decade, primarily due to the country's **dependence on fossil fuels**, especially coal, for electricity generation.

BiH is almost **four times more energy-intensive** than the average EU Member State⁷⁹. Although the energy sector is the primary source of emissions, the **Land Use, Land-Use Change, and Forestry - LULUCF** sector serves as an **important carbon sink**. The potential for improvement is high, as the household sector accounts for the largest share of final energy consumption.

The Neretva-Trebišnjica basin records significant levels of pollution, with the need to include undeclared sources. Only 14% of the population has access to **wastewater treatment** facilities (Čitluk, Neum). Most untreated wastewater is discharged into the environment, often through septic tanks that pollute the groundwater. There is an urgent need to develop integrated wastewater treatment systems and increase level of treatment capacities. Key challenges include reducing water losses, combating illegal pollution, and developing sustainable infrastructure. Priorities include strengthening inspection, protecting sensitive ecosystems, and investing in modern wastewater management systems. Physicochemical water quality indicators in the Neretva River basin⁸⁰ have identified excess phosphorus, especially in the reservoir of the Jablanica hydroelectric power plant, with **algal blooms**. The construction of hydroelectric reservoirs like Jablanica has significantly changed the river's physicochemical characteristics, creating conditions different from the natural river. Most locations are not at high risk, but continuous monitoring is essential.

The main sources of freshwater are karst springs and wells, with limited capacity for commercial consumption. Excessive capturing of fresh groundwater for irrigation can cause **secondary salinization**, which is currently found to be happening in the Neretva Valley in Herzegovina. If this process is

⁷⁷ https://www.eea.europa.eu/en/advanced-search?size=n_10_n&filters%5B0%5D%5Bfield%5D=readingTime&filters%5B0%5D%5Btype%5D=any&filters%5B0%5D%5Bvalues%5D%5B0%5D%5Bname%5D=All&filters%5B0%5D%5Bvalues%5D%5B0%5D%5BrangeType%5D=fixed&filters%5B1%5D%5Bfield%5D=issued.date&filters%5B1%5D%5Btype%5D=any&filters%5B1%5D%5Bvalues%5D%5B0%5D=Last%20%20years&filters%5B2%5D%5Bfield%5D=language&filters%5B2%5D%5Btype%5D=any&filters%5B2%5D%5Bvalues%5D%5B0%5D=en

⁷⁸ Land Use, Land-Use Change, and Forestry

⁷⁹ Eurostat, 'Energy intensity' (2024); https://doi.org/10.2908/NRG_IND_EI.

⁸⁰ Ivanković, Anita & Rozić, Irena. (2022). Physicochemical Water Quality Indicators in the Neretva River Basin (B&H) With Reference to Ecological Conditions for Endemic Salmonids. Ekologija Bratislava. 41. 1-8. 10.2478/eko-2022-0001.



not stopped by using water accumulated in reservoirs instead of groundwater during the winter period, such lands can be permanently degraded and rendered infertile. Regarding freshwater resources in HNC, estimates show that only 14% of the actual load is charged, which requires inspections and additional measures. Losses in **water supply networks** reach up to 70%, with uneven coverage (e.g., Mostar 47% losses, Neum 60%). Water quality meets standards, but rainy periods are accompanied by problems with turbidity.

Surface waters have a good ecological status, but urbanization, salinization and illegal gravel exploitation in the Neretva Delta threatens ecosystem and economic stability. The Bregava River requires protection from faecal and industrial waste. Groundwater monitoring (e.g., Mostar, Konjic, Neum) shows good status, but source protection zones are missing. which is currently occurring in the Neretva Valley in Herzegovina. If this process is not stopped by using water accumulated in reservoirs instead of groundwater during the winter period, such lands can become permanently degraded and infertile.

The NP Hutovo Blato pilot area faces distinct vulnerabilities. As a wetland protected area home to diverse bird species and rare plants, it relies on the natural tidal rhythm of the Neretva River. The main waterbody, the Krupa River, has no fixed source; it flows from Lake Deransko into the Neretva and can move in either direction depending on the water levels of the Neretva. Water covers approximately 39% of Hutovo Blato, but its quality is threatened by agricultural runoff and improper waste disposal. In the Neretva Delta, freshwater mixes with seawater, leading to salinization of both water and soil. A significant driver of this salinization is altered water regimes caused by hydropower infrastructure. The use of saltwater for irrigation results in secondary salinization, which gradually degrades soil quality. Urbanization within the valley adds further pressure, making it increasingly challenging to maintain water quality standards. Additional causes include riverbed regulation, uncontrolled gravel extraction, and widespread use of pumps for irrigating agricultural fields and households—these pumps often lead to uncontrolled water drainage. The future of this vital ecosystem is uncertain, as rising frequency of droughts depletes water reserves and human activities—such as dam construction—continue to threaten its delicate balance.

👉 **Lack of coordination between different sectors** (tourism, agriculture, transport) and local authorities can make it difficult to implement sustainable practices. A clear strategy and cooperation at all levels are needed.

👉 **Lack of systematic and continuous education awareness-raising campaigns** among stakeholders - residents, tourism operators and tourists about the importance of sustainable tourism.

To achieve long-term success, it is necessary to focus on an integrated approach that includes environmental protection, local community involvement, development of environmentally friendly tourism services and promotion of awareness of sustainable practices.



4.2. PRIORITIES AND RECOMMENDATIONS FOR STRENGTHENING CLIMATE RESILIENCE OF TOURISM

Strengthening the resilience of the tourism sector is essential to ensure its sustainability and to adapt to the changing climate realities. This chapter outlines the key priorities and recommendations necessary to enhance climate resilience, enabling tourism to withstand and recover from climate-related challenges.

Clear political commitment and measures

- For the most vulnerable sectors (agriculture, water resources, biodiversity and forestry, human health, and tourism).

Promoting a multi-level governance structure

- Ensuring cooperation and alignment with the EU acquis, especially with European Green Deal and climate neutrality and adaptation legislation framework.

Establish regional and local climate strategies with data monitoring

- Strengthen multilevel and cross-sectorial cooperation and documents with clearly defined climate action and measures, as well as their implementers (stakeholders) within the financial and time frame
- Strengthen water conservation and revitalization of wetlands in the Neretva valley to prevent the river from drying up and eutrophication
- Implement data bases and early warning system for monitoring climate, and socio-economic data, including extreme weather events in cooperation with hydrometeorological services, public institution for environmental and nature protection, statistical office etc.
- Ensure appropriate human and financial capacities, and monitoring⁸¹ framework to track the progress

Diversification of the tourist offer

- Develop Cultural and Heritage Tourism Routes by creating themed routes that highlight the historical, religious, and cultural sites of HNC to attract a broader range of tourists interested in heritage and education
- Promote Eco-Tourism and Nature-Based Activities by establishing eco-friendly accommodations and organized nature experiences like birdwatching, botanical tours, and hiking in protected areas, encouraging sustainable tourism that emphasizes natural resource conservation and environmental awareness
- Support development of adventure tourism, e.g., mountain biking trails on Čvrsnica (NP Blidinje)

⁸¹ <https://www.oneplanetnetwork.org/knowledge-centre/resources/climate-action-tourism-sector-overview-methodologies-and-tools-measure>



- Promote traditional dishes in partnership with local producers
- Promote stay of digital nomads (e.g., Mostar is becoming popular).

Strengthen protection of main natural resources

- Designate critical water sources and key natural habitats as protected zones to prevent overdevelopment, pollution, and habitat destruction, ensuring the preservation of biodiversity and water quality.
- Promote water-saving technologies, efficient irrigation methods, and waste reduction in municipalities to reduce water extraction and pollution, maintaining the health of aquatic ecosystems.
- Upgrade existing wastewater treatment facilities and enforce strict pollution controls on both municipal and industrial discharges to prevent contamination of water bodies and protect natural habitats.
- Undertake habitat restoration initiatives, such as riverbank stabilization, wetland rehabilitation, and forest management, to enhance ecosystem resilience, improve water filtration, and support biodiversity conservation.

Overcome energetic and infrastructure challenges


- Connect destinations by e.g., construction of Mostar–Počitelj–Međugorje bicycle paths to reduce car dependence
- Support sustainable accommodation, e.g., the construction of eco-lodges in rural areas (e.g., Blagaj, Konjic) instead of mass hotel complexes
- Establish the foundations of multimodal transport that is connected to destinations (local and with neighbouring countries).

Put sustainability as an imperative

- Balance between natural and cultural authenticity and modern trends (e.g. digital nomads + traditional workshops with the focus on nature and cultural values in the service of tourism, e.g. gastro, eco-tourism).
- Cooperation with neighbouring destinations – joint promotional packages of destinations, e.g., Mostar and Neum (FBiH) and Dubrovnik

Introduce innovative financing for decarbonization and climate resilient tourism

- Establish innovative financing framework from national, regional and local funding sources and use of EU funds for green projects and innovations.
- Establish procedures for public-private partnerships

 **Establish monitoring system** for managing tourism and threats that prevent its sustainable development (pollution, climate change, fragmentation of natural areas, etc.).

 **Achieving continuity of systematic education and rising awareness** among tourism stakeholders on the sustainable tourism development with an

emphasis on reducing the carbon footprint and adapting activities, infrastructure, and resources to climate change. The tourism should be adaptable, focused on sustainable forms that provide visitors with safety, comfort, and preserved attractions throughout the year (e.g., rural tourism in the Neum hinterland).

In the context of CRA (Chapter 3), for each observed Tourism Area the following considerations should be applied:

■ Tourist infrastructure should be designed, planned, implemented, and maintained to ensure resilience against identified climate risks.

■ Tourist offer should be adaptable and prioritize sustainable tourism practices that ensure safety, comfort, and the preservation of attractions year-round.

■ Natural areas face unique vulnerabilities to climate risks compared to other tourism resources. Therefore, they require particular attention not only regarding nature conservation and protection but also in terms of the consider losses of ecosystem services they provide to tourism businesses, visitors, and local communities.

Without **urgent measures** and engagement of **relevant stakeholders** – policy makers, public institutions related to environmental and nature protection, tourism managers, local communities, non-governmental organizations and visitors, the county risks losing its competitiveness compared to neighbouring Mediterranean destinations, which are already investing heavily in climate adaptation. Regional stakeholders should actively engage the **private sector** and local communities in planning and managing sustainable tourism development. It is especially important to **support local producers, family businesses**, and **artisans** who can contribute to the tourism experience, such as through organic food production, handicrafts, and cultural events. Equally important is the **employment of residents** in tourism, as well as the **education and training** employees in the tourism industry, which can enable balanced economic development with heritage and nature preservation. (Figure 4.2).



Figure 4.2. Handicrafts of residents (left) and fishing activities in Hutovo Blato National Park (right) (Source: Shutterstock and NP Hutovo Blato)



5. CONCLUSION

This document presents a comprehensive situation analysis grounded in an examination of relevant strategic, planning, programming, and reporting documents from Bosnia and Herzegovina (BiH), the Federation of Bosnia and Herzegovina (FBiH), and the Herzegovina-Neretva Canton (HNC), as well as additional local data. It also incorporates insights from national, federal, regional, local, as well as international documents related to energy, climate, hydrology, and tourism, alongside spatial, demographic, economic data, and relevant projects.

The resulting analysis serves as a foundational element for the development of the Regional Strategy for Mitigation and Adaptation to Climate Change Climate for the HNC and the Climate Adaptation Plan for the NP Hutovo Blato (pilot destination), situated in Čapljina and Stolac municipalities, within the HNC region.

Beyond presenting the current state of climate mitigation and adaptation, this document highlights potential threats that may impact socio-economic sectors in the HNC, particularly tourism development. It further emphasizes recommendations for maintaining the attractiveness of the destination while safeguarding its natural resources against the adverse effects of climate change.

In summary, the identification and analysis conducted within this document can inform the development of other essential documents aimed at creating evidence-based mitigation and adaptation strategies and actionable measures. Stakeholders and the interested public stand to gain valuable insights from the findings presented by the NaTour4CChange project.

Given the extensive data, analyses and evaluations that were made in accordance with the methodological guidelines of the NaTour4CChange project (and beyond), this outcome (Deliverable 2.4.1.) is crucial for the next phases of the Na Tour4CChange project.



REFERENCES

A complete list of references is provided in Chapter 1.3. of this document, as well as in the footnotes, where they appear. Below are selected documents of greater importance for the HNC region:

- Herzegovina-Neretva County Development Strategy for the period 2021-2027
- Herzegovina-Neretva County Tourism Development Strategy 2011-2021
- Federal Hydrometeorological Institute of Bosnia and Herzegovina - announcements
- Tourism Development Strategy of the West Herzegovina County for the period 2020 - 2027
- Rural Development Strategy of Herzegovina-Neretva County 2021-2027
- Development Strategy for Small and Medium-sized Enterprises in the Herzegovina-Neretva County /Canton for the period 2012-2020
- Small Business/Economy Development Strategy of HNC County/Canton for the period 2023-2027.
- Spatial Plan of the City of Municipality of Čapljina 2023
- Integrated Development Strategy for Čapljina 2017-2027
- Management Plan for Hutovo Blato Nature Park
- Water Management Plan for the Adriatic Sea River Basin District 2022 – 2027
- Development Strategy of Mostar for the period 2022-2027.