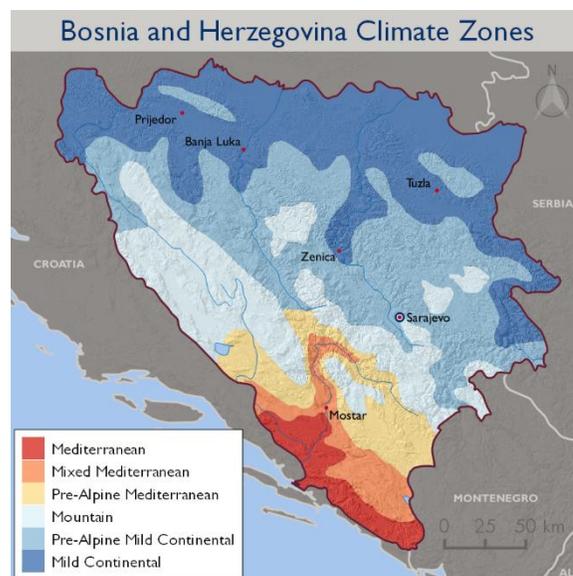




CLIMATE CHANGE RISK PROFILE BOSNIA AND HERZEGOVINA

COUNTRY OVERVIEW

Bosnia and Herzegovina's (BiH) adaptive capacity is challenged by a large vulnerable population on the brink of poverty, a high unemployment rate of 40 percent, wartime infrastructure damages, limited information on climate-related social, health and environmental trends and a lag in technological innovation. The frequency and intensity of natural hazards has increased. Risks related to climate variability in Bosnia were highlighted by the 2014 floods, which led to more than 20 deaths, 90,000 people displaced and billions of dollars in damages (an estimated 15 percent of the country's GDP). (2, 9, 12, 13)



CLIMATE PROJECTIONS



1°C increase in seasonal average temperatures by 2030



More extreme weather, with intense precipitation, floods and droughts



Rainfall variable but summer averages likely to decrease

KEY CLIMATE IMPACTS

Agriculture



Increased soil erosion
Increased crop losses/failure
More pests, weeds, pathogens

Water Resources



Decreasing river levels
Decline in water quality
Increased evapotranspiration

Human Health



More death/illness from extreme events
Increased range for vector-borne disease from mosquitoes, ticks, etc.

Ecosystems



Loss of habitat and species
Introduction of invasive species
More forest fires

Energy & Infrastructure



Reduced hydropower potential
Disaster-related infrastructure damage

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This document was prepared under the Climate Change Adaptation, Thought Leadership and Assessments (ATLAS) Task Order No. AID-OAA-I-14-00013 and is meant to provide a brief overview of climate risk issues. The key resources at the end of the document provide more in-depth country and sectoral analysis. The contents of this report do not necessarily reflect the views of USAID.

CLIMATE SUMMARY

BiH's climate varies with its topography (see climate zones map, previous page): Mediterranean climate in the Adriatic coast and lowland Herzegovina, moderate continental climate in the plains and hills in the center of the country and an alpine climate in the mountains. Since 1990, the most frequent natural hazards in BiH have been floods, extreme temperatures, droughts and storms. (1, 8)

HISTORICAL CLIMATE

BiH's climate has experienced significant changes in the last 50 years:

- Since 1961, average annual air temperatures have increased 0.4°C – 0.8°C, with seasonal variations. The highest increases in temperatures were recorded during the summer months (June – August).
- Long term (50+ years) changes in rainfall trends are minimal though some data suggest decreases in rainfall during spring and summer and increased rainfall during winter, accompanied by decreased snowpack, which can significantly affect water availability during the spring and summer months. (2, 3, 11)

FUTURE CLIMATE

Limited knowledge exists on climate changes specific to BiH, but data for Europe's Mediterranean region suggest that:

- Mean seasonal increases in temperature will average 1°C by 2030, with the highest increases occurring in the summer but also pronounced in the fall.
- Temperature increases will be more pronounced in the inland areas.
- A marked increase in high temperature extremes and meteorological droughts across Europe will likely also affect BiH. (2, 6)

SECTOR IMPACTS AND VULNERABILITIES

AGRICULTURE PRODUCTION

Although agriculture only contributes 7.6 percent to BiH's GDP, it employs 20 percent of the workforce and is a critical source of food security for the country's rural population. Limited productivity, poor soil quality and small-scale plots contribute to the sector's vulnerability to climate change. For example, only a small proportion of suitable land is under intensive production and less than 1 percent is under irrigation. Climate risks and potential impacts to this climate-sensitive sector are in the table at right. (1, 2)

Climate Stressors and Climate Risks AGRICULTURE PRODUCTION	
Stressors	Risks
Increased temperatures	Extended growing season
	Increased incidence of agricultural pests
Increased frequency of intense precipitation	Soil erosion and waterlogging
	Yield losses and/or crop failure
Drought and reduced rainfall	Spread of invasive weeds that thrive in higher temperatures and spread of pathogenic microorganisms and parasites
	Increased food prices

WATER RESOURCES

Located on the Sava River and Adriatic Sea basins, BiH is endowed with abundant water resources but limited information exists on river flows and meteorological conditions for vulnerability mapping and hydrological monitoring. BiH already faces challenges related to water use and availability that could be exacerbated by the potential climate risks and impacts shown in the table at right. For example, drinking water supply systems and flood control facilities are in disrepair as a result of wartime damage, lack of maintenance and land mine contamination. (2, 3)

Climate Stressors and Climate Risks WATER RESOURCES	
Stressors	Risks
Increased temperatures	Lowered or altered river flows, especially in summer
	Reduced reliability and quality of potable water
More frequent droughts	Flash flooding affecting existing water services infrastructure
	Increased water loss from evaporation and transpiration
Increased frequency of intense precipitation	Related impacts on agriculture, health and energy

HUMAN HEALTH

Heat-related deaths, especially among the elderly, are the most researched direct health risk of climate change predicted for the Balkans. Information on other direct or indirect effects of climate change on human health in BiH and for Europe as a whole is nascent, but the main potential impacts for BiH based on available research are summarized at right. Currently, circulatory system disease and cancer account for nearly 75 percent of deaths in BiH. BiH has no clear model of information flow between the health sector and other sectors to generate response, prevention or mitigation methodologies for crises or complications caused by climate change, however. (2, 6)

Climate Stressors and Climate Risks HUMAN HEALTH	
Stressors	Risks
Increased temperatures	Increased mortality from heat stroke and exacerbation of pre-existing conditions
	Decreased number of cold-related deaths
Heat waves	Flooding-caused impacts such as increased mortality, exposure to chemical hazards, infections, psychological distress and damage to health care infrastructure
Increased frequency of intense precipitation	Increased range of Asian tiger mosquito, ticks and other vector-borne disease carriers

ECOSYSTEMS

Although only around 5 percent of BiH is covered by protected area status, BiH is one of the most biodiverse countries in Europe – home to more than 5,000 species and subspecies of plants, more than 320 species of birds and more than 100 species of fish. This rich biodiversity – particularly the flora and fauna of the Dinarides mountain range, karst fields and wetland areas – faces a range of potential climate impacts, with principal ones summarized at right. The vulnerability of forest ecosystems could have additional socioeconomic impacts because of the forestry sector’s contribution to exports and jobs. (2, 4)

Climate Stressors and Climate Risks ECOSYSTEMS	
Stressors	Risks
Increased temperatures	Habitat shifts, loss and fragmentation
	Species loss and/or spread of invasive species
Changes in amounts and seasonal distribution of precipitation	Disrupted species migration patterns
	Changes in water level and quality, affecting food web
	Penetration of brackish water into freshwater ecosystems
Rising sea levels	Increased risk of forest fires
	Increased vulnerability of forests to vermin and pathogens

ENERGY AND INFRASTRUCTURE

The vulnerability of BiH’s infrastructure to climate risks is summarized at right and is exemplified by the impacts of the May 2014 floods and landslides. These natural hazards, which affected bridges, roads, homes, businesses, electricity distribution and flood protection infrastructure, highlight the need to factor climate risks into decisions regarding investments in short- and long-term infrastructure assets. The energy sector is largely reliant on domestic coal and hydropower and supplements this through oil and natural gas imports from the Balkans, Central Europe and Russia. The country’s buildings are aging and energy-inefficient, compounding BiH’s vulnerability to fluctuations in energy supply. (2, 5, 9)

Climate Stressors and Climate Risks ENERGY AND INFRASTRUCTURE	
Stressors	Risks
Changes in amounts and seasonal distribution of precipitation	Lowered or altered river flows leading to reduction in hydropower potential
	Flooding-caused infrastructure damages, including dam breaks and disruption of communication systems
Increased frequency of intense precipitation	

POLICY CONTEXT

BiH faces significant institutional, financial and human resource constraints to addressing climate change issues. The BiH EU accession process is a driving force in reform of the environment sector, however, as integration directly implies close cooperation with EU regulations and adoption of robust climate policies. (5)

INSTITUTIONAL FRAMEWORK

Environmental governance in BiH is devolved across four administrative levels: state, entity, cantonal and municipal. Almost all national environmental legislation operates at entity level, while all international agreements and projects are coordinated through the Ministry of Foreign Trade and Economic Relations. To date, climate change issues have been peripheral to most institutions in BiH; however, the Climate Change Adaptation and Low Emission Development Strategy tasks several institutions with adaptation activities. (4,5)

The BiH Institute for Meteorology and the [Republic Hydrometeorological Institute](#) track and disseminate weather information. They coordinate BiH's participation in [Meteoalarm](#); an EU-wide weather emergency alert system. Initial steps have been taken to modernize and develop the meteorological system, such as installing new equipment, educating staff and developing climate scenarios.

NATIONAL STRATEGIES AND PLANS

- [Initial National Communication](#) (2009) and [Second National Communication](#) (2013) identify agriculture, water resources, human health, forestry, biodiversity and vulnerable ecosystems as most vulnerable to climate change.
- [Climate Change Adaptation and Low Emission Development Strategy](#) (2013) serves as an overarching, integrated framework for sectoral strategies and action plans, prioritizing the same sectors as the national communications in addition to tourism and energy.
- A Third National Communication and a National Action Plan on Adaptation are in preparation.
- BiH established a Disaster Risk Reduction Platform that brings together representatives of government and civil society.

KEY RESOURCES

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3. Centre for Climate Adaptation. n.d. [Bosnia](#).
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9. ReliefWeb. n.d. [Emergency Appeal Operations Update: Bosnia and Herzegovina: Floods](#).
10. United Nations Environment Program. 2012. [Climate Change Adaptation in South Eastern Europe](#).
11. Vukmir, G., et. al. 2009. [Initial National Communication of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change](#).
12. World Bank. n.d. [Data: Bosnia and Herzegovina](#).
13. World Bank. n.d. [Poverty and Social Exclusion in Bosnia and Herzegovina. Insights from the 2011 Extended Household Budget Survey](#).

Map modified from <http://bih-x.info/bh-info/klima/>
Elevation data from Jarvis, A., H.I. Reuter, A. Nelson, E. Guevara.2008. Hole-filled SRTM for the globe Version 4, available from the [CGIAR-CSI SRTM 90m Database](#).

SELECTED ONGOING EXPERIENCES

The table below summarize recent and ongoing donor-funded programs related to climate change adaptation in Bosnia and Herzegovina, including those focused on flood recovery.

Selected Program	Amount	Donor	Year	Implementer
BiH Floods Emergency Recovery Project	\$100 million	World Bank	2014–2018	Federal Ministry of Finance
EU Floods Recovery Program	€43 million	EU	2014–2016	UNDP, UNICEF, IOM
UN Floods Recovery Programme "Danas za nas"	\$22.6 million	28 bilateral donors	2014–2015	Coordinated by UNDP
USAID Flood Recovery Initiative	\$15 million	USAID	2014–2015	Chemonics International (through FARMA), Cardno (through FIRMA), CRS, Save the Children, Mercy Corps
Technology transfer for climate resilient flood management in Vrbas River Basin	\$5 million	GEF	2015–2020	UNDP
Landslide Disaster Risk Management	\$4.1 million	Governments of Japan and of BiH	2015–2016	UNDP
Capacity Development for the Integration of Global Environmental Commitments into National Policies and Development Decision Making	\$1.4 million	GEF	2014–2017	UNEP
Enhancement of Disaster Risk Reduction and Management (DRRM) capacities and mainstreaming CCA practices into Agriculture sector in the Western Balkans	\$485,000	FAO	2016–2017	FAO
Building Local Community Resilience for the Sustainable Development of Watersheds in South Eastern Europe (GRESSIDA)	\$400,000	US EPA	2014–2019	Regional Environmental Center for Central and Eastern Europe
Pilot project on water and climate change adaptation in the Sava River	\$200,000	UNECE	2010–2012	International Sava River Basin Commission and UNECE