

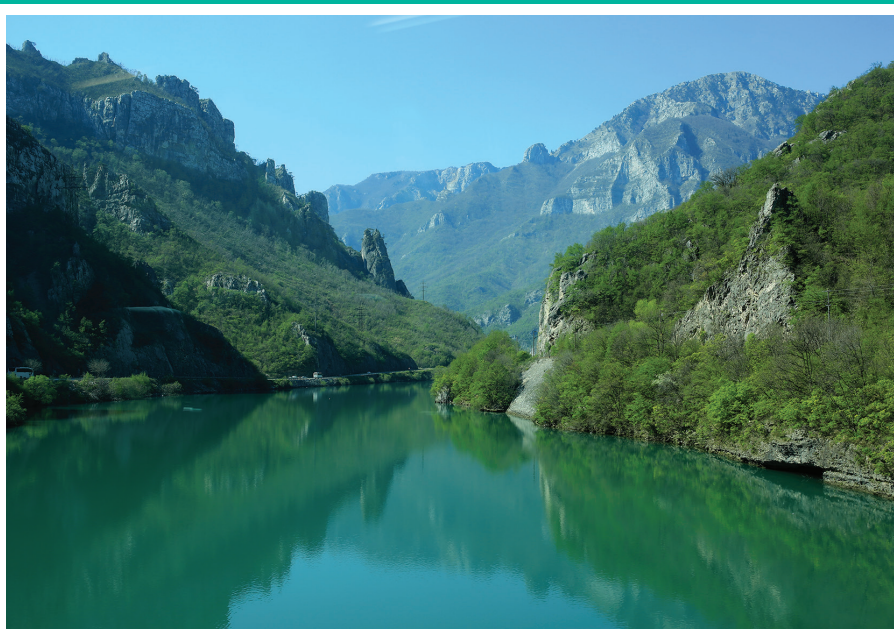
UNECE

Bosnia and Herzegovina

Environmental Performance Reviews



Third Review



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Foreword

It is essential to monitor progress towards environmental sustainability and to evaluate how countries reconcile environmental and economic targets and meet their international environmental commitments. Through regular monitoring and evaluation, countries may more effectively stay ahead of emerging environmental issues, improve their environmental performance and be accountable to their citizens. The United Nations Economic Commission for Europe (ECE) Environmental Performance Review (EPR) Programme provides valuable assistance to member States by regularly assessing their environmental performance. Countries can then take steps to improve their environmental management, integrate environmental considerations into economic sectors, increase the availability of information to the public and promote information exchange with other countries on policies and experiences.

Recently, new instruments, such as the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change, have been negotiated and adopted to address sustainable development challenges. ECE peer review mechanisms, including the Environmental Performance Reviews, play an important role in assessing how well countries are addressing such challenges and meeting their commitments, both old and new. These mechanisms will also continue to provide an opportunity to evaluate whether policies are achieving results, whether there might be better ways to do so and how to address any shortcomings.

The third Environmental Performance Review of Bosnia and Herzegovina brings together a wealth of information to build a picture of the country's environmental governance and performance – in terms of both achievements and shortcomings. I trust that this third review will serve as a powerful tool to support policymakers and representatives of civil society in their efforts to improve environmental management and further promote sustainable development in Bosnia and Herzegovina. ECE wishes the governmental authorities of Bosnia and Herzegovina further success in carrying out the tasks involved in meeting the country's environmental objectives, including the implementation of the recommendations in the third review. I also hope that the lessons learned from the peer review process in Bosnia and Herzegovina will benefit other countries throughout the ECE region and facilitate the achievement and monitoring of the SDGs.

Olga Algayerova



Executive Secretary
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Preface

This third Environmental Performance Review (EPR) of Bosnia and Herzegovina takes stock of progress made by Bosnia and Herzegovina in the management of its environment since it was reviewed for the second time in 2010 and assesses the implementation of the recommendations made in the second review. It covers issues of specific importance to the country related to legal and policy frameworks, greening the economy, air protection, water and waste management, biodiversity and protected areas and protection of the Adriatic Sea. It also examines the efforts of Bosnia and Herzegovina to integrate environmental considerations into its policies in the forestry sector.

The review further provides a substantive and policy analysis of the country's climate change adaptation and mitigation measures and its participation in international mechanisms. The review also highlights challenges to be addressed by Bosnia and Herzegovina when implementing the globally-agreed SDGs.

The third EPR of Bosnia and Herzegovina began in February 2017 with a preparatory mission to agree on the structure of the report and the schedule for its completion. A team of international experts took part in the review mission from 28 March to 5 April 2017. In October 2017, the draft report was submitted to Bosnia and Herzegovina for comments and to the ECE Expert Group on Environmental Performance Reviews for consideration. During its meeting on 24 and 25 October 2017, the Expert Group discussed the draft report with a delegation from Bosnia and Herzegovina, focusing on the conclusions and recommendations made by the international experts. The recommendations, with suggested amendments from the Expert Group, were then submitted for peer review to the ECE Committee on Environmental Policy at its twenty-third session on 16 November 2017. A high-level delegation from Bosnia and Herzegovina participated in the peer review and the Committee adopted the recommendations in this report.

The Committee and the ECE secretariat are grateful to the authorities of Bosnia and Herzegovina and their experts who worked with the international experts and contributed their knowledge and assistance. ECE would also like to express its appreciation to the German Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety and the German Federal Environment Agency for their support by providing funds through the Advisory Assistance Programme, and to Switzerland for its financial contribution. Sincere thanks also go to France, Hungary, Italy, Portugal and the United Nations Environment Programme (UNEP) for having provided their experts and to the United Nations Development Programme (UNDP) for its support of this review.

ECE also takes this opportunity to thank Portugal and Switzerland for their general financial support to the EPR Programme in 2017 and expresses its deep appreciation to Belarus, Estonia, Georgia, Germany, Hungary, Italy, Montenegro, the Republic of Moldova, Romania and Switzerland for having provided their experts for the ECE Expert Group on Environmental Performance Reviews, which undertook the expert review of this report.

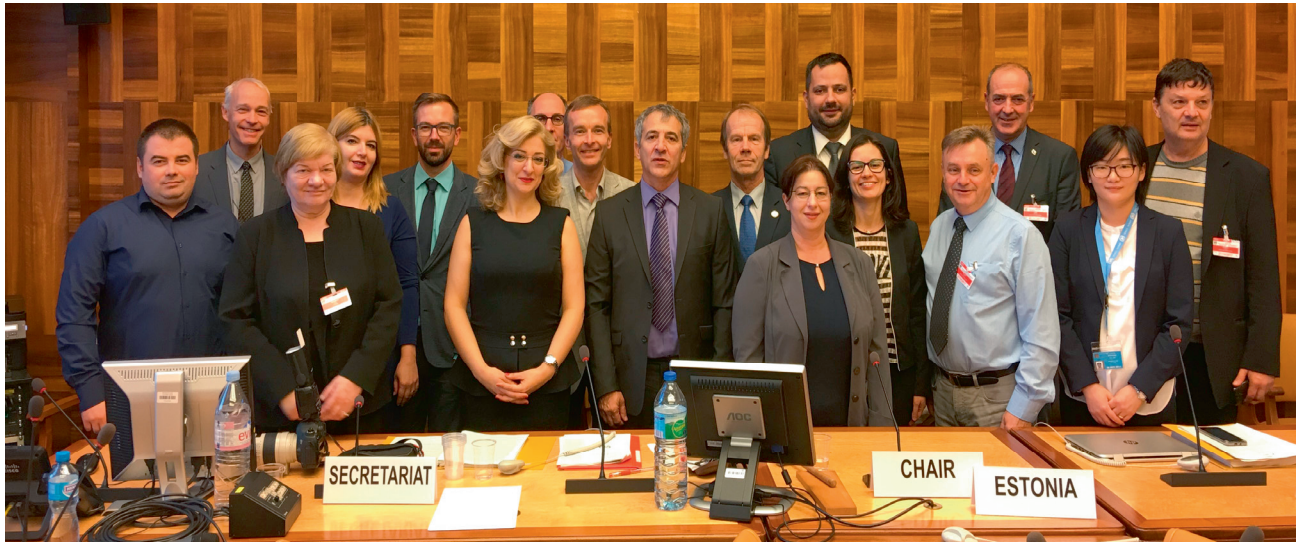
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KEY ACRONYMS AND ABBREVIATIONS

CBD	Convention on Biological Diversity
CLRTAP	Convention on Long-range Transboundary Air Pollution
EIA	environmental impact assessment
EMEP	European Monitoring and Evaluation Programme
EnvIS	Strengthening of Environmental Institutions and Preparation for Pre-Accession Funds
EU	European Union
FSC	Forest Stewardship Council
GEF	Global Environment Facility
HPP	hydropower plant
ICZM	integrated coastal zone management
LEAP	local environmental action plan
MDG	Millennium Development Goal
NBSAP	National Biodiversity Strategy and Action Plan
NEAP	National Environmental Action Plan
NGO	non-governmental organization
NIP	National Implementation Plan
NO _x	Nitrogen Oxides
NWFP	non-wood forest product
OG	Official Gazette
POP	persistent organic pollutant
PM	particulate matters
PRTR	pollution release and transfer register
RES	renewable energy source
SDG	Sustainable Development Goal
SEA	strategic environmental assessment
SEAP	sustainable energy action plan
TPP	thermal power plant
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WFD	Water Framework Directive
WWTP	wastewater treatment plant

SIGNS AND MEASURES

..	not available
-	nil or negligible
.	decimal point
€	euro
\$	dollar
cap	capita
eq.	equivalent
g	gram
Gg	gigagram
GWh	gigawatt-hour
ha	hectare
kg	kilogram
km	kilometre
km ²	square kilometre
km ³	cubic kilometre
kt	kiloton
ktoe	kiloton of oil equivalent
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
l	litre
m	metre
m ²	square metre
m ³	cubic metre
Mg	megagram
MW	megawatt
PJ	petajoule
t	ton (1,000 kg)
toe	ton of oil equivalent
TWh	terawatt-hour

CURRENCY CONVERSION

Exchange rate (period average)
Monetary unit: 1 marka = 100 fening

Year	NCU/US\$	NCU/Euro
2009	1.41	1.96
2010	1.48	1.96
2011	1.41	1.96
2012	1.52	1.96
2013	1.47	1.96
2014	1.47	1.96
2015	1.76	1.96
2016	1.77	1.96
2017	1.74	1.96

Source: ECE common database (accessed on 26 March 2018)

Note: NCU: national currency unit

Executive summary

The second Environmental Performance Review (EPR) of Bosnia and Herzegovina was carried out in 2010. This third review intends to assess the progress made by Bosnia and Herzegovina in managing its environment since the second EPR and in addressing new environmental challenges.

Legal, policy and institutional framework

The Stabilisation and Association Agreement (SAA) has been in force since June 2015. According to the SAA, the association shall be progressively and fully realised over a transitional period of six years. Since 2011 Bosnia and Herzegovina has made some efforts to transpose the EU environmental acquis into the national legislation; however, the country is still at an early stage in these efforts.

In terms of implementation steps for the 2003 Law on Environmental Protection of the Federation of Bosnia and Herzegovina since 2011, the major focus has been to make the environmental permitting system work. All new installations receive environmental permits and go through an environmental impact assessment (EIA), when required, before receiving an environmental permit. However, still, not all operators of existing installations have applied for environmental permits.

A new Law on Environmental Protection of Republika Srpska was adopted in 2012. In 2015, its provisions on EIA and environmental permits were amended. The main improvements are related to strategic environmental assessment (SEA), which is now covered by a dedicated chapter, more elaborated provisions on environmental permits and eco-labelling, and provisions on access to environmental information and public participation. Nevertheless, challenges remain for the implementation of provisions on SEA, EIA, environmental permits and eco-labelling.

There is a Law on Genetically Modified Organisms (GMO) at the state level. The country claims not to produce any GMO food or feed. The country allows imports of genetically-modified food and feed upon authorization. Republika Srpska has a Law on Genetically Modified Organisms accompanied by subsidiary legislation. There is no separate legislation on GMOs in the Federation of Bosnia and Herzegovina or in Brčko District.

The pollution release and transfer register legislation was adopted in 2007 in the Federation of Bosnia and Herzegovina and Republika Srpska. An EU-funded project provided the database, the training and the server for the PRTR. However, after the project ended, the web page disappeared and the register was left to the Ministry of Foreign Trade and Economic Relations. The Ministry of Foreign Trade and Economic Relations did not have the capacity and handed over the equipment to the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, which currently maintains the part of the database related to the Federation of Bosnia and Herzegovina.

The Criminal Codes of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District include articles on environmental crimes. These articles differ in the three Criminal Codes and do not cover the whole spectrum of offences as provided in the EU Directive 2008/99/EC on the protection of the environment through criminal law.

The Environmental Protection Strategy of the Federation of Bosnia and Herzegovina for the period 2008–2018 provides for strategic directions and measures in the legal and institutional field and covers the use of economic instruments, nature protection, land protection, air protection and waste management. As of early 2017, about half its measures are not implemented and remain relevant.

In the Federation of Bosnia and Herzegovina, SEA remains a novelty, although the requirement of SEA was first introduced in 2003. Only three SEAs were conducted in 2015–2016. Sectoral ministries do not initiate SEAs for their draft strategic documents because there is no subsidiary legislation that would tell them how to do it. Active promotion of the SEA instrument has not been a priority for the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina.

In Republika Srpska five SEAs were processed in 2015 and three in 2016. A major criticism is of the quality of public participation as part of the SEA procedure.

In Brčko District, no SEA has ever been done. There are plans to do an SEA for the new spatial plan of Brčko District to be prepared for the period 2017–2027.

Regulatory and compliance assurance instruments

The entity-level laws on environmental protection stipulate the requirement for EIA and SEA as prerequisites for the granting of operating permits to large-scale projects with significant environmental impact. However, there are no specific regulations on EIA and SEA that establish the direct links between the permitting and environmental assessment, either at project level (EIA) or spatial planning and sectoral plan level (SEA).

Both entities and Brčko District provide for both accomplice liability and liability of legal persons, as required by the EU Directive 2008/99/EC on the protection of the environment through criminal law. However, the legal provisions on who can initiate court proceedings for damage caused to the environment, how proceedings can be initiated, what represents such damage, how liability for such damage is determined, who is paid for such damage, and how such damage is repaired, are insufficiently specific, not precise and clear, and incomplete.

Integrated permits, such as are regulated by the EU Directive 2010/75/EU on industrial emissions (IPPC Directive), have not yet been issued in Bosnia and Herzegovina, since the Directive has not yet been fully transposed. Thus, an operator of an installation having multiple environmental impacts, for example, on air, water and generation of waste, would need to apply for multiple individual permits from different ministries.

Eco-labelling of products, corporate social responsibility and voluntary environmental reporting by companies are useful tools for implementing and promoting environmental standards. The implementation of voluntary environmental standards is best emphasized by the increased number of ISO 14001 certificates issued in the period 2009–2015.

In the event of emergency inspections (e.g., after accidents), but also during some routine inspections, immediate sampling of air, soil, water or waste samples cannot be performed. As of May 2017, the environmental inspectorate does not have an accredited laboratory of its own nor a collaborating partner which could be requested to take samples at short notice. The entities' bodies responsible for environmental inspection do not have framework agreements with accredited laboratories to provide such a service. These services are outsourced to private laboratories, are costly and cannot respond in the event of emergencies.

The current level of financial sanctions following damage to the environment by legal bodies does not motivate the permit owners who violate permit conditions to change their behaviour. The applicable fine, ranging from €500–€5,000, is too small to bring about behavioural change, especially in installations in need of technological upgrading to meet environmental standards.

Greening the economy

Progress has been made since 2011 with regard to legislation considering economic instruments for environmental protection, but their implementation is limited and often not compliant with efficiency and effectiveness principles, while policies to exploit Bosnia and Herzegovina's green economy potential are substantially lacking.

Tariffs are the dominant funding source of the water management sector and they are insufficient to cover operation and maintenance expenses. Water supply and wastewater services are not financially self-sustainable and the infrastructures for water management and provision are obsolete. The low levels of tariffs and collection rate are not effective in incentivizing water saving and water loss reduction.

The price of wood is settled by law and the profitability rates of public enterprises are very low. Under-profitability of forest management enterprises limits the resources available for infrastructural and equipment investments in forest management and remediation and discourages private capital flows into the sector, leading

to a gradual degradation of forest heritage and endangering the development of forest-related economic activities and exports.

Energy prices are low and do not reflect the total cost of production and provision. As a consequence of the low level of tariffs, financial resources to maintain and develop infrastructures are scarce and infrastructures face progressive deterioration. Further, the low per-unit prices of fossil fuel sources and electricity make it difficult to influence behaviours and cross-subsidization further hampers proper functioning of the instrument.

Setting energy prices in such a way as to reflect the total costs of energy should, on the one hand, grant the sustainability of energy supply and encourage energy efficiency, energy saving and the introduction of cleaner energy sources. On the other hand, increases in energy prices conflict with the affordability criteria due to, on the households' side, the low income levels and the high relative share of income spent on energy and transport.

The special environmental fee is paid at the time of motor vehicle registration. From April 2013, a correction coefficient has been introduced to account for the different types of engine and fuel, and vehicle age, aiming to better price environmental damage from emissions. However, the linkage of the fee with actual pollution, depending on vehicle use, is still weak.

The tax on emissions is linked to the actual emissions into the atmosphere by enterprises. Fees are progressive, being higher for bigger polluters.

The building sector is the second largest contributor to air pollution and is characterized by high levels of energy inefficiency. The low level of household income reduces the availability of the financial resources needed to improve energy efficiency and to switch towards cleaner technologies and energy sources; few financial mechanisms are available to small businesses or individuals and those that are available, such as loans from commercial banks, are poorly subscribed due to high interest rates, transaction fees and collateral requirements.

The Federation of Bosnia and Herzegovina introduced special fees on plastic bags, packaging and electronic wastes. Regarding plastic bags and bottles, several measures have been introduced, such as a deposit-refund scheme for recycling, economic incentives for selected collection and fines and penalties in the event of non-compliance, but their use should be reinforced.

Only one special fee is currently in force in Republika Srpska: the fee on packaging, paid mainly by importers. The fee revenue goes mainly to the Environmental Protection and Energy Efficiency Fund, which uses it to co-finance projects mobilizing private sector financial resources.

Environmental monitoring, information, public participation and education

Ten locations in Bosnia and Herzegovina conduct air quality measurements. Recent progress includes the establishment of a website where it is possible to obtain information on the real-time state of air quality. The United Nations Environment Programme (UNEP) has recently opened two new air monitoring stations in Bosnia and Herzegovina (in Prijedor and Gorazde) and brought two existing ones (in Ivan Sedlo and Banja Luka) back to full function since 2011.

The quality of groundwater is monitored only in areas where water is abstracted for public water supply. The monitoring of bathing waters is not performed systematically, but according to needs and available funds.

The lack of systematic soil monitoring, a soil and land information system and information on soil contamination is primarily linked to the lack of specific laws at the state or entity level that address soil protection and/or monitoring. The limited information available is restricted to basic land structure and use, soil classes and land ownership structures. Monitoring of noise is not carried out. There is no systematic collection of data on vibration. No biodiversity monitoring system is in place to provide quality data on the status of biodiversity in the country.

There are 11 automatic stations in Bosnia and Herzegovina distributed across the entities, which perform continuous measurement of ionizing radiation in ambient air.

The national shared environmental information system performance score for Bosnia and Herzegovina was 58 per cent in 2016. While this performance score reflects an increase in the overall accessibility of environmental indicators, the generally limited access to relevant environmental information and data in Bosnia and Herzegovina remains significant.

Bosnia and Herzegovina produced its first national State of the Environment Report in 2012. The report provides limited information on the state of the environment. This is principally due to the significant lack of relevant information and data on the environment (e.g. on biological diversity, climate change and land resources).

Some NGOs contribute to enforcing the law on access to public information, monitoring its application and collecting relevant data through the submission of freedom of information requests and starting appeal procedures. The participation of NGOs in environmental policy formulation and development is at a low level.

Implementation of international agreements and commitments

Bosnia and Herzegovina is a party to a number of international environmental agreements. This demonstrates the political importance that the Government attributes to being an engaged participant in international cooperation in the environmental domain. The aspiration to EU membership is the main driver for improving and completing the strategic and legal environmental framework in the country.

Bosnia and Herzegovina does not have in place effective institutional mechanisms to oversee and coordinate the implementation of all international environmental agreements to which the country is a party. The case-by-case approach followed in Bosnia and Herzegovina, under which implementation arrangements were established for some agreements, does not resolve the absence of these arrangements for the whole set of environmental agreements to which the country is committed.

Red Lists were developed and approved at the entity level. In 2012, Republika Srpska approved the Red List of Endangered Species of Flora and Fauna. In 2014, the Federation of Bosnia and Herzegovina approved the Red List of Endangered Wild Species and Subspecies of Plants, Animals and Fungi.

Bosnia and Herzegovina has no provisions in place at either the state or entity level aimed at combating the illegal killing of birds. There are no actions aimed towards the conservation of bird species and implementation of measures, including legal measures, to reduce and monitor illegal hunting, taking and trade of wild birds.

Implementation of the Vienna Convention and Montreal Protocol is progressing well. The country has complied with zero consumption of chlorofluorocarbons (CFCs) since 2009. In 2012, the hydrochlorofluorocarbons (HCFCs) phase-out management plan (HPMP) was approved, committing the country to follow the Montreal Protocol phase-out schedule for HCFCs.

The National Implementation Plan (NIP) for Reduction and Disposal of Persistent Organic Pollutants was adopted in 2016. The country has progressed, notably in developing the main foundations for implementation of the Convention. A preliminary inventory of POPs was developed in 2013. Bosnia and Herzegovina has prohibited the import of all 10 POP pesticides.

Bosnia and Herzegovina acceded to the Convention on the Transboundary Effects of Industrial Accidents in 2013. No significant progress has been achieved in implementing the obligations under the Convention. Bosnia and Herzegovina does not have in place mechanisms for consultation with neighbouring countries on the identification of hazardous activities. The absence of coordination and cooperation regarding the identification of hazardous activities, and their eventual notification to neighbouring and riparian countries, are major shortcomings in the Convention's implementation.

Climate change mitigation and adaptation

Extreme climate events in Bosnia and Herzegovina have become more frequent. In the period 2003–2014, 6 of the 12 years were either very dry or extremely dry. In 2001, 2002, 2009, 2010 and 2014, there were large to disastrous floods. These extreme climate and weather episodes have caused substantial material and financial deficits, as well as casualties.

The energy sector is the main source of anthropogenic emission of greenhouse gases (GHGs). Two the most carbon-intensive energy subsectors are energy conversion (thermal power plants (TPPs), heating plants and transport) and industrial fuel combustion. The share of the energy industry in total emissions varies from 61 to 70 per cent across the years.

The risks associated with climate change have not yet been systematically considered in strategies and management plans for hydropower development. The hydropower sector has not yet adapted its infrastructure to both low river flows and increased peak river flows.

There is no evidence that Bosnia and Herzegovina has already implemented or is currently implementing policies and measures on adaptation of agriculture, the industrial and transport sectors and infrastructure to the current and foreseeable impact of climate change.

There is no comprehensive system for the monitoring of epidemics and disease prevalence correlated with climate parameters in Bosnia and Herzegovina. The increased temperature is likely to result in a higher number of cases of cardiovascular and cerebrovascular illness. Higher temperatures will also contribute to the spread of vector-borne diseases, thus increasing the incidence and extent of infectious diseases. Increased humidity will increase the number of respiratory ailments. Heatwaves will affect risk and mortality, for the elderly population in particular.

The Climate Change Adaptation and Low-Emission Development Strategy was adopted in 2013. The Strategy has two main objectives: increase resilience to climate change and reach a peak and stop annual growth values of GHG emissions by 2025.

Air protection

Pollutant release and transfer registers (PRTRs) have been installed in entity ministries and the Hydrometeorological Institute of Republika Srpska. The implementation of the E-PRTR Regulation ((EC) No. 166/2006) is hampered by the lack of sufficiently trained personnel within the governments and operators.

The environmental permits for industrial establishments are issued at entity and cantonal levels in the Federation of Bosnia and Herzegovina or at entity level in Republika Srpska and include emission limit values (ELVs) for the main air polluting substances. ELVs are in many cases based on EU standards.

The transport sector causes causes 40 per cent of the nitrogen oxides (NO_x), 80 per cent of the non-methane volatile organic compounds and an estimated 10 per cent of the emission of particulate matter (PM_{2.5}) (particulate matter up to 2.5 µm in diameter). At the moment, the average age of the private car fleet is 17 years and more than 75 per cent of the cars use diesel as fuel. More than 50 per cent of vehicles fail to achieve Euro-3 standards.

In Bosnia and Herzegovina, the heating of buildings and services consumes more than 50 per cent of the primary energy consumption. About 70 per cent of the houses are individually heated by furnaces that use fuel wood, lignite or coal as fuel. In winter, with periods of unfavourable meteorological conditions, the many emissions points at low altitude intensify the bad air quality and considerably increase local peak concentration levels of SO₂ and dust.

The 2015 National Emission Reduction Plan (NERP) for Large Combustion Plants envisages the reduction of emissions of SO₂, NO_x and dust from large combustion plants by 95 per cent, 65 per cent and 85 per cent respectively, to gain (overall) levels in the IPPC Directive by 2027. However, its budget is assessed at more than €300 million; a solution for financing has still to be found.

The WHO Air Quality Guideline for the annual mean concentration of PM₁₀ (particulate matter up to 10 µm in diameter) is exceeded in many cities in Bosnia and Herzegovina, as is the EU Air Quality Standard.

Industrial air emissions, combined with the air emissions from the growing number of vehicles and from domestic heating using firewood and lignite, create severe air pollution in industrial and urban areas, which causes serious nuisance and health problems. During less favourable meteorological conditions, high concentrations of

substances such as SO₂ and particulate matter are reached in some urban areas that are situated in valleys, such as Tuzla, Zenica and Sarajevo.

The high levels of air pollution in and around cities in Bosnia and Herzegovina lead to serious health complaints, such as cardiovascular, respiratory and lung diseases. According to the World Health Organization, the per capita mortality rate in Bosnia and Herzegovina attributed to household and ambient air pollution is 223.6 per 100,000, which is one of the highest mortality rates by air pollution in the world. Concrete measures in all sectors (industry, traffic and domestic heating) are not being taken to improve this situation.

Water management

Most anthropogenic pressures on water are caused by urban zones without sewerage and wastewater treatment plants (WWTPs) or uncontrolled leachates from solid waste sites without proper treatment. It is evident that groundwater vulnerability is boosted by the prevalence of Bosnia and Herzegovina's karst geology.

Water resources in Bosnia and Herzegovina are sufficient to fulfil drinking water demands, but microbiological hazards are a health concern. Chlorination is the standard disinfection method in Bosnia and Herzegovina. However, 21 per cent of drinking water samples failed microbiological tests.

Approximately 82 per cent of the water abstraction in Bosnia and Herzegovina is for domestic use, 16 per cent is for industry and the remainder for agriculture and other applications. These figures are not the traditional pattern in EU countries and reveal the underdevelopment of industry and irrigated agriculture in Bosnia and Herzegovina.

Currently, surface water quantity monitoring is performed at 134 hydrological stations in Bosnia and Herzegovina, most of which (around 90 per cent) are automatic. Furthermore, the Sava River Watershed Agency has an online water monitoring service with forecasting and early warning, based on online data acquisition and numerical simulation.

The main environmental pressures on surface waters derive from urban and rural agglomerations, industrial facilities, livestock and poultry farms and fish farms. Diffuse sources of pollution in Bosnia and Herzegovina result from uncontrolled animal manure, the leaching of silage and solid waste dumping sites, and fertilizer surplus.

In the Federation of Bosnia and Herzegovina, 33 per cent of the population is covered by a sewerage system, but only about 3 per cent is connected to a WWTP in 2015 (excluding Sarajevo WWTP). In Republika Srpska, 36 per cent of the population is covered by a sewerage system but less than 5 per cent of population is connected to a WWTP. Brčko District has no urban wastewater treatment facility at all.

Adriatic Sea protection

The Bosnia and Herzegovina part of the Adriatic Sea is still one of the best-preserved regions in the Mediterranean. Generally, the marine environment in Bosnia and Herzegovina is in good condition. However, the elaboration of the current state of the investigated marine water body indicates that it is exposed to significant anthropogenic influence that needs to be better assessed. Illegal construction, without any wastewater treatment system, poses a big potential threat to coastal areas.

Coastal tourism, which is the major current and potential activity in Neum, has become a major impact threat since the town has 4,000 inhabitants and receives more than 20,000 tourists per day in summer. This level of tourism corresponds to the maximum capacity of local infrastructure, especially for sewage.

Along the Eastern coast, solid waste is one of the main identified sources of pollution; there are no sanitary landfills but numerous dumping sites. Due to the karstic nature of the terrain, leachates from waste dumping sites are quickly released into the sea, increasing health risks for the local population and endangering tourism activities.

The main regional challenge is the issue of ballast waters from maritime transport, which are recognized as one of the main vectors for the spread of invasive species in the Adriatic Sea. The introduction of invasive species

and loss of biodiversity further threaten tourism and fishing activities, including in the Bosnia and Herzegovina coastal area.

Waste management

The predominant method for waste disposal in Bosnia and Herzegovina is landfilling. According to the Agency for Statistics of Bosnia and Herzegovina, between 2011 and 2015, the rate of waste permanently disposed of in landfills varied between 67 per cent and 79 per cent. The recovery rate was increasing during this period, but it did not reach 1 per cent by 2015.

On the one hand, there has been some improvement in waste management in Bosnia and Herzegovina since 2011, first by the adoption of an operator system in both entities. On the other hand, the introduction of the operator system did not solve the municipal waste management issues because the operator system exists in parallel to the municipal solid waste (MSW) management services. The operator system does not interfere with the MSW management services, because the rules do not oblige the operators to cover MSW. Thus entities still lack long-term solutions for proper MSW management.

Although waste statistics are not reliable, there is a huge difference between the amounts of generated MSW and disposed waste, which suggests that about 20–30 per cent of the collected MSW ends up on illegal dumpsites. The completion of the long-awaited regional landfills would be only the first, though most important, step towards creating an MSW system that is sustainable. There are deficiencies with the management of other types of waste, most significantly of medical waste – even its quantities are unknown. Significant funds and investments will certainly be required for the development of adequate facilities for the proper disposal of medical waste.

With the introduction of the system of operators for packaging waste, both entities made a significant step towards promoting the separate collection, reuse and recycling of waste, with ambitious targets. Other waste streams are not included in these schemes.

There was some progress with the closure of illegal dumpsites, which was connected to regional landfill construction. Inventories of illegal dumpsites were prepared in both entities, but there are no data on the impact from illegal or uncontrolled dumpsites on human health and the environment.

Since 2011, the practice of hazardous medical waste management in Bosnia and Herzegovina has remained unchanged. Medical waste might be subject to separate collection, but the lack of data hampers sound medical waste management.

Biodiversity and protected areas

The territory of protected areas in Bosnia and Herzegovina is small, and its percentage share of the total territory of the country is well below the European average. The existing 30 protected areas in the country cover only 2.07 per cent of the national territory.

No biodiversity monitoring system is in place to provide quality data on the status of biodiversity in the country. The country does not have an institution tasked to monitor the state of biodiversity, while the entities lack capacities to establish their own monitoring systems stipulated in their laws on nature protection.

Data on biodiversity in Bosnia and Herzegovina are scarce, fragmented and often outdated. In spite of the country's rich biodiversity, international obligations and growing anthropogenic pressures, nature conservation efforts remain insufficient.

The major threats to biodiversity in Bosnia and Herzegovina include unsustainable use of land and forests, habitat conversion, vegetation succession and invasive alien species, overexploitation of natural resources, waste mismanagement, inadequate fire protection, illegal hunting and fishing and climate change.

Socioeconomic challenges, such as unemployment and poverty, have resulted in communities focusing on immediate economic priorities rather than environmental issues, including biodiversity. Thus, biodiversity conservation is not seen as a national priority.

There has not been progress in terms of biodiversity since 2011, apart from the improvements to the legal framework. Progress in collecting environmental data and reporting on the state of biodiversity remains hindered. Budgetary allocations for nature conservation and biodiversity monitoring are low and insufficient for proper conservation measures. Public involvement and interest in the matters of nature conservation are sporadic.

Forestry and environment

Forests and forestlands are important natural resources in Bosnia and Herzegovina. Forests cover 56.2 per cent of the entire territory of the Federation of Bosnia and Herzegovina and 57.9 per cent of the entire territory of Republika Srpska.

The forest in Bosnia and Herzegovina has a typical structure of forests in South-East Europe, which consists of high and coppice forests. In terms of forest types, broadleaf forest is predominant, accounting for 65.8 per cent of forests in the Federation of Bosnia and Herzegovina and 74.2 per cent in Republika Srpska.

Forest fires are a common occurrence in Bosnia and Herzegovina and result in incalculable damage, despite the fact that this area is not in the category of high risk within the European framework. Direct damage includes loss of timber stock, ground vegetation and other forest products, and the costs of firefighting and remediation and recultivation of the burned area.

5.7 million m³ of timber is harvested per year. Compared with an annual increment of more than 11 million m³, this means that only around 50 per cent of the annual increment is used for wood production.

Bosnia and Herzegovina has over 700 species of medicinal and aromatic plants, of which 200 are utilized. Various non-wood forest products (NWFPs) are extensively used by the local population and private companies who hire local people in the rural areas to collect mushrooms, medicinal plants, berries, etc. There are no clear statistics on the collection of NWFPs. It is estimated that around 100,000 people collect various types of NWFPs within companies registered for their collection and processing.

Introduction

I.1 Physical context

Bosnia and Herzegovina is situated on the Balkan Peninsula in South-Eastern Europe and has a land area of 51,209.2 km². The country is bordered by Croatia to the north, west and southwest (border length 932 km), and by Montenegro (249 km) and Serbia (357 km) to the southeast and east. The country also has a short, 13 km, coastline along the Adriatic Sea around the town of Neum.

Bosnia and Herzegovina is a mountainous country. The Dinaric Alps cross the country from its western border with Croatia to the southeast. Of the total surface of the country, 42 per cent is covered by mountains and the average altitude is about 500 m. The highest point of the country, the 2,386 m peak of Maglić Mountain, is situated on the border with Montenegro.

I.2 Demographic context

Bosnia and Herzegovina's total population has been slowly diminishing since 2008; according to the latest available census (2013) the country had 3,531,159 inhabitants while the population density was 69 inhabitants/km². The largest city in the country is the capital, Sarajevo (population 305,000). The second largest city is Banja Luka (population 180,053), which is the political and administrative centre of Republika Srpska, one of the two entities of Bosnia and Herzegovina. Other cities include Zenica (population 115,134) and Mostar (population 111,186). The urban population is 39.77 per cent of the total.

Bosnia and Herzegovina has three major population groups. According to the 2013 census, Bosniaks constitute 50.11 per cent of the population, Serbs 30.78 per cent and Croats 15.43 per cent, while the remaining 2.73 per cent either did not declare their ethnicity or did not answer.

The country has three official languages, Bosnian, Croatian and Serbian, with two different alphabets in use, Latin and Cyrillic. All three languages are South Slavic languages with only minor differences.

Life expectancies have risen slightly since 2008. The latest available figures (2014) give a life expectancy of 79.03 years for women and 73.96 years for men. The country's fertility rate was 1.27 in 2008 and has decreased slightly to 1.26 in 2014, which is lower than in any other of the western Balkan countries and also

lower than the European Union (EU) average of 1.54 in 2014.

The infant mortality rate has decreased from 7.0 deaths per 1,000 live births in 2008 to 5.1 in 2014. Unfortunately, the death rate for the total population has been on the rise, increasing from 9.45 (per 1,000) in 2008 to 10.53 in 2015.

The country's human development index (HDI) has been measured by the United Nations Development Programme (UNDP). The HDI criteria for country rankings are measured on a scale from 0 to 1, with the number 1 indicating the best attainable human development. Bosnia and Herzegovina's development since the 2007 Human Development Report, when it had an HDI of 0.812, placing it in 76th position of 182 countries reviewed, has not been positive. In the 2016 Human Development Report, the country's position had deteriorated to 81st place of 188 countries, with an HDI of 0.750.

I.3 Political context

Bosnia and Herzegovina has been actively working on changing its political and economic environment by forming closer ties with the EU and engaging with other international organizations. In 2003, the European Council in its Thessaloniki summit identified Bosnia as a potential candidate for EU membership. The accession negotiations started in November 2005 and since then a number of agreements between the EU and Bosnia and Herzegovina have entered into force: visa facilitation and readmission agreements in 2008, the Interim Agreement on Trade and Trade-related Issues in 2008 and a visa-free regime for the Schengen Area introduced for all Bosnian citizens with a biometric passport in 2010. The Stabilisation and Association Agreement (SAA), which serves as the basis for the implementation of the accession process, entered into force on 1 June 2015 and in 2016 Bosnia and Herzegovina submitted its EU membership application.

In addition to the EU accession process, Bosnia and Herzegovina has been negotiating its entry into the World Trade Organization. In 2006, the country signed the Central European Free Trade Agreement with neighbouring countries. The country was also one of the founding members of the Mediterranean Union upon its establishment on 13 July 2008.

I.4 Economic context

The annual GDP growth in 2008 was 5.48 per cent, which at the time was above the Western Balkan country average of 5.1 per cent. The steady pace of GDP growth during the 10-year period before 2008 had eased employment recovery, although registered unemployment in 2009 was still at 24.1 per cent, one of the highest rates in the region. The 2008 international financial crisis brought the positive development to a sudden halt when in 2009 the GDP diminished by 2.87 per cent. During the subsequent five years, annual average GDP growth was a sluggish 0.84 per cent. This dismal economic performance finally improved in 2015 when GDP grew by 3.03 per cent. The unemployment figure increased to 28.10 per cent in 2012, finally decreasing slightly to 25.76 per cent in 2016.

Inflation had been at low, single-digit levels since 1997 when the new national currency, konvertibilna marka (KM), was introduced. The 2008 international financial crisis and its effects caused the annual growth rate of the Consumer Price Index (CPI) to jump to 7.4 per cent, but this had already turned into -0.4 per cent in 2009. There was continuous deflation from 2013 to 2015 and the latest available (2015) CPI figure was -0.8 per cent.

The prevailing feature of the country's economy has been a persistent, fluctuating but significant current account deficit driven by a large trade deficit. Since 2008, the current account imbalance has shown a diminishing trend, the deficit decreasing from 13.84 per cent of GDP in 2008 to 5.70 per cent of GDP in 2015. In monetary terms, the reduction of the current account deficit is even more remarkable – the deficit in 2008 was US\$2.643 billion and in 2015, US\$0.923 billion.

While inflation has not been a problem for the economy of Bosnia and Herzegovina for the past 20 years, the high current account deficits and the elevated unemployment levels have been and still are serious hindrances for the economic development of the country.

For years, the emigration of Bosnians to other countries generated a massive inflow of remittances from abroad but, according to World Bank figures, this has changed. The remittances peaked at US\$2.662 billion in 2008, dropping by one third in two years to US\$1.775 billion in 2010 and since then fluctuating at this lower level – the latest available figure, for 2015, was US\$1.741 billion. The declining importance of remittances is also visible in its share of GDP. In 2008,

remittances formed 14.23 per cent of GDP but by 2015 were much lower at 11.12 per cent.

The level of foreign direct investment (FDI) has declined even more dramatically than remittances. FDI decreased by 74.56 per cent between 2008 and 2015, from US\$0.965 billion to US\$0.245 billion. However, although the drop was dramatic, FDI was never as important as remittances for the Bosnian economy. Even in 2008 it formed only 5.26 per cent of GDP and in 2015 the share had fallen to 1.81 per cent of GDP.

Gender

Bosnia and Herzegovina ratified the Convention on the Elimination of All Forms of Discrimination against Women on 1 September 1993 and submitted its combined initial, second and third periodic report in 2006.

Bosnia and Herzegovina adopted a Law on Gender Equality in 2003 and amended it in 2009. The Law prohibits discrimination on the grounds of gender and sexual orientation. The law established the Gender Equality Agency at the state level and gender centres at the entity level to monitor and ensure implementation of the Law and the Bosnia and Herzegovina gender action plans (GAPs). Two GAPs were developed for the years 2006–2011 and 2013–2017.

The Law obligates all public bodies to take appropriate and necessary measures to implement provisions prescribed by this Law and the Bosnia and Herzegovina GAPs. They must do so by introducing measures for achieving gender equality, adopting new or amending existing laws, implementing the Bosnia and Herzegovina GAPs, collecting and keeping records, and analysing and presenting gender-related statistical data.

The 2003 Law on Gender Equality prescribes that equal representation of men and women exists when one sex is represented to a level of at least 40 per cent in bodies at all levels of authority in Bosnia and Herzegovina. This includes legislative, executive and judicial authorities, political parties, legal persons with public authorities and others that work under the control of the State, entities, cantons, cities and municipalities, as well as appointments to delegations and international organizations or bodies.

The Social Institutions and Gender Index (SIGI) measures the level of gender inequality in social institutions by constructing a non-weighted average index of five subindices on a scale ranging from 0 to 1

(higher levels indicate greater inequality). In the 2014 edition of the SIGI, Bosnia and Herzegovina's general score was 0.0333, placing it among countries with a very low level of gender discrimination in social institutions. In the subindices, the country had medium levels of discrimination in family code and son bias, low levels in civil liberties and restrictions on resources and assets, and very low levels in physical integrity.

The political representation of women in the Bosnian Parliamentary Assembly has increased since 2005. According to UNSTAT's Millennium Development Goals (MDGs) indicators, the proportion of female legislators in the parliament increased from 16.7 per cent in 2005 to 19.0 per cent in 2010 and to 21.4 in 2015. The number of women holding ministerial positions has been low. In 2017, only two of the 10 Cabinet members were women.

The gender parity index (GPI) in Bosnia and Herzegovina varies between the educational levels. The 2014 World Bank GPI figure for primary school enrolment was 1.00, while the parity index at the secondary level was just a bit higher at 1.03. The tertiary education level GPI in 2014 was 1.34, indicating female overrepresentation at that level.

The international comparisons of gender equality differ significantly depending on the indices used for the ranking. The 2016 UNDP Gender Inequality Index gave Bosnia and Herzegovina a score of 0.158 in 2015, ranking it 34th of the 188 countries compared, while the World Economic Forum's 2016 Gender Gap Report gave Bosnia and Herzegovina a score of 0.685, ranking it 83rd of 144 countries.

I.5 Political organization and institutions

Administrative and political structure

The political divisions of Bosnia and Herzegovina and its structure of government were created by the Dayton Peace Agreement. The Constitution, which was agreed upon as a part of the Agreement, gave Bosnia and Herzegovina a complex political structure with a multilayer administrative structure and an exceptionally heavy institutional configuration.

Bosnia and Herzegovina and its institutions are responsible for the country's foreign policy, foreign trade, customs policy, monetary policy and international obligations, and the financing of the country's institutions. Bosnia and Herzegovina is also responsible for matters concerning immigration, refugee and asylum policies and international and inter-entity law enforcement. Finally, matters related

to air traffic control, inter-entity transportation and the common and international communications facilities are under its jurisdiction. The armed forces have been unified under a single command.

The central governing apparatus of Bosnia and Herzegovina consists of a rotating tripartite Presidency, a Council of Ministers and a bicameral Parliamentary Assembly convening in Sarajevo.

The three-member joint Presidency consists of one Bosniak, one Croat and one Serb elected by popular vote: two from the Federation of Bosnia and Herzegovina and one from Republika Srpska. All three serve for four years and have equal rights. The chair of the Presidency rotates every eight months. The Presidency is responsible for the foreign policy of the country; it ratifies international treaties after approval by the Parliamentary Assembly and represents Bosnia and Herzegovina in international organizations and institutions.

The Council of Ministers is the executive branch of the Government, responsible for carrying out policies and implementing decisions. It is composed of a Chair and nine ministers, all appointed along ethnic lines. The Chair of the Council of Ministers is nominated by the Presidency and confirmed by the national House of Representatives. The Chair of the Council of Ministers appoints the other ministers.

The Parliamentary Assembly of Bosnia and Herzegovina, responsible for adopting laws and for state budget institutions, is divided into a House of Representatives and a House of Peoples. The House of Representatives has 42 directly elected members, of whom two thirds are elected from the Federation of Bosnia and Herzegovina and one third from Republika Srpska. The House of Peoples has 15 members, elected for a four-year term and representing the constituent peoples, Bosniaks, Croats and Serbs.

Under the Bosnia and Herzegovina administration are two almost independent entities: the Federation of Bosnia and Herzegovina, and Republika Srpska. Each of these entities has its own political structure and administration, with its own government, flag and coat of arms, president, parliamentary assembly, police, postal system and customs department.

The political structure of the Federation of Bosnia and Herzegovina is divided into three levels: the entity level, the cantonal level and the municipal level. At the entity level, the Federation of Bosnia and Herzegovina has its own Constitution, a bicameral parliament and a Government headed by a Prime Minister, who is nominated by the parliament. At cantonal level, each

of the 10 cantons has its own parliamentary assembly with the power to adopt cantonal laws and appoint the cantonal government. The third political level is the municipal one, where each self-governing municipality has its own municipal council and administrative structures.

Republika Srpska is an entity without the cantonal level administration – it has 64 municipalities of which seven are cities and 57 municipalities. At the entity level, there is a National Assembly, a Council of Peoples, a President, two Vice-Presidents and a Government under a Prime Minister. All municipalities have their own councils and administrative structures.

In both entities, the responsibilities of the municipalities include childcare, education, employment, social care, culture, sports, housing and urban planning, municipal utilities (sanitation, sewage treatment and water supply), public order, tourism and management of municipal properties.

In addition to the entities, Bosnia and Herzegovina includes the small, autonomous Brčko District, created from part of the territory of both entities. Brčko District is a shared territory that belongs to both entities but comes under the exclusive sovereignty of the State of Bosnia and Herzegovina. The Brčko District authorities consist of the District Assembly, a multi-ethnic Government, police force and judiciary.

Photo I: Banja Luka-Doboj highway "9 January"



Map I.1: Bosnia and Herzegovina



Source: United Nations Cartographic Section, 2009.

Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

**PART I: ENVIRONMENTAL GOVERNANCE AND
FINANCING**

Chapter 1

LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

1.1 Legal framework and its implementation

The Stabilisation and Association Agreement (SAA) has been in force since June 2015. In February 2016, Bosnia and Herzegovina submitted its application for EU membership. According to the SAA, the association shall be progressively and fully realised over a transitional period of six years. By that time, the country should achieve approximation of its legislation to that of the EU.

The period since 2011 has been characterized by some efforts to transpose the EU environmental acquis into the national legislation; however, the country is still at an early stage in these efforts. Assistance with analysing the legal and policy framework vis-à-vis the EU environmental acquis and drafting new legal and policy documents has been provided to Bosnia and Herzegovina through the EU-funded projects, Strengthening of Environmental Institutions and Preparation for Pre-Accession Funds (EnvIS, 2012–2014) and Capacity Building in the Water Sector in Bosnia and Herzegovina (2014–2016). Due to a complex political and institutional structure, it takes years for developed documents to receive the necessary approvals.

Environmental laws

According to the 2017 Environmental Approximation Strategy of Bosnia and Herzegovina, Bosnia and Herzegovina has the following competences in environmental matters:

- Implementation of international treaties;
- Defining policies, general principles, coordinating activities and harmonizing plans of entity authorities and institutions at the international level within the competences of Bosnia and Herzegovina;
- Coordinating activities to approximate the legal system of Bosnia and Herzegovina with the EU acquis;
- Environmental statistics in cooperation with competent entity institutions;
- Ozone protection;
- Liquid fuels quality;
- Coordination of activities on phytosanitary protection;

- Freedom to access information and access to justice;
- Protection of animals used for scientific purposes;
- Mitigating noise from aircraft.

All other environmental competences fall under the ambit of competences of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District; however, they can agree for certain of their competences to be performed by Bosnia and Herzegovina.

At the same time, if one looks at the existing legal frameworks at the state, entity and Brčko District levels, the above classification is not always followed. For example, access to information is heavily regulated at the entity level, rather than the state level.

Laws on environmental protection

State level

There is no state-level law on environmental protection. Numerous recommendations were made to the country in the past two decades to adopt such a law. Since 2011, some efforts were applied in this area and a draft law was developed but it never reached the stage of a publicly accessible document.

Federation of Bosnia and Herzegovina

The Law on Environmental Protection of the Federation of Bosnia and Herzegovina (OG FBiH, No. 33/03, 38/09) dates back to 2003. No amendments were introduced in this Law during the review period. In terms of implementation efforts, since 2011, the major focus has been to make the environmental permitting system work. All new installations receive environmental permits and go through an environmental impact assessment (EIA), when required, before receiving an environmental permit. The problem is with existing installations that were built before the adoption of the Law on Environmental Protection and cannot be closed for social reasons (jobs). The deadline for existing installations to apply for an environmental permit has been postponed; still, not all operators have applied for environmental permits.

For existing installations, the operator has to submit the request for an environmental permit along with the plan of activities necessary to adjust performance to environmental standards and regulations. The permit is issued for a period of five years; within that period the operator needs to perform all the activities in the plan. The inspection controls the implementation of the plan. At least six months before the permit expires, the operator has to submit a request for renewal of the permit, along with all the reports on emissions, inspection reports and a description of measures performed according to the plan. However, there are cases (e.g. the metallurgical plant in Zenica, thermal power plants (TPPs) in Tuzla and Kakanj and the coke plant in Lukavac) when operators fail to implement all the activities from the plan (e.g. to install new equipment) by the date indicated in the permit and even by the date of the permit expiration, yet nevertheless permits are renewed. In the Federation of Bosnia and Herzegovina, a growing number of environmental permits are appealed in courts as a result of the poor quality of EIAs and environmental permits, along with increased public awareness on environmental issues.

Since 2011, no changes were introduced to the EIA procedure in the Federation of Bosnia and Herzegovina, which is governed by the Law on Environmental Protection of the Federation of Bosnia and Herzegovina and the Regulation on Plants and Installations (OG FBiH, No. 19/04), for which EIA is obligatory and plants and installations may only be constructed and operated if issued an environmental permit. There have been about 450 EIAs done since 2006. Effective public participation at both the EIA and environmental permit issuance stages is still a challenge. The Law does not provide for any public participation during the screening procedure.

A new law on environmental protection is under development in the Federation of Bosnia and Herzegovina.

Republika Srpska

A new Law on Environmental Protection of Republika Srpska (OG RS, No. 71/12, 79/15) was adopted in 2012. In 2015, its provisions on EIA and environmental permits were amended. The main improvements brought about by the new Law are related to strategic environmental assessment (SEA), which is now covered by a dedicated chapter. Also, the new Law has more elaborated provisions on environmental permits and eco-labelling. The provisions on access to environmental information and public participation were advanced. There are

challenges for implementation of provisions on SEA, EIA, environmental permits and eco-labelling.

Brčko District

There have been no amendments to the Law on Environmental Protection of Brčko District of Bosnia and Herzegovina (OG BD, No. 24/04, 19/07, 1/05, 9/09) in the period since 2011. Challenges for implementation are mostly capacity related. According to the Department of Spatial Planning and Property Issues, there are no installations in Brčko District that operate without an environmental permit. About 20–25 environmental permits are issued per year. In Brčko District, licences issued by the Federation of Bosnia and Herzegovina and Republika Srpska for preparation of EIA studies are recognized. Evaluation and approval of an EIA study is done by only three people in the Department of Spatial Planning and Property Issues; there is no opportunity provided by the Law to engage additional expertise.

Air protection

As of early 2017, Bosnia and Herzegovina has an ongoing infringement procedure in the Energy Community with regard to the incorrect transposition and implementation of Directive 1999/32/EC on reduction of sulphur content of certain liquid fuels. The state-level governmental Decision on Liquid Fuels Quality of 2002, with amendments, includes a derogation clause, which resulted in a failure to transpose correctly the provisions of the Directive related to the maximum sulphur content allowed in heavy fuel oil and gas oil. The country grants domestically produced petroleum products more favourable treatment with regard to the maximum sulphur content than it does imported products. In addition, the legislative limit values of sulphur content of gas oil have not been set at the required level.

The legal framework includes the Law on Air Protection in the Federation of Bosnia and Herzegovina (OG FBiH, No. 33/03, 4/10), in Republika Srpska (OG RS, No. 124/11, 46/17) and in Brčko District (OG BD, No. 25/04, 1/05, 19/07, 9/09).

In the Federation of Bosnia and Herzegovina, the Regulation on Limit Values of Air Emissions from Combustion Plants (OG FBiH, No. 03/13) transposes the emission limit values (ELVs) of Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants (chapter 7). The Regulation requires operators of large combustion plants to develop emission reduction plans.

In Republika Srpska, the Rulebook on measures for preventing and reducing air pollution and improving air quality (OG RS, No. 3/15, 51/15, 47/16) transposes the ELVs of Directive 2001/80/EC for both new and existing plants, but the deadline for existing plants to comply has been extended from 2017 to 2020.

In both the Federation of Bosnia and Herzegovina and Republika Srpska, the ELVs of Directive 2010/75/EU on industrial emissions for new plants (IPPC Directive) have not yet been transposed.

Climate change

There are no separate laws on climate change at the state level or in the entities or Brčko District. Climate change is poorly accounted for in the legislation of the entities and Brčko District.

Nature protection

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, the important changes since 2011 include the adoption in 2013 of the Law on Nature Protection (OG FBiH, No. 66/13). However, the subsidiary legislation has yet to be developed. The Law prescribes the establishment of the office or institute for the protection of nature; so far, such office or institute has not been established. Difficulties in implementation are also connected with the underfinancing of protected areas.

Since 2011, one new protected area was proclaimed: protected landscape Trebević, proclaimed in 2014. There are multiple challenges with proclamation of new protected areas in the Federation. While existing protected areas and future protected areas that are planned to be proclaimed are usually well reflected in cantonal spatial plans, the development plans of municipalities often do not follow the cantonal spatial plans and the municipalities approve construction in those areas.

One of the novelties is that the Law on Nature Protection requires prospective researchers to obtain a permit from the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina for research on nature protection in the territory of the Federation and share the outcomes of research with the Ministry – this is one of the ways the Ministry gathers data on biodiversity.

Republika Srpska

Since 2011, Republika Srpska has adopted several new laws: Law on Nature Protection (OG RS, No.

20/14), Law on National Park "Sutjeska" (OG RS, No. 121/12) and Law on National Park "Kozara" (OG RS, No. 121/12). Since 2011, eight new protected areas have been proclaimed: nature monuments Rastuša cave, Ledana pit, Žuta Bukva, Vagan cave, Pavlova cave and Đatlo cave, as well as the area for resource management "University City" and the strict nature reserve "Lom Primeval Forest". The Law on National Parks (OG RS, No. 21/96, 75/10) defines an obligation of the ministry competent for the environment to provide preliminary protection of a natural area if the available data indicate that the area has characteristics of a protected area and if the procedure for protection has been initiated.

Brčko District

In Brčko District there is a protected landscape. Its protection regime is regulated by the Spatial Plan of Brčko District.

Natura 2000

In 2014, the project Support to the Implementation of the Birds Directive and the Habitats Directive proposed 122 potential Natura 2000 sites (58 in the Federation, 61 in Republika Srpska and 3 in Brčko District) but no further work on Natura 2000 has been done since the completion of the project.

In 2011, the Federation of Bosnia and Herzegovina adopted the Regulation on Natura 2000 (OG FBiH, No. 43/11). The appropriate assessment procedure for plans and projects that are likely to have a significant effect on the conservation and integrity of ecologically significant areas, i.e. the future Natura 2000 sites, has been introduced in the Law on Nature Protection but is not yet applied. There are no mechanisms in place to ensure that EIA studies take into account the effects on potential Natura 2000 sites.

In Republika Srpska, the 2014 Law on Nature Protection stipulates that the Government of Republika Srpska, at the proposal of the ministry responsible for environmental protection, shall adopt a regulation that establishes the ecological network.

As of early 2017, no subsidiary legislation on Natura 2000 has been adopted.

Genetically modified organisms

There is a Law on Genetically Modified Organisms (OG BiH, No. 23/09) at the state level. The country claims not to produce any GM food or feed. The country allows imports of GM food and feed upon authorization. Subsidiary legislation approved in 2012

and 2014 covers procedures for authorization for placing GM food and feed on the market of Bosnia and Herzegovina for the first time, risk assessment for the placing of GMOs and GMO products on the market, and other aspects.

The subsidiary legislation that will address administrative procedures for transit and contained use is still in preparation. The Council of Bosnia and Herzegovina for Genetically Modified Organisms, which is in charge of risk assessment and scientific review, meets on a regular basis. The capacity to evaluate the risks is not sufficiently developed in the country.

Republika Srpska has a Law on Genetically Modified Organisms (OG RS, No. 103/08) accompanied by subsidiary legislation. There is no separate legislation on GMOs in the Federation of Bosnia and Herzegovina or in Brčko District.

Waste management

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, no amendments were introduced in the review period into the Law on Waste Management (OG FBiH, No. 33/03 and 72/09), which regulates all waste other than radioactive waste and wastewater.

The implementation of the Law with regard to the adoption of strategic documents on waste management has advanced. New subsidiary legislation includes the Rulebook on the management of packaging and packaging waste (OG FBiH, No. 88/11, 28/13), which obliges manufacturers, importers, distributors and end suppliers to arrange for special places of collection and sorting of packaging waste and provides for the possibility of concluding a contract on the transfer of this responsibility to a system operator.

New subsidiary legislation also includes the Rulebook on the management of waste from electrical and electronic products (OG FBiH, No. 87/12), which prescribes the manner and procedure of placement of electrical and electronic products on the market, the setting up of a system of collection and treatment of waste from electrical and electronic products and the operation of such a system.

The implementation of the Rulebook on medical waste management (OG FBiH, No. 77/08), which obliges medical facilities to appoint a responsible body for the treatment of medical waste, development of medical waste management plans and treatment of infectious waste with thermal or chemical sterilization on site, is

progressing slowly. The results of research conducted by the Institute of Public Health of the Federation of Bosnia and Herzegovina in 2011–2012 showed that only 42 per cent of health facilities in the Federation have developed healthcare waste management plans. Three medical institutions have the equipment for the safe disposal of infectious waste (University Clinical Center of Sarajevo, General Hospital "Abdulah Nakaš" Sarajevo, and the Institute of Public Health in Central Bosnia Canton).

Republika Srpska

In Republika Srpska, the new Law on Waste Management (OG RS, No. 111/13) was adopted in 2013 in place of 2002 law. The new Law provides a better framework for transposition of relevant EU legislation. The import of hazardous waste is prohibited. Major changes in waste legislation in the review period referred to packaging waste: several rulebooks were adopted and amendments on this issue were introduced into the new Law in 2015. Also, a new Rulebook on the management of waste tyres (OG RS, No. 20/12) was adopted.

Brčko District

Brčko District has the Law on Waste Disposal Management (OG BD, No. 25/04, 01/05, 19/07, 2/08, 9/09).

Chemicals

In the Federation of Bosnia and Herzegovina, the laws of the former Yugoslavia (Law on the Transport of Dangerous Goods (OG SFRY, No. 27/90) and Law on the Trade of Poisons (OG SFRY, No. 82/90) still apply. They are complemented by the Decision on the List of Poisonous Substances that can be Placed on the Market in the Federation of Bosnia and Herzegovina (OG FBiH, No. 50/08) and the Decision on the Prohibition or Restriction of the Import, Manufacture and Use of Certain Hazardous Industrial Chemicals in the Federation of Bosnia and Herzegovina (OG FBiH, No. 52/16). The latter prohibits or restricts the import, production, marketing and use of the hazardous industrial chemicals listed in Annex III of the Rotterdam Convention. There is no official register of chemicals that are on the market in the Federation. There are no procedures for data collection and risk assessment of chemicals in the Federation. Also, there are no legal provisions in terms of export and safe storage of mercury and mercury-containing products. The Ministry of Health of the Federation of Bosnia and Herzegovina has prepared a draft law on chemicals.

Republika Srpska adopted the Law on Chemicals (OG RS, No. 25/09) and the Law on Biocides (OG RS, No. 37/09) in 2009. It adopted a number of regulations in order to align its legislation with the EU acquis, including the Regulation on the Conditions for Restriction and Prohibition of the Production, Circulation and Use of Chemicals (OG RS, No. 100/10, 63/13). The Law on Chemicals aims to transpose the REACH Regulation. Legislation that prohibits the production and use of persistent organic chemical (POP) substances has also been adopted.

In Brčko District, the laws of the former Yugoslavia (Law on the Transport of Dangerous Goods (OG SFRY, No. 27/90) and Law on Transport of Hazardous Materials (OG SFRY, No. 27/90)) still apply. Registration, evaluation, authorization and restriction of chemicals are not regulated in Brčko District.

Industrial pollution

In the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, the procedures for issuance of relevant permits are not integrated: in addition to environmental permits, water acts and waste management permits are also to be obtained.

The Laws on Environmental Protection of the two entities and Brčko District promote the application of best available techniques (BAT) in order to prevent and reduce emissions into the environment. The practical application of BAT is constrained by the fact that BAT are not known in the country. There still is no guidance on how to assess BAT and use best available techniques reference documents (BREFs).

Pollution release and transfer register

The pollution release and transfer register (PRTR) legislation was adopted in 2007 in the Federation of Bosnia and Herzegovina (Regulation on Registers of Installations and Polluters (OG FBiH, No. 82/07) and Republika Srpska (Regulation on the Methodology and Manner of Maintenance of the Register of Installations and Polluters (OG RS, No. 92/07)). An EU-funded project provided the database, the training and the server for the PRTR.

However, after the project ended, the web page disappeared and the register was left to the Ministry of Foreign Trade and Economic Relations. The Ministry of Foreign Trade and Economic Relations did not have the capacity and handed over the equipment to the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, which currently maintains the part of the database related to the Federation of Bosnia and Herzegovina.

In the Federation of Bosnia and Herzegovina, the obligation to report to the PRTR is not included in environmental permits. The operators in the Federation submit their reports, which are then manually fed into the database. The register is not accessible to the public online. The only way for the public to access the data in the register is by written request sent to the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina. The data in the register are often incomplete and inaccurate. For example, some operators do not submit their reports while others omit some pollutants or provide the data obtained through improperly functioning emission monitoring systems. The Ministry has no capacity to maintain the PRTR. No training was systematically organized for the operators. The data from the PRTR are used only by the Environmental Protection Fund and the Ministry.

In Republika Srpska, the Hydrometeorological Institute maintains the PRTR database but the number of reports submitted by operators remains unsatisfactory. The obligation to report to the PRTR is stipulated by the Law on Environmental Protection and it is included in environmental permits. As of mid-2017, the register is not accessible to the public online.

Water

In the Federation of Bosnia and Herzegovina, the 2006 Law on Water (OG FBiH, No. 70/06) is accompanied by extensive subsidiary legislation. Since 2011, progress has been made with advancing the legislation on water quality. The Rulebook on drinking water safety (OG FBiH, No. 40/10, 30/12) prescribes the requirements and standards for drinking water and measures for monitoring the health safety of drinking water. New subsidiary legislation has been adopted on wastewater discharges (Regulation on Requirements for Wastewater Discharge into Natural Receptors and Public Sanitation Systems (OG FBiH, No. 101/15, 1/16)) and sanitary protection zones (Rulebook on requirements for determination of sanitary protection zones and protection measures for water sources used for public water supply (OG FBiH, No. 88/12)). Amendments to the Law on Water are currently under preparation to better coordinate the procedures for issuance of environmental permits and water permits and to increase the transposition of the EU Water Framework Directive and the Floods Directive. It is also envisaged to amend the fines stipulated in the Law on Water – surprisingly, to decrease the fines by a factor of two to three.

In Republika Srpska, the 2006 Law on Water (OG RS, No. 50/06, 92/09, 121/12) is supported by extensive subsidiary legislation. In 2012, through amendments

to the Law on Water, the two water agencies were merged into a new centralized institution – the Public Enterprise "Vode Srpske".

Brčko District still uses the old 1998 Law on Water of Republika Srpska although this law is no longer in use in Republika Srpska. A new law on water is being developed in Brčko District.

Environmental noise

Federation of Bosnia and Herzegovina

The Law on Protection from Noise (OG FBiH, No. 110/12) defines permissible noise levels, noise protection measures and methods of measuring and recording noise. The Law requires federal, cantonal, city and municipal authorities responsible for spatial planning issues to ensure the preparation of noise maps for forecasting, recording and monitoring of noise levels.

For example, Sarajevo Canton recently adopted the Law on Protection from Noise (OG Sarajevo Canton, No. 23/16), which entrusts cantonal, city and municipal authorities in charge of spatial planning with ensuring that noise maps are produced for forecasting, recording and monitoring of noise levels. Based on strategic noise maps, action plans are to be prepared within spatial and urban plans with the identification of vulnerable zones, measures and deadlines for the reduction of noise.

This obligation of preparing action plans refers to the owners or managers of industrial zones, railways, airports and roads. In practice, these provisions are not implemented and the lack of noise maps has a direct negative impact during the preparation of planning documents. One reason is the lack of regular monitoring of noise: noise measurements are not implemented in a systematic way, and there are no accurate data on the sources and the level of noise.

Republika Srpska

In Republika Srpska, the Law on Environmental Protection provides that the user of the source of noise may use such a source if stipulated measures for noise mitigation are applied. Measures for noise prevention and mitigation are described in environmental permits. The Law provides a legal basis for adoption of a new regulation on noise limits; in practice, the 1989 Regulation on Permitted Limits of Noise (OG SRBiH, No. 46/89) is still in use. Exceedances of noise levels are common in many municipalities, e.g. the 2016 draft local environmental action plan (LEAP) of Pnavor Municipality for the period 2015–2020 notes

with concern the exceedances of noise limits next to M16-1 highway and in the area of the Ljubic quarry.

Brčko District

In Brčko District, the 2004 Law on Environmental Protection includes several provisions on noise. As in Republika Srpska, the 1989 Regulation on Permitted Limits of Noise (OG SRBiH, No. 46/89) is still in use.

Eco-labelling

In the Federation of Bosnia and Herzegovina, the Rulebook on eco-labels and the management system for eco-labelling (OG FBiH, No. 92/07) was adopted back in 2007 to advance the use of eco-labelling first introduced by the 2003 Law on Environmental Protection. Only four eco-labels have been issued since then.

In Republika Srpska, the Rulebook on eco-labelling and the management system for eco-labelling (OG RS, No. 22/08) was adopted in 2008. No eco-label has ever been issued.

Environmental crimes

The state-level Criminal Code of Bosnia and Herzegovina does not cover any crimes against the environment.

The Criminal Codes of the Federation of Bosnia and Herzegovina (OG FBiH, No. 36/03, 56/06), Republika Srpska (OG RS, No. 49/03, 37/06) and Brčko District (OG BD, No. 10/03, 06/05, 21/10, 52/11, 33/13) include articles on environmental crimes. These articles differ in the three Criminal Codes and do not cover the whole spectrum of offences as provided in Directive 2008/99/EC on the protection of the environment through criminal law. In addition, the entity-level Laws on Environmental Protection provide for criminal punishment in certain cases. With regard to implementation, the capacity and willingness to prosecute for crimes against the environment are low.

Environment-related provisions in sectoral laws

Energy efficiency

At the state level, the energy sector laws include the 2002 Law on Electricity Transmission, Regulator and System Operator (OG BiH, No. 7/02, 13/03, 76/09, 1/11), 2004 Law Establishing an Electricity Transmission Company (OG BiH, No. 35/04, 75/09, 1/11) and 2004 Law Establishing an Independent

System Operator for the Transmission System (OG BiH, No. 35/04). There is no state-level law on energy efficiency.

In the Federation of Bosnia and Herzegovina, the Law on Energy Efficiency was first adopted in February 2017. In the absence of the law, very little has been done in practice, and that which has been done, has been done without proper planning, mainly through the implementation of projects financed predominantly by international organizations. The recently adopted Law envisages the establishment of the agency for energy efficiency to perform activities that improve conditions and measures for rational use and savings of energy in all consumption sectors. According to the Law, energy audits will be performed only by licensed legal and natural entities. The Law also has an impact on public procurement. When public procurement is conducted by contracting authorities financed from the budgets of the Federation, cantons or municipalities, they are obliged to take into consideration the energy efficiency of the goods and services as additional selection criteria. Furthermore, the sellers or the lessors of the buildings or building units (i.e. apartments) are under the obligation to indicate, in the sale or lease advertisement, the energy characteristics of the building or the building unit. For new buildings, the investors will be under the obligation to submit energy certificates to accompany the request for the issuance of the usage permit.

In Republika Srpska, the 2013 Law on Energy Efficiency (OG RS, No. 59/13) aims to encourage the application of policies and measures on energy efficiency in order to reduce negative impacts on the environment, increase energy security and meet the energy needs of all consumers. The Law includes provisions on the Energy Efficiency Action Plan, energy efficiency in public procurement, the energy efficiency obligations of energy distributors, distribution system operators and energy suppliers, the development of a market for energy services and provisions related to metering and informative billing of energy consumption. The Law stipulates that all local government units that have more than 20,000 inhabitants shall adopt their energy efficiency action plans.

Also, large energy consumers (whose total annual energy consumption exceeds TJ 36 or 10 GWh) are required to adopt their plans for energy efficiency. In order to facilitate the development and adoption of such plans, templates have been issued by the Ministry of Industry, Energy and Mining of Republika Srpska. The 2013 Law on Spatial Planning and Construction (OG RS, No. 40/13) covers the setting of minimum

energy performance requirements for new and existing buildings, certification and audit of buildings.

There is no law on energy efficiency in Brčko District.

Renewable energy

There is no state-level legal framework on renewable energy. The state-level 2002 Law on Electricity Transmission, Regulator and System Operator does not cover the development of the network to integrate more renewable energy into the transmission grid. There is also no guaranteed or priority access to the transmission network for renewable energy producers.

In 2013, both entities adopted a Law on the Use of Renewable Energy Sources and Efficient Cogeneration (OG FBiH, No. 70/13; OG RS, No. 39/13, 108/13 and 79/15). Both entities promote electricity generated from renewable sources through feed-in tariffs or feed-in premiums.

In the Federation of Bosnia and Herzegovina, all incentivized renewable energy is bought by the renewable energy operator as a single buyer. The same body also issues guarantees of origin and sets up a registry of producers of renewable energy. The feed-in tariff is paid for energy from small hydro, wind and solar plants and financed through an uplift charge applied to end users. The authorization procedures are very lengthy, partly due to the complex administrative structure of the entity. There is no one-stop-shop for potential renewable energy source (RES) investors.

In Republika Srpska, support is granted for 15 years. It can take the form of feed-in tariffs or premiums offered on top of an administratively set electricity price and financed through an uplift charged on all final customers. The administrative procedures for authorization of RES producers are regulated in numerous legal acts and there is no one-stop-shop for potential investors.

In both entities, there are instances of many small hydropower plants (HPPs) being planned in one area. No assessment of cumulative effect on the environment is made as it is not prescribed by the legislation. EIA is not required for HPPs with a capacity up to 5 MW; for such facilities environmental permits can be issued without an EIA. The lack of cumulative effect assessment, combined with non-mandatory EIA, is particularly worrying where there are multiple small HPPs in one area. Public participation requirements are in place only at the stage of EIA and environmental permit application. It is difficult for the public to intervene at other stages of the HPP authorization process (e.g. during the

issuance of the location conditions or an urban permit, issuance of a construction permit, issuance of a usage permit, etc.).

There is no law on RES in Brčko District.

Transport

In 2016, the Council of Ministers of Bosnia and Herzegovina introduced the ban on import of old vehicles: only those vehicles that meet the Euro 4 standard can be imported into the country as of April 2016. However, the vehicle fleet remains very old, e.g. in Sarajevo Canton the average age of the fleet is about 16 years. The development of rail transport is stagnating and railways play a very minor role in public transportation.

In early 2017, after years of campaigning led by the non-governmental organization (NGO) Centre for Environment (Banja Luka), amendments were introduced to the Law on Traffic Safety on the Roads of Bosnia and Herzegovina to abolish compulsory wearing of bicycle helmets in the country.

Mining

In the Federation of Bosnia and Herzegovina, the Law on the Mining Industry (OG FBiH, No. 26/10) requires mining companies to comply with health and safety regulations and environmental protection regulations. A company that executes mining operations in facilities or sites with potential fire and explosive hazards, which may result in toxic gases and fumes and breakthroughs of gas, water and mud, must organize a rescue service and must supply it with the necessary equipment. An environmental permit and an urban planning permit are to be submitted as part of the application to obtain an exploitation permit. During the execution of mining operations and no later than by the end of the mining operations, mining companies should remediate and reclaim the area damaged by mining operations. The company cannot be issued an exploitation permit for a new exploitation field if it fails to complete technical reclamation on an earlier approved exploitation field.

In Republika Srpska, under the Law on Mining (OG RS, No. 59/12), the concessionaire is obliged to implement all protective measures, including measures of occupational health, water protection, waste disposal and environmental protection as prescribed by the Law on Mining and relevant regulations in those fields. According to the annual report of the Commission for Concessions for 2012, for concessions granted in mineral resources exploration the implementation of measures for

protection of the environment, human health and property was at a high level but still not sufficient. Drafting of the new law on mining is under preparation in Republika Srpska.

Agriculture

There is no law at the state level on organic agriculture. In Republika Srpska, the Law on Organic Production was first adopted in 2004 and then replaced with a new Law in 2013 (OG RS, No. 12/13). In the Federation of Bosnia and Herzegovina, the Law on Organic Farming (OG FBiH, No. 72/16) was adopted only in 2016. The major challenge for organic agriculture across the entire country is an underdeveloped market for organic products. Since 2007, organic certifications in the country have been issued by "Organska Kontrola", which is accredited by IOAS according to ISO 17065.

Forestry

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, the Law on Forests (OG FBiH, No. 20/02, 20/03, 37/04) was abolished by the Constitutional Court in 2009. This decision was based on a petition submitted by the Mayor of the Konjic Municipality and the Council of Municipalities and Cities of the Federation of Bosnia and Herzegovina for protection of the right to local self-governance. Since then, forest management in the Federation of Bosnia and Herzegovina is governed by the temporary Regulation on Forests (OG FBiH, No. 83/09, 26/10, 33/10, 38/10).

The development of the new law on forests started in 2010 but no law on forests was yet adopted as of April 2017. The main issue at stake is to coordinate the interests of municipalities, cantons and the Federation in delineating the competences and finances in the forestry sector.

In the Federation of Bosnia and Herzegovina, even in the absence of a valid law, a significant body of forestry legislation has been developed at cantonal level. For example, the Law on Forests of Sarajevo Canton (OG Sarajevo Canton No. 05/13) regulates planning in forestry, forest management, forests with a special management regime, protection of forests and their functions, economic functions of forests and the use of forests for other purposes.

This cantonal Law is supplemented by 12 cantonal rulebooks regulating, for example: calculation of the direct and indirect damage caused by forest fires; the content of plans to protect forests from fires; the

method of determination of and compensation for damage caused to forests and forest lands; maintenance of the Forest Cadastre (of forests in public and private ownership); monitoring of the health status of forests; and the activities of rangers.

Republika Srpska

In Republika Srpska, major challenges for implementation of the Law on Forests (OG RS, No. 75/08, 60/13) are illegal activities in the forestry sector, such as illegal logging, the causing of fires and the grabbing of forest land. Other challenges are fragmentation of private forests, an incomplete system of monitoring of forest biodiversity, and forest health.

Forest management plans are in place, in line with the Regulation on the Elements and Content of Forest Management Plans for State and Private Forests (OG RS, No. 25/94, 52/09, 43/11).

The Law on Forest Reproductive Material (OG RS, No. 70/09) regulates the quality, processing, validation and use of such material.

Hunting

In the Federation of Bosnia and Herzegovina, the 2006 Law on Hunting (OG FBiH, No. 4/06, 8/10, 81/14) was amended in 2010 to increase penalties for violation of hunting legislation. It was amended in 2014 to allow non-governmental hunting associations to use the mechanism of renting the hunting grounds in addition to the mechanism of concessions, which was the only mechanism prior to the amendments and could not be used by the hunting associations. This formalized procedure reportedly allows better control in the area. Some hunting associations construct infrastructure to provide food and shelters for game animals but there is no governmental support for these efforts. Breeding institutions are not established by the Government. Hunting in excess of the number of animals stipulated in the hunting permit is among typical violations of the legislation in this area.

In Republika Srpska, the 2009 Law on Hunting (OG RS, No. 60/09) is the major legal act in the area. In 2015, there were 89 hunting grounds in Republika Srpska occupying 2,391,000 ha in total.

There are differences in the legal frameworks on hunting of the two entities. According to the Ornithological Society "Naše ptice", 119 bird species are listed as game animals in the Law on Hunting of the Federation of Bosnia and Herzegovina, whereas 153 bird species are listed in the Law on Hunting of Republika Srpska. For several species listed as game

species (12 in the Federation and 33 in Republika Srpska), no hunting season is defined in the hunting calendar, so technically they can be hunted throughout the year. For some species which are listed as seasonally protected game (nine species in the Federation and four species in Republika Srpska), no data about the start/end date of the hunting season are found in the hunting calendar. If one takes the Greater White-fronted Goose as an example, it is listed as a species that can be hunted during open season in the Federation, but the season is not defined; in Republika Srpska this species is fully protected.

The Hunting Law of Brčko District is in force since 2015.

Tourism

The Federation of Bosnia and Herzegovina has the 2009 Law on Tourism (OG FBiH, No. 32/09) and 2009 Law on the Hospitality Industry (OG FBiH, No. 32/09), both accompanied by subsidiary legislation.

Republika Srpska has the 2011 Law on Tourism (OG RS, No. 70/11), the 2010 Law on Public Ski Resorts (OG RS, No. 15/10) and the 2010 Law on the Hospitality Industry (OG RS, No. 15/10), all accompanied by subsidiary legislation.

In both entities, the legislation on the tourism sector does not include any environmental requirements and is not based on the principles of sustainable tourism. There are no requirements to collect information on environmental pressures from the tourism sector, no requirements to promote efficient use of water and energy resources and minimize waste by the tourism sector, and no environmental knowledge requirements for the certification of tourism guides. New laws on tourism are under preparation in both entities.

Brčko District has the 2005 Law on Tourist Activities.

Health

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, the Law on Health Care (OG FBiH, No. 46/10, 75/13) identifies the need for monitoring of the hygienic epidemiological situation in living and work environments as one of the tasks of public health institutions, as well as the need to conduct analysis of environmental impacts on health. Such analysis is conducted in many areas, primarily by the Institute of Public Health of the Federation of Bosnia and Herzegovina.

However, the disease registers for certain types of diseases are incomplete or non-existent. There is an absence of adequate environmental health reports, including reports on risk factors and their impact on climate change and human health.

A draft law on control of and limiting the use of tobacco and other products for smoking is in the process of adoption in the Federation of Bosnia and Herzegovina, to replace the currently valid Law on Limited Use of Tobacco Products (OG FBiH, No. 6/98, 35/98, 11/99, 50/11). Today, in the Federation of Bosnia and Herzegovina, no indoor public places are completely smoke free. The Federation has a ban on several but not all forms of direct and indirect tobacco advertising, promotion and sponsorship.

The Law on Occupational Safety and Health (OG FBiH, No. 22/90) is the primary legislation for the protection of the health of workers in the Federation. In 2012, the Committee of Experts on the Application of Conventions and Recommendations of the ILO noted with concern that measures do not appear to have been taken for the protection of workers against the specific health hazards inherent in occupational exposure to asbestos.

Republika Srpska

In Republika Srpska, the Law on Health Care (OG RS, No. 106/09) recognizes hygiene, epidemiology and environmental health as part of preventive medical science and acknowledges the role of public health in environmental protection.

The Law on Prohibition of Smoking of Tobacco Products in Public Places (OG RS, No. 46/04, 74/04, 92/09) and Law on Prohibition of Advertising of Tobacco Products (OG RS, No. 46/04, 74/04, 96/05, 92/09) are in place. In Republika Srpska, no indoor public places are completely smoke free. Almost all forms of direct and indirect tobacco advertising, promotion and sponsorship are banned.

The country's reports on implementation of the ILO Asbestos Convention, 1986 (No. 162) never included information on the application of the Convention in Republika Srpska.

Education

Provisions on environmental education and training are present in the Law on Environmental Protection of both entities and Brčko District but are absent in the laws on the education sector, which cover the various stages of the educational system.

Other laws

There are no specific laws on environmental inspections. The activities on inspection are regulated by the general laws on inspections of the two entities and Brčko District and related legislation in relevant areas (water, waste, mining, etc.). The new Law on Public Procurement of Bosnia and Herzegovina, adopted in 2014, establishes a fully decentralized public procurement system, which grants the responsibility for public procurement to contracting authorities. According to the Law, technical specifications, which are part of the bidding documentation, shall be determined in the form of performance or functional requirements that may include environmental features and features regarding energy efficiency. The Law also provides for the use of the most economically advantageous tender (MEAT) criterion, which provides opportunities for green public procurement.

1.2 Policy framework

Planning system

The mid-term planning system focusing on the linkages between planning and budgeting and aimed at ensuring coherent planning by all the institutions of Bosnia and Herzegovina is prescribed by two decisions of the Council of Ministers of Bosnia and Herzegovina adopted in 2014: the Decision on the Procedure of the Mid-Term Planning, Monitoring and Reporting in the Institutions of Bosnia and Herzegovina (OG BiH, No. 62/14) and the Decision on the Annual Planning and Manner of Monitoring and Reporting in the Institutions of Bosnia and Herzegovina (OG BiH, No. 94/14).

Bosnia and Herzegovina does not have a national sustainable development strategy or other comprehensive development strategy. The draft development strategy and draft social inclusion strategy were prepared for the period 2008–2013 but were never adopted.

The most significant planning document is the Reform Agenda 2015–2018 of Bosnia and Herzegovina. It foresees the implementation of activities in public finances, the business climate and competitiveness, the labour market, social welfare and pension reform, the rule of law and public administration reform. However, it has no provisions related to environmental protection.

The three-year economic reform programmes include some priority measures and projects related to the environment and environmental infrastructure. The

current Economic Reform Programme for the period 2017–2019 includes a section on measures in the environmental sector. The section, however, reflects the input from the Federation of Bosnia and Herzegovina only. Moreover, the two priorities identified (completing the implementation of the Second Solid Waste Management Project and adoption of new Law on the Environmental Protection and Energy Efficiency Fund in the Federation of Bosnia and Herzegovina) are questionable vis-à-vis the whole spectrum of needs.

In general, the country has the relevant rules for a well-functioning planning system in place; however, their proper implementation is an enormous challenge in view of the complex institutional set-up in the country. Specifically, strategic documents are developed and adopted on the basis of a bottom-up approach: a document is first developed and adopted at the entity and Brčko District level, and then the state-level document is drafted by extracting what is common in the documents at the entity and Brčko District levels. Also, strategic documents are often adopted with significant delays due to the long approval procedures. While they usually remain relevant by the time of adoption in terms of priorities and measures envisaged, the information and data they include often remain outdated.

Strategic documents on environment

State level

There is no state-level policy and strategy on the environment.

The Environmental Approximation Strategy of Bosnia and Herzegovina (supplemented by Environmental Approximation Programmes for the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District) was developed with support from the EnvIS project in 2014. The lack of such national strategy had long been the key reason for discontinuation of funding from the Instrument for Pre-Accession (IPA) to Bosnia and Herzegovina in 2012. The process of approval of the Strategy took a long time. At the end of May 2017, the Environmental Approximation Strategy of Bosnia and Herzegovina was adopted by the Council of Ministers of Bosnia and Herzegovina. In June 2017, the Government of Republika Srpska issued a Resolution on conditional acceptance of the Environmental Approximation Strategy of Bosnia and Herzegovina (No. 04/1-012-2-1354/17 dated 08.06.2017), requiring its urgent revision in accordance with the comments from the Ministry of Health and Social Welfare of Republika Srpska and

the Ministry of Economic Relations and Regional Cooperation of Republika Srpska.

The Environmental Approximation Strategy of Bosnia and Herzegovina addresses eight subsectors of the EU environmental acquis: horizontal issues (EIA, SEA, liability, access to information, etc.); water management; waste management; air quality and climate change; industrial pollution; chemicals; nature protection; and environmental noise. For each of the subsectors, legal, institutional, economic and financial aspects are analysed and recommendations for short-term and mid-term measures provided.

In addition, the draft environmental policy of Bosnia and Herzegovina (supplemented by environmental policy documents for the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District) was prepared with support from the EnvIS Project in 2014, but as of March 2017 its approval procedures had not yet commenced.

The Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and Herzegovina was adopted by the Council of Ministers of Bosnia and Herzegovina in 2013. The adaptation component of the Strategy is focused on seven priority sectors, with water management underpinning many of the activities. In addition, a range of cross-cutting issues are also discussed and considered in the formulation of activities. The low-emission development component focuses on three sectors where the opportunities for emission reduction are highest, and where the economic and social impact of investment in emission reduction is potentially most beneficial: electricity generation, buildings and district heating, and transport. The document recognizes that securing financing and ensuring multidisciplinary and multisectoral institutional linkages represent key challenges for implementation of both components.

An Action Plan for Flood Protection and River Management for Bosnia and Herzegovina for the period 2014–2017 was adopted at the state level after the catastrophic flood of 2014. It provides for a set of measures directed at designing new technical solutions for protection from floods and the construction of new facilities, as well as building the capacities of institutions responsible for water management and flood protection. Implementation of these measures has received strong support from the international community.

The Strategy for Radioactive Waste Management adopted by the Council of Ministers of Bosnia and Herzegovina in 2013 (OG BiH, No. 01/14) calls for a centralized approach to radioactive waste

management in Bosnia and Herzegovina through the creation of a central storage facility for the entire territory of Bosnia and Herzegovina.

The Action Programme to Combat Land Degradation and Mitigate the Effects of Drought in Bosnia and Herzegovina, adopted in May 2017, includes four strategic objectives:

- Improvement of the legal framework in order to protect land resources and sustainable land management (measures include the adoption of regulations on good agricultural practice and regulations on the treatment and application of biodegradable waste in agriculture);
- Efficient institutions and administration able to respond to the requirements of sustainable land management (measures include strengthening inspection services in order to enhance supervision of land protection in all areas);
- Improvement and implementation of melioration measures, remediation and sustainable land management (measures include addressing the problem of mining-contaminated land, which, according to 2017 data from the Mine Action Centre, covers 1,091 km² or 2.2 per cent of the total country area);
- Public awareness-raising and the role of education in combating land degradation and drought.

The Strategy of Bosnia and Herzegovina and Action Plan for the Protection of Biological and Landscape Diversity 2008–2015 – in effect, the NBSAP – was adopted by the Council of Ministers of Bosnia and Herzegovina in 2011. The Strategy and Action Plan for Protection of Biodiversity in Bosnia and Herzegovina 2015–2020, adopted in May 2017, is the country's second NBSAP. It is developed in line with the Convention on Biological Diversity (CBD) Strategic Plan for 2011–2020 and the Aichi Biodiversity Targets. It identifies national goals, of which the five priority goals are:

- By 2017, prepare and adopt the strategy for mobilization of financial resources for the preservation of biological diversity;
- By 2020, increase the level of public awareness in the domain of preservation of biological diversity;
- By 2020, establish the system for purification of industrial and utility wastewaters and monitoring of the use of pesticides and fertilizers;
- By 2020, map and urgently protect the specific biological diversity of Bosnia and Herzegovina (canyon, mountain, alpine and wetland ecosystems, karst fields and alluvial plains) in accordance with the applicable spatial planning documents;

- By 2020, map and evaluate the benefits from forest, agricultural and water ecosystems, and strengthen the mechanism of environmental permits and supervisory inspection within the spaces of protected areas, areas of special interest and areas planned for the Natura 2000 ecological network.

The drafts of the first Sava River Basin Management Plans in Bosnia and Herzegovina for the period 2016–2021 were prepared in the framework of the EU project Capacity Building in the Water Sector in Bosnia and Herzegovina. They comprise three river basin management plans for the Sava River (for the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District) and, at the country-level, the Roof report and the Programme of Measures (to implement the river basin management plans) for Bosnia and Herzegovina.

Federation of Bosnia and Herzegovina

The Environmental Approximation Programme of the Federation of Bosnia and Herzegovina – a kind of action plan for the Environmental Approximation Strategy of Bosnia and Herzegovina in the Federation of Bosnia and Herzegovina – was approved in December 2016. It is more specific than the Environmental Approximation Strategy of Bosnia and Herzegovina in describing the actual status and required changes in the legal framework in the Federation for transposition of the EU environmental acquis.

The Environmental Protection Strategy of the Federation of Bosnia and Herzegovina for the period 2008–2018 provides for strategic directions and measures in the legal and institutional field and covers the use of economic instruments, nature protection, land protection, air protection and waste management. As of early 2017, about half its measures are not yet implemented and remain relevant.

The Waste Management Strategy for the period 2008–2018 and the Waste Management Plan for the period 2012–2017 are aimed at establishing priority infrastructure for integrated waste management, reducing the amount of waste for final disposal and strengthening the enforcement system. Implementation responsibilities for concrete measures are defined in the Plan, together with necessary funding and donors. In practice, the establishment of regional waste management centres and rehabilitation and closing of unregulated landfills are progressing very slowly.

The implementation of the Water Management Strategy for the period 2010–2022 suffers from insufficient funding from both the Government and cantons of the Federation of Bosnia and Herzegovina, along with the suspension of access to IPA funding. The Strategy includes ambitious targets (e.g. to increase the population coverage by central water supply systems from 60 per cent to 80 per cent, and to reduce water losses by 15 per cent in central water supply systems, in the period covered by the Strategy) which are not possible to achieve without investment at all levels of government. One of the key issues is small-scale water supply systems, as their number and location are not known and they are not covered by wastewater treatment. Control of the health safety of drinking water in small-scale water supply systems is not satisfactory. In most cases, chlorination is not carried out in these water supply facilities, or it is only occasionally done manually, while sanitary protection zones are not defined.

Flood protection is the subject of a separate document, the Operational Flood Protection Plan (OG FBiH, No. 07/11).

The draft river basin management plans for the Adriatic Sea watershed area and Sava River watershed area (i.e. those parts in the Federation) have been prepared. These draft plans are among very few documents for which the SEA procedures were conducted in the Federation of Bosnia and Herzegovina. The SEAs for both draft plans were concluded in June 2017.

Republika Srpska

The Environmental Approximation Programme of Republika Srpska – a kind of action plan for the Environmental Approximation Strategy of Bosnia and Herzegovina in Republika Srpska – was adopted by the Government of Republika Srpska in December 2016. It is more specific than the Environmental Approximation Strategy of Bosnia and Herzegovina in describing the actual status and required changes in the legal framework in Republika Srpska for transposition of the EU environmental acquis.

The Strategy of Nature Protection (OG RS, No. 65/11) provides long-term vision and measures on nature and biodiversity conservation, linking them also to spatial planning. It defines operational objectives with regard to education and awareness-raising, enhancing monitoring of biodiversity, monitoring of invasive species, establishment of ex-situ conservation and use of GIS technology for the formation of a network of existing and future protected areas. The Strategy is not accompanied by an action plan. Major achievements

in nature protection are related to the improvement of the legal framework, declaration of new protected areas and implementation of regional projects related to nature protection and the protection of wild species. Major challenges in nature protection include the lack of substantive funding of protected areas and for effective management of national parks, lack of cooperation between local self-governments and relevant ministries in nature protection, and the conflict of interest between construction and development interests on one side, and nature protection on the other.

The Chemical Safety Strategy for the period 2012–2016 (OG RS, No. 49/12) has among its strategic objectives to provide a basis for achieving a high level of protection of human health and the environment from possible adverse effects of chemicals, particularly in terms of the pollution of air, water and land, and the control of emissions and corresponding hazardous wastes.

The Air Protection Strategy of Republika Srpska (OG RS, No. 37/11), designed for a six-year period, aims at improvement of air quality and the health of the population and implementation of international obligations under air- and climate-change-related agreements. In accordance with the Strategy, in 2017 the Parliament adopted amendments to the Law on Air Protection (OG RS, No. 124/11, 46/17), aimed at harmonizing the legislation with the EU acquis in the areas of greenhouse gas (GHG) inventory and reporting, and implementation of the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer and amendments. The lack of an action plan represents a key challenge for the Strategy's implementation.

Republika Srpska adopted its Strategy for Integrated Water Management for the period 2015–2024 (OG RS, No. 04/16) in March 2016. The Strategy provides a comprehensive outlook on the state of water management and describes measures related to the protection of water from harmful effects, protection of water quality, management of water uses, improvement of the institutional framework for water management, and financing the water sector.

The draft waste management strategy of Republika Srpska for the period 2017–2026 is currently subject to public consultation.

The draft river basin management plan for the Sava River Basin (i.e. those parts in Republika Srpska) has been prepared. As of July 2017, an SEA procedure for the draft plan is ongoing.

Brčko District

The Environmental Approximation Programme of Brčko District – a kind of action plan for the Environmental Approximation Strategy of Bosnia and Herzegovina in Brčko District – was approved in early 2017. It is more specific than the Environmental Approximation Strategy of Bosnia and Herzegovina in describing the actual status and required changes in the legal framework in Brčko District for transposition of the EU environmental acquis.

The Development Strategy of Brčko District for the period 2008–2017 includes a section on the environment. Operational objectives include: establishment of a system for monitoring the quality of air, water, forests, land and noise levels; disposal of municipal and industrial waste; reducing the risk of accidents; planting and reconstruction of the central city green spaces and parks and connecting them with the peripheral suburban green areas; and increasing the level of flood protection. As for practical implementation, the most pressing issues remain the lack of facilities for waste disposal and wastewater treatment. The successes include building the highway around Brčko District (the so-called Brčko bypass route), which will reduce pollution from transport; covering all large industrial facilities with environmental permits; and replacement of most of the water pipes that contain asbestos.

The Environmental Protection Strategy of Brčko District in Bosnia and Herzegovina for the period 2016–2026 includes five objectives: European integration and implementation of EU Directives; institutional strengthening and reform of Brčko District institutions related to environmental protection and promotion of sustainable development; the strengthening of personnel capacities in the area of environmental protection in all sectors; raising awareness on environmental protection, creating and increasing expert capacities; and the establishment of intersectoral cooperation and coordination and integrating environmental protection principles into other sectors. Measures are defined for each objective, together with deadlines and responsible institutions.

The Nature Protection Strategy of Brčko District, the Air Protection Strategy of Brčko District and the Waste Management Strategy of Brčko District are part of the Environmental Protection Strategy of Brčko District for the period 2016–2026.

Sectoral development with a possible impact on the environment

Energy efficiency
State level

Bosnia and Herzegovina does not have a national energy efficiency action plan, which is a requirement for the country in line with its Energy Community obligations. Such a plan was first developed in 2012 but never adopted.

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, there is no action plan on energy efficiency as such a plan would need to be based on the Law on Energy Efficiency, which was only adopted in early 2017 after a long stalemate.

Republika Srpska

In Republika Srpska, the Energy Efficiency Action Plan until 2018 (OG RS, No. 1/14) was adopted in 2013 in line with the requirements of the 2013 Law on Energy Efficiency of Republika Srpska. The overall energy savings target for 2018 is 3.77 PJ / 90 ktoe (9 per cent of the average final energy consumption in the period 2006–2010), with intermediate energy savings targets of 0.20 PJ / 4.8 ktoe (0.5 per cent) in 2012, and 1.40 PJ / 33.4 ktoe (3.3 per cent) in 2015. Measures are envisaged in the residential, services, industry and transport sectors. Development of the energy service companies' market is required for implementation of many measures (in the building sector, water supply systems, public lighting and industry). The Environmental Protection and Energy Efficiency Fund has an important role in implementation of the Plan.

The implementation report for 2015 indicates the successes in the development and improvement of subsidiary legislation on energy efficiency. However, as the database on energy efficiency is not yet established, the report does not provide information on the results of realized energy savings. The main problems identified in the report are insufficient financial mechanisms and lack of administrative capacity to implement energy efficiency policy at both the Government of Republika Srpska and local levels. The Environmental Protection and Energy Efficiency Fund can finance programmes on energy efficiency only from the resources raised specifically for improving energy efficiency. These funds are not sufficient for the realization of a significant number of projects.

In Republika Srpska, an Operational Plan to Improve Energy Efficiency in Public Administration Bodies, approved in 2014 by the Director of Government Administration of Republika Srpska, is also in place.

Renewable energy

In 2016, Bosnia and Herzegovina submitted to the Energy Community Secretariat its National Renewable Energy Action Plan (NREAP), adopted by the Council of Ministers of Bosnia and Herzegovina in March 2016. The Plan is based on the country's target of 40 per cent renewable energy in gross final energy consumption in 2020, compared with 34 per cent in 2009. The Plan prescribes the sectoral goals for renewable energy share: 52.4 per cent in the heating and cooling sector; 56.9 per cent in the electricity sector; and 10 per cent in the transport sector. However, according to the energy balance published by EUROSTAT, by 2014 the country had already achieved a 42.3 per cent share of energy from renewable sources – overachieving the target for 2020 – due to the revision of biomass data. This makes the national target meaningless for comprehensive planning of further promotion of RES.

The two entities have adopted renewable energy action plans in 2014 and have developed legal and regulatory frameworks for renewable energy. The Renewable Energy Action Plan of the Federation of Bosnia and Herzegovina (OG FBiH, No. 48/14) sets an entity target of 41 per cent, starting from a 36 per cent share in 2009. In Republika Srpska, the Renewable Energy Action Plan (OG RS, No. 45/14, 111/15) sets an entity target of 48 per cent, starting from a share of 42 per cent in 2009. Both entities promote electricity generated from RES through feed-in tariffs or feed-in premiums.

The 2015 Sustainable Energy Action Plan (SEAP) of Brčko District includes a reference inventory of CO₂ emissions in various sectors for 2012 and identifies energy efficiency measures by sectors.

Transport

One of the four objectives of the Framework Transport Policy of Bosnia and Herzegovina for the period 2015–2030 is addressing the environmental and social impacts of the transport sector.

The specific objectives of the Framework Transport Strategy of Bosnia and Herzegovina for the period 2016–2030 are: the harmonization of EIA legislation with EU standards; monitoring polluting emissions from the transport sector; enhancing modal shift for passenger and freight transport; harmonization with

EU standards on vehicle emissions (cars and heavy vehicles); and reducing the average age of vehicles. The document, however, lacks any data or estimates on the average age of the vehicle fleet or vehicle emissions. On road safety, it provides for the improvement of road safety audits and road safety inspections and upgrading of the rest stations on motorways.

The documents on road safety have been adopted at entity level: the Baseline of Road Traffic Safety in the Federation of Bosnia and Herzegovina (2008–2013) and the Strategy for Road Traffic Safety in Republika Srpska (2009–2013) and (2013–2022). It is planned to adopt a state-level strategy on road safety in 2017.

Industry

There is no policy document on industry at the state level.

In the Federation of Bosnia and Herzegovina, in 2009, the project Development of Industrial Policy in the Federation of Bosnia and Herzegovina, under the Ministry of Energy, Mining and Industry, analysed the situation in the industrial sector and defined strategic objectives for revitalization and development of industry in the Federation for the period 2009–2018. This was followed by the adoption of the Action Plan for implementation of the project Development of Industrial Policy in the Federation of Bosnia and Herzegovina in 2011–2015. Five annual reports for implementation of the Action Plan were produced. The report for 2015 indicates that 49 per cent of measures were implemented fully and 13 per cent partially. The good implementation score is attributed to implementation of the following priorities: encourage research and development activities; increase the level of export orientation of industry; and increase the level of competitiveness of industrial products. Most of the envisaged measures, however, related to improving the legal framework. A new Action Plan for implementation of the project Development of Industrial Policy in the Federation of Bosnia and Herzegovina in 2016–2019 (OG FBiH, No. 4/16) is currently in place. One of its priorities is "Federation of Bosnia and Herzegovina provided with sufficient amounts of energy, taking into account energy efficiency and environmental protection".

In Republika Srpska, according to the Foreign Investment Encouragement Strategy for the period 2016–2020 of Republika Srpska, the results of a survey conducted among manufacturing industry companies indicate that about 47 per cent of all companies have obsolete technology (average age of more than 10 years) and that universal machinery (i.e.

without computerized numerical control) prevails. In 2013, 44.38 per cent of all wastewater discharged from manufacturing industry was untreated. One of the five strategic goals of the Strategy and Policy for Industry Development for the period 2016–2020 of Republika Srpska is the application of environmental standards in industry and more efficient use of resources. The document calls for the reduction of environmental pollution by industry, introduction of BAT, introduction of systems of environmental management, efficient use of raw materials, greater use of renewable materials and RES, and energy saving by industry. The document recognizes the need to update the PRTR and to stimulate the use of eco-labelling. The Ministry of Spatial Planning, Civil Engineering and Ecology is entrusted with a number of tasks and responsibilities under the document's Action Plan.

Agriculture

There is no policy document on agriculture at the state level. In Bosnia and Herzegovina there is no established monitoring of consumption of mineral fertilizers and pesticides.

In the Federation of Bosnia and Herzegovina, relevant strategic documents for the sector include the Mid-term Development Strategy for the Agricultural Sector 2015–2019 and the Programme for the Eradication of Brucellosis in Sheep and Goats for the period 2010–2016.

In Republika Srpska, the Foreign Investment Encouragement Strategy for the period 2016–2020 of Republika Srpska and the Strategic Plan for the Development of Agriculture and Rural Areas in Republika Srpska for the period 2016–2020 recognize the potential of developing organic agriculture. For the agricultural sector to become more competitive they envisage work towards the amalgamation of agricultural farms, application of new scientific and technological achievements in agricultural production, permanent education of agricultural staff and development of processing capacities for agricultural products. They also recognize the need to further develop a certification system.

Forestry

There is no policy document on forestry at the state level.

In the Federation of Bosnia and Herzegovina, there is no strategy or programme in the forestry sector. The draft forestry programme has been developed and adopted by the Government. It was sent to the

Parliament of the Federation of Bosnia and Herzegovina for adoption, but is not yet formally adopted since there is no law on forests, which would provide its legal basis. The draft programme encompasses 22 areas of sustainable forest management including a section on hunting. Forest management plans (between one and several per canton) are in place; their implementation is to be ensured by the forest management enterprises under control of the cantonal governments. Forest Stewardship Council (FSC) certification was already in place in 2011; currently, most of the FSC certificates need to be renewed and only one cantonal forest management enterprise has a valid certificate.

In Republika Srpska, the 2012 Forestry Development Strategy of Republika Srpska for the period 2011–2021 recognizes as its strategic goals: the attainment of forest management based on law and the standards of sustainable forest management; increasing the economic contribution of forestry to rural and social development; and ecosystem-based forest management, environmental protection, nature conservation and biodiversity. It provides for specific objectives and measures related to public forests, private forests, protective forests and forests of special purpose, as well as forest wildlife. The strategy does not address hunting.

Tourism

There is no policy document on tourism at the state level.

In the Federation of Bosnia and Herzegovina, the tourism sector has been growing in recent years. According to data of the Ministry of Environment and Tourism, tourist arrivals in the Federation of Bosnia and Herzegovina have grown from 435,698 in 2011 to 811,055 in 2016, and the number of tourist nights from 870,163 in 2011 to 1,613,567 in 2016. There were 11.7 per cent more arrivals in 2016 than in 2015. In 2016, 63.4 per cent of tourist nights were of foreign tourists. At the same time, the Federation of Bosnia and Herzegovina has no strategic document in the tourism sector. There is no pronounced focus on development of ecotourism in general nor on rural ecotourism. Mountain tourism, ecotourism and rafting activities are available on the market but more in response to demand than as a result of a strategic approach. Some services in these types of tourism are provided by the black market. Tourism in protected areas is promoted by protected area administrations but there is no strategic approach to its development. A draft strategy on tourism for the period 2008–2018 was developed and reached the bicameral Parliament of the Federation of Bosnia and Herzegovina but was not

approved. No strategic support to and coordination for tourism development in the Federation of Bosnia and Herzegovina is apparent from the state level.

In Republika Srpska, the tourism sector currently primarily attracts tourists from the region. These tourists tend to visit natural spa and mountain resorts (such as Jahorina) and larger cities (Banja Luka, Trebinje, Višegrad). According to data of the Institute of Statistics of Republika Srpska, in 2015 there were 294,781 tourist arrivals (an increase from 253,653 in 2013) and 686,944 tourist nights (an increase from 629,663 in 2013). Foreign tourist arrivals account for 46 per cent of all tourist arrivals. However, there is no strategic document in the tourism sector. The Foreign Investment Encouragement Strategy of Republika Srpska for the period 2016–2020 advocates for the future focus of the tourism sector to be on spa or health tourism and on mountain tourism.

Spatial planning

The two entities, Brčko District and the cantons in the Federation of Bosnia and Herzegovina have their own spatial plans. There is no formal requirement or mechanism to ensure coordination between these documents.

The Spatial Plan of Bosnia and Herzegovina for the period 1981–2000 still applies. For several years, work has been ongoing to develop and approve a new spatial plan of the Federation; however, not all stakeholders are yet on board. Although the Ministry of Environment and Tourism is part of the working group that is developing the draft plan, it is not clear to what extent the draft takes into account the development of the Pan European Ecological Network and potential Natura 2000 sites. The Decree on Unique Methodology for Preparation of Spatial Planning Documents (OG FBiH, No. 63/04, 50/07) requires the consideration of environmental requirements at various stages of the development of spatial planning documents.

In Republika Srpska, the Spatial Plan was adopted in 2007 covering the period until 2015. In 2015, it was amended as the Spatial Plan of Republika Srpska until 2025 (Decision on Adoption of the Proposed Amendments to the Spatial Plan of Republika Srpska until 2025, OG RS, No. 15/15). The new document recognizes the need to establish a national ecological network and identify areas for the Natura 2000 network; calls for development of special purpose spatial plans for larger protected areas; provides for updating and maintenance of the existing GIS database of protected areas; and recognizes the importance of further identification of Important Bird

and Biodiversity Areas (IBAs), Ramsar Sites and biosphere reserves. It envisages an increase by at least 5 per cent in the total area under protection by 2018 through the proclamation of new protected areas. The new document also provides a list of 14 areas with a total area of 29,117.2 ha in ongoing proceedings for proclamation or in the process of drafting the study for the area proposed for protection.

The Spatial Plan of Brčko District for the period 2007–2017 remains in effect until the adoption of a new spatial plan.

Health

State level

There is no policy document on environmental health at the state level. No national profile on asbestos has been prepared. No programme to eliminate asbestos in existing buildings has been developed at state or entity level.

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, the National Environmental Health Action Plan (NEHAP) was developed in 2001 but was never officially adopted by the Government of the Federation. In 2014, the Programme of Measures to Protect Health from Adverse Environmental Factors (OG FBiH, No. 27/14) was approved. It provides for:

- Laboratory control of the health safety of drinking water and food;
- Laboratory control of surface water;
- Training of staff employed in the production and trade of foodstuffs;
- Provision of professional and methodological assistance and services in the implementation of measures related to food safety, water and consumer goods;
- Collection, processing and analysis of data, and drafting a report on the quality of water, food and consumer goods and assessing their impact on the health of the population;
- Health promotion and education of the population;
- Education of health workers in relation to food and water safety;
- Monitoring of radionuclide content in air;
- Monitoring the level of external ionizing radiation;
- Monitoring of radionuclide content in soil;
- Supervision of persons working with sources of ionizing radiation – personal dosimetry control and medical control;
- Monitoring the storage of radioactive materials;

- Testing of building materials on the content of radionuclides;
- Strengthening the capacity of laboratories.

As of early 2017, no implementation report for the Programme of Measures has been produced.

Republika Srpska

The NEHAP of Republika Srpska was adopted in 2002 (OG RS, No. 1/02). No implementation report has been produced and the NEHAP is no longer considered valid. One of the policy goals of the Policy for Improvement of Health of the Population in Republika Srpska by 2020 is creating a healthy and supportive environment for health and well-being. This policy goal is to be achieved through evaluating the impact of sectoral policies on health, promoting "green" and environmentally sustainable health care institutions and adapting health care institutions to changes taking place in the environment.

Statistics

The 2013 Strategy for Development of Statistics of Bosnia and Herzegovina 2020, developed at the state level, defines as strategic priorities the strengthening of coordination mechanisms and the exchange of data between the Agency for Statistics of Bosnia and Herzegovina and the entity Statistical Institutes, and the alignment of the statistics of Bosnia and Herzegovina to international standards and practice. Among the expected outcomes, the Strategy lists the introduction of (a) environmental-economic accounts in accordance with the System of Environmental-Economic Accounting (SEEA) methodology and (b) environmental accounts in accordance with the conclusions and recommendations from the second EPR.

Green economy policy framework

Prior to the United Nations Conference on Sustainable Development (Rio+20) in 2012, UNEP and the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina prepared a report entitled *Bosnia and Herzegovina and the Rio+20 Process*. It evaluates achievements and challenges in the implementation of sustainable development, and names the opportunities for the development of green economy in the country in three areas: water, food and energy. The report does not have recommendations and was not formally adopted.

The strategic document that explicitly mentions green economy is the Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and

Herzegovina. Its vision is that, by 2025, Bosnia and Herzegovina will be a sustainable and prosperous green economy. The document includes a large number of measures for emissions reduction in various sectors, which would advance the green economy approach.

Strategic documents at subentity level

Federation of Bosnia and Herzegovina

At cantonal level, the cantonal development strategies for the period 2016–2020 have been drafted and/or adopted. They include sections and measures related to environmental protection. For example, the Development Strategy of Tuzla Canton for the period 2016–2020 includes the strategic objective to establish a functioning system of environmental protection and sustainable management of natural resources. The indicators for monitoring progress to achieve this strategic objective are: coverage of the territory by systematic monitoring of the state of the environment; coverage of households by waste removal services; and the amount of financial support to the implementation of measures on energy efficiency.

Also at cantonal level, cantonal environmental action plans are now being developed or have been drafted and/or adopted. These documents include a detailed description of the environmental situation and sectoral development with an impact on the environment; they can in fact be seen as cantonal state-of-the-environment reports. Each section includes conclusions and recommendations. Waste management plans have also been adopted at cantonal level (e.g. the Waste Management Plan of Sarajevo Canton for the period 2015–2020). Strategic documents on the environment also exist at municipal level. Municipalities have adopted municipal development strategies (sometimes called municipal strategies for sustainable development (e.g. in Trnovo and Ilijaš Municipalities of Sarajevo Canton) or local municipal development strategies (e.g. in Stari Grad of Sarajevo Canton)). Strategic documents also include LEAPs and municipal waste management plans. A snapshot of adoption of strategic documents on the environment by municipalities of the Zenica–Doboj Canton is presented in table 1.1.

Republika Srpska

Municipalities have municipal development strategies, which, in most cases, include environmental protection sections. For example, the 2013 Strategy of Municipal Development of Mrkonjic Municipality for the period 2014–2024 includes three plans: local economic development plan, social

development plan, and environmental protection and infrastructure development plan. The latter prioritizes four issues: waste management, flow protection in the Vrbas and Crna Rivers, environmental behaviour of businesses and improvement of utilities operation. Many municipalities have also adopted LEAPs, which describe the environmental situation and include priorities and measures to address problems in relation to environmental protection and infrastructure. Some municipalities have adopted local waste management plans (e.g. Uglevic Municipality has such a plan for the period 2011–2016). Another example of an environment-related local policy document is the 2012 Strategy of Tourism Development in Bijeljina Municipality for the period 2012–2017, the strategic objectives of which include the development of rural tourism and ecotourism. Another municipality, Prnjavor, is developing a water supply strategy.

Sustainable Energy Action Plans

Many cities, in both the Federation of Bosnia and Herzegovina and Republika Srpska, have developed SEAPs in line with the Covenant of Mayors. The SEAPs of Doboj (2015), Livno (2015), Travnik (2012), Gradiška (2012), Zenica (2011), Trebinje (2011), Prijedor (2011), Bijeljina (2011), Tuzla (2011), Zvornik (2011), Laltasi (2011), Banja Luka (2010) and Sarajevo (2011) have been accepted. For the SEAPs of Čajniče (2016), Gračanica (2015), Kakanj (2013), Bihac (2012) and Municipality of Bosanski Petrovac (2016), clarifications have been requested by the Covenant of Mayors Office. The common issue for many SEAPs is that there is no monitoring of the implementation of measures prescribed by SEAPs, which would indicate whether they have a positive impact on reducing emissions.

1.3 Strategic environmental assessment

Legal requirements

In the Federation of Bosnia and Herzegovina, implementation of SEA is regulated by only two articles in its Law on Environmental Protection. Both articles were amended in 2009 in an attempt to clarify the requirements for SEA, but the amendments did not result in significant advancement. Article 51 states that the SEA is required for spatial planning documents and for plans, programmes and strategies on agriculture, fisheries, forestry, energy, mining and industry, transport, waste management and water management, which may have a negative impact on the environment. The scope of planning documents covered does not exactly match that of the Protocol on Strategic Environmental Assessment to the

Convention on Environmental Impact Assessment in a Transboundary Context (Protocol on SEA) and of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive). Article 52 outlines the elements of the SEA procedure. These two articles are clearly not sufficient for proper regulation and implementation of SEA. The draft of the new law on environmental protection in the Federation of Bosnia and Herzegovina includes a section on SEA.

In Republika Srpska, SEA is regulated by section VI of its Law on Environmental Protection, complemented by the Rulebook on the criteria for deciding on the need to carry out strategic environmental assessment (OG RS, No. 28/13) and the Rulebook on the contents of the SEA report (OG RS, No. 28/13). The list of sectors in which an SEA must be carried out corresponds to that of the Protocol on SEA. The Law requires that a report must contain a part regarding public consultations. The provisions on monitoring of impacts of adopted plans and programmes are in place. The gaps in the legal framework refer to the lack of requirement to obtain the opinion of health authorities and the need to strengthen provisions on public participation and consultation.

In Brčko District, Article 50(1) of its Law on Environmental Protection prescribes that in the process of adoption of a decision by the Mayor or by the District Assembly, and if such a decision may have a negative impact on the quality of the environment or human health, SEA shall be obtained. This article does not list activities/areas that may be subject to SEA procedure and does not define steps and procedures of the SEA. No subsidiary legislation to detail its provisions has been further developed.

Transboundary context

In 2017, Bosnia and Herzegovina became a party to the Protocol on SEA. An implementation plan for Bosnia and Herzegovina for the Protocol, accompanied by implementation plans for both entities and Brčko District, has been developed in 2014 as part of the EnvIS Project. Before becoming a party, Bosnia and Herzegovina submitted reports in two rounds of review of implementation of the Protocol. The report for 2013–2015 indicates the country's participation in four transboundary SEAs, in one of which it was a party of origin.

In the Federation of Bosnia and Herzegovina and in Brčko District, the legislation includes no provisions on transboundary consultations.

Table 1.1: Strategic documents on the environment issued by municipalities of the Zenica–Doboj Canton

Municipality	Local environmental action plan, year of adoption or validity period	Municipal development strategy, validity period	Waste management plan, validity period
Breza	2012–2018	2006–2011	2014–2019
Doboj Jug	2012–2017	2011–2020	-
Kakanj	2010	2007–2017	-
Maglaj	2005	2012–2020	-
Olovo	2011–2015	-	-
Tešanj	-	2013–2018	-
Usora	-	-	-
Vareš	2009	2006–2015	2014–2019
Visoko	2015–2025 (in preparation)	2015–2021	2011–2016
Zavidovići	2012–2017	2011–2016	2011–2016
Zenica	2009	2012–2022	2011–2016
Žepče	2012–2017	2011–2018	-

Source: Draft cantonal environmental action plan of Zenica–Doboj Canton for the period 2017–2025, October 2016.

In Republika Srpska, the Law on Environmental Protection provides for the obligation to ensure the participation of relevant authorities and the public of the other entity, Brčko District or another country in case the plan and programme may have an impact on their environment.

Practical implementation

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, SEA remains a novelty, although the requirement of SEA was first introduced in 2003. Only three SEAs were conducted in 2015–2016. Sectoral ministries do not initiate SEAs for their draft strategic documents because there is no subsidiary legislation that would tell them how to do it. Active promotion of the SEA instrument has not been a priority for the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina. Republika Srpska

In Republika Srpska, some SEAs were completed. In 2015, five SEAs were processed: the SEA on transboundary cooperation between Croatia, Montenegro and Bosnia and Herzegovina; SEA on the new Adriatic–Ionian transnational programme for the period 2014–2020; SEA for the Spatial Plan of the Municipality Kotor Varos for the period 2011–2030; SEA on the new programme of transnational cooperation Danube for the period 2014–2020; and SEA of the Zoning Plan for Ferrous Ore Mine, expert opinion.

In 2016, three SEAs were completed: the SEA on the Spatial Plan for Municipality Petrovo; SEA on the Plot Layout for the Highway Banja Luka–Doboj; and SEA on the Spatial Plan for the Municipality of Samac. As of mid-2017, one SEA was completed in 2017, the

SEA on the Urban Plan for the Municipality of Vlasenica. A major criticism is of the quality of public participation as part of the SEA procedure.

Brčko District

In Brčko District, no SEA has ever been done. There are plans to do an SEA for the new spatial plan of Brčko District to be prepared for the period 2017–2027.

1.4 Sustainable Development Goals

Millennium Development Goals

The last report to assess progress towards the realization of the MDGs in Bosnia and Herzegovina was prepared in 2013 by the Ministry of Finance and Treasury of Bosnia and Herzegovina and the United Nations Country Team. According to that report, the achievement by 2015 of most targets under Goal 1 (To eliminate extreme poverty and hunger) was unlikely, meaning that less than 50 per cent of progress had been achieved by 2013. Mixed progress was achieved for Goal 2 (To achieve universal primary education), with rather good scores on enrolment rates at primary school, secondary school and higher education, and on adult literacy.

Progress was achieved under Goal 3 (To promote gender equality and empower women); however, some of the targets established for this Goal appeared too modest. Good progress was achieved under Goal 4 (To reduce child mortality). Mixed results were obtained for Goal 5 (To improve maternal health), with Target 5.B (To achieve universal access to reproductive health by 2015) representing the problematic area. With regard to Goal 6 (To combat HIV/AIDS, malaria and other diseases), the country

achieved Target 6.A (To have halted and begun to reverse the spread of HIV/AIDS by 2015) but was unlikely to achieve Target 6.B with regard to tuberculosis. Mixed progress was achieved with regard to Goal 8 (To develop a global partnership for development).

For Goal 7 (To ensure environmental sustainability), Target 7.A (To integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources), the country has set rather high targets for the percentage of forest area (60 per cent) and for CO₂ emissions (5 metric tons per capita) and was unlikely to achieve either by 2015. For Target 7.B (To halve the proportion of the population without sustainable access to safe drinking water and basic sanitation by 2015), Bosnia and Herzegovina was scoring high according to global MDG indicators using the definition of "improved" drinking water sources and sanitation facilities; however, real access to water supply and sewerage systems was a very different matter. Preparation of a final MDG implementation report is not envisaged. However, a number of lessons learned from MDG implementation can be identified:

- The country's MDG experience shows the importance of stronger ownership by the Government at various levels. In Bosnia and Herzegovina, MDGs were poorly integrated into and not referenced in the planning documents at various levels.
- The setting by Bosnia and Herzegovina of additional targets and indicators (e.g. to achieve 80 per cent of surface cleared of landmines by 2015) has been a positive factor, bringing the MDGs closer to national stakeholders.
- Some national targets set by the country proved to be unrealistic or not ambitious enough, which shows the need for the national target-setting process to rely on thorough analyses and clear methodology.

Institutional set-up for Sustainable Development Goals

As of April 2017, the Sustainable Development Goals (SDGs) process in Bosnia and Herzegovina has been largely driven by the United Nations Country Team. In late March 2017, the Council of Ministers of Bosnia and Herzegovina, upon the proposal of the United Nations Country Team to nominate a national partner, appointed the Directorate for Economic Planning under the Council of Ministers to coordinate the process of implementation and monitoring of the SDGs. It is expected that this Directorate will be a

technical body for coordinating implementation and monitoring of the SDGs.

SDGs in the national policy framework

As of April 2017, the SDGs are not mentioned in any of the planning documents at state or entity level. The United Nations Country Team has done the mapping of various strategies and plans at state, entity and cantonal levels against the goals and targets (<http://zamisli2030.ba/dms/>) using the Rapid Integrated Assessment methodology.

Awareness

The United Nations Country Team did impressive work to raise awareness of the SDGs among its counterparts in Bosnia and Herzegovina and to promote the country's ownership of the SDGs. The 2030 Agenda has been translated into the local language. In 2016, the United Nations Country Team launched the SDG initiative *Imagine 2030* (Zamisli2030). The activities included developing an SDG consultation tool for localization of the goals and targets in Bosnia and Herzegovina and applying this tool at 28 workshops in nine cities. The tool provides the participants with the opportunity to work on correlating concrete goals and targets with urgent societal priorities. The United Nations Country Team also organized an online competition, *Postcards from the Futures*, and actively advances online engagement with the SDGs (www.zamisli2030.ba, [Zamisli2030Facebook](https://www.facebook.com/zamisli2030)). A high-level SDG conference was organized in April 2017 under the auspices of the Presidency of Bosnia and Herzegovina and the Dialogue Platform format established through the Dialogue for the Future work of the United Nations and the Presidency of Bosnia and Herzegovina.

Further steps

As of April 2017, SDG-related activities focused on awareness and creating ownership and had not yet moved towards nationalization of the SDGs and their implementation. Further steps would include incorporation of the SDGs in strategic documents and policies, establishing national targets, establishing baselines to measure progress, defining the allocation of responsibilities among the levels of government and establishing a monitoring system that supports SDG reporting. Aligning SDGs implementation and monitoring with the EU accession process could raise attention to the SDGs and ensure coherent implementation of priorities. A challenge for SDG integration into national policies is the weak tradition of strategic planning in the country vis-à-vis the need to plan with a time horizon of 2030.

Photo 1: Award winner of the Postcards from the Futures competition



Sustainable Development Goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis Target 17.14 is described in box 1.1.

1.5 Institutional framework

Environmental responsibilities in Bosnia and Herzegovina are distributed among a number of institutions at various levels (figure 1.1).

State level

In the Council of Ministers of Bosnia and Herzegovina, the Directorate for Economic Planning is responsible for short-, medium- and long-term economic policy, including coordinating the preparation and monitoring of the Strategic Framework for Bosnia and Herzegovina and economic reform programmes (2016–2018, 2017–2019). It is also responsible for preparation, monitoring and evaluation of documents on development and social inclusion. The Directorate for European Integration is tasked to coordinate the process of integration of Bosnia and Herzegovina into the EU.

At the state level, environmental matters continue to be the responsibility of the Ministry of Foreign Trade and Economic Relations. In 2011, environmental matters were dealt with by the Ministry's Sector of

Natural Resources, Energy and Environment. Currently, they are dealt with by the Sector of Water Resources, Tourism and Environmental Protection (figure 1.2). The reorganized Sector employs four staff on water resource issues, four staff on tourism issues and eight staff on environmental protection issues. The number of staff dealing with environmental issues did not increase.

While the separation of competences on environmental protection from those on energy is a positive step, this reorganization is a cosmetic improvement. It does not strengthen the authority of the Ministry to lead the formulation of environmental policy and legislation. Formally, the Ministry is supposed to define basic principles, and coordinate and facilitate harmonization of environmental policy and legislation, but practical implementation of these tasks faces difficulties. The role of the Ministry is limited, due in part to the division of powers that has been enshrined in the Constitution of Bosnia and Herzegovina, which assigns primary responsibility for environmental issues to the entities. It has not been possible to date to create the state-level environmental agency that was called for in the first EPR. While the second EPR called for a separate sector of environmental protection to be established as part of the Ministry, the reorganization performed cannot be considered as effective implementation of that recommendation. The drawbacks of such an institutional set-up are particularly evident now, when

the requirements of the EU integration process necessitate the country speaking with one voice.

Similarly to environmental protection, the Ministry has the coordination functions and acts to consolidate entity plans with those of international institutions in

the areas of agriculture, forestry, energy, use of natural resources and tourism. Its subordinated institutions include the Authority for Plant Health Protection and the Veterinary Office. The National Ozone Unit is also located in the Ministry.



Box 1.1: Target 17.14 of the 2030 Agenda for Sustainable Development

Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development Target 17.14: Enhance policy coherence for sustainable development

This target covers one of the systemic issues for achievement of the SDGs. It addresses how the country works across policy sectors and the levels of governance and coordinates them to achieve joint objectives of sustainable development. As of early 2017, the indicator proposed for Target 17.14 at the global level (currently, a Tier III indicator) refers to the existence in countries of mechanisms to enhance policy coherence for sustainable development.

Bosnia and Herzegovina does not have strong and effective mechanisms to enhance policy coherence for sustainable development, either in terms of intersectoral cooperation for sustainable development or in terms of cooperation between the levels of governance. The National Steering Committee for Environment and Sustainable Development was discontinued in 2005. The country does not have a national sustainable development strategy or other comprehensive development strategy. The SEA does not yet properly operate in the country. Coherence of policies adopted at various levels of governance is a major challenge for Bosnia and Herzegovina with its four-level governance system. Coordination and harmonization of policies at the level of the entities is not functioning smoothly, as demonstrated by numerous examples of diverging environmental policies and legislation.

Future efforts to enhance policy coherence for sustainable development could focus on establishing the mechanisms to enhance policy coherence for sustainable development, such as the national body entrusted with promoting sustainable development, and strengthening the existing coordination mechanisms such as the Inter-Entity Coordination Body for the Environment. The development of a national sustainable development strategy as a framework policy document for the country is also crucial for enhancing policy coherence.

Figure 1.1: Environmental competences

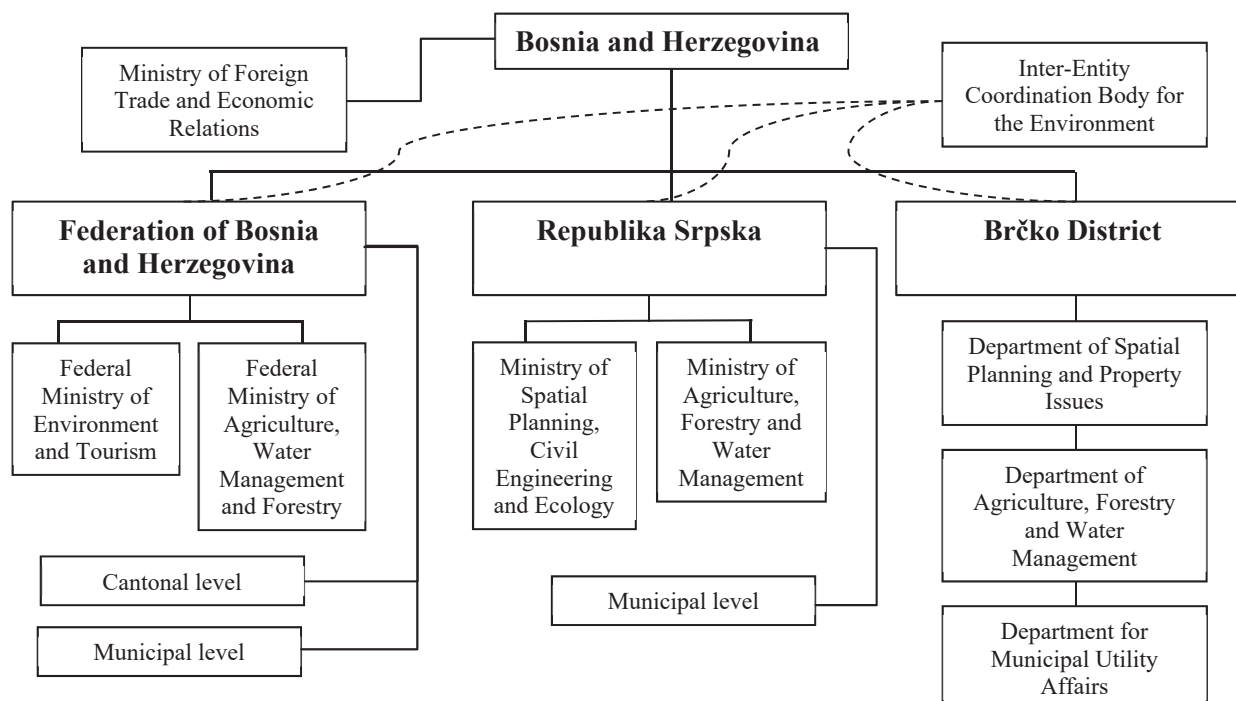
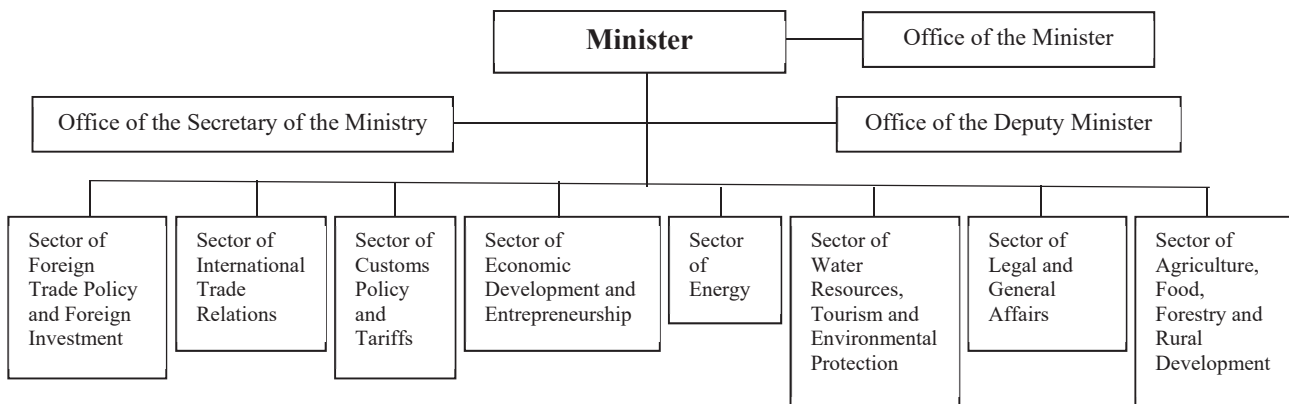


Figure 1.2: Structure of the Ministry of Foreign Trade and Economic Relations

Source: Ministry of Foreign Trade and Economic Relations, 2017.

The Ministry of Communication and Transport is competent, among other areas, for international and inter-entity transport and infrastructure, including relations with international organizations and development of strategic planning documents. The Agency for Statistics of Bosnia and Herzegovina collects and processes statistics based on data submitted by the entity statistical institutes and/or data collected directly by the Agency.

The State Regulatory Agency for Radiation and Nuclear Safety is a regulatory body that reports directly to the Council of Ministers. It defines policies on radiation and nuclear safety, ensures that operators conduct safety assessments, issues authorizations for activities involving radiation sources and maintains the state register of ionizing radiation sources and exposed workers.

The Food Safety Agency, subordinated to the Council of Ministers, is the competent authority for GMOs.

Entity level

Federation of Bosnia and Herzegovina

The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina performs administrative and regulatory tasks related to air, water and soil protection; the drafting of environmental strategy and policy; environmental monitoring and standards; tourism development; and other tasks as set in the relevant legislation. There are five sectors within this Ministry: Environment Sector, Environmental Permitting Sector, Tourism Sector, Sector for Project Implementation and Sector for Legal, Financial and General Affairs. As of mid-2017, eight staff work in the Environment Sector (one more than in 2011) and six staff in the Environmental Permitting Sector (two fewer than in 2011). An Advisory Council for the Environment of the

Federation of Bosnia and Herzegovina, appointed in accordance with the Law on Environmental Protection of the Federation of Bosnia and Herzegovina, is responsible for providing scientific and expert support in the environmental sector to the Ministry of Environment and Tourism and the Government of the Federation of Bosnia and Herzegovina.

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina performs administrative and regulatory tasks in its respective fields. The Forestry and Hunting Sector prepares legislation and regulations in these two fields and oversees the work of cantonal ministries responsible for forestry and hunting and of forest management companies.

The Forest Office of the Federation of Bosnia and Herzegovina deals with data collection and inventory, the Forest and Forestland Cadastre, monitoring of forest health and production of forest seedlings.

The Water Management Sector of the Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina prepares the strategy and water management development policies, coordinates water resources monitoring activities, develops laws and secondary legislation on water management and proposes development projects with a view to improving water supply, sanitation, wastewater treatment and flood management. It also coordinates water management institutions at the level of the Federation – the Adriatic Sea Watershed Agency (head office in Mostar) and the Sava River Watershed Agency (head office in Sarajevo). In their respective districts, the Agencies prepare analyses of district characteristics, develop economic analyses of water use, establish a registry of water bodies used for water abstraction, organize water monitoring and prepare a water management plan and a programme of measures.

The Ministry of Spatial Planning of the Federation of Bosnia and Herzegovina carries out tasks related to spatial planning and development in the Federation. It is responsible for drafting and enforcing the spatial plan of the Federation and harmonizing the spatial plans of cantons with that of the Federation. It also deals with land use.

The Ministry of Health of the Federation of Bosnia and Herzegovina performs administrative and regulatory tasks related to: implementation of policies and strategies on health; development and improvement of the healthcare system and health insurance, and inter-entity and cantonal cooperation on health; and coordination and implementation of projects.

The Institute of Public Health of the Federation of Bosnia and Herzegovina, together with six cantonal Institutes of Public Health, monitors the health safety of drinking water, bathing water and recreational water. The activities of the Institute of Public Health of the Federation of Bosnia and Herzegovina include control of infectious diseases; analysis of the impact of environmental factors on health; control and prevention of chronic non-communicable and communicable diseases; the adoption of measures in emergencies; and planning and research in public health.

The Ministry of Energy, Mining and Industry of the Federation of Bosnia and Herzegovina performs administrative and regulatory tasks in the areas of energy, including energy efficiency and RES; mining; geological surveys; and industry, except the food industry; and deals with coordination and implementation of projects of importance to the Federation in these areas. It issues energy permits for the construction of new and reconstruction of existing production facilities.

The Administration for Inspection Affairs of the Federation of Bosnia and Herzegovina brings together 10 inspection authorities of the Federation of Bosnia and Herzegovina, including the Water Inspectorate, Forestry Inspectorate (which covers forestry, nature protection and hunting) and Urban-Environmental Inspectorate. The transfer of inspectorates from the line ministries to an independent Administration was implemented in 2007. The positive outcomes include easier organization and improved planning of inspections, better access to equipment and more independent functioning of inspectors. Currently, the inspection system has clear strategic goals defined in its annual work plan, and reports on implementation are regularly prepared. Inspectors' manuals and

checklists are in place. Risk analysis is increasingly used for planning the inspections.

The E-Inspector system is in use; it is highly appreciated for the archiving and storage of information on inspections but is less suitable for reporting on inspections. The Administration's functioning allows the inspectors to assist each other, for example, in the absence of a law on forests the water inspectors sanction offenders against forestry legislation based on the Law on Water.

However, the inspectorates with an environment-related mandate are understaffed: for example, the Water Inspectorate has four staff but nine positions assigned, whereas the Forestry Inspectorate has six staff and eight positions assigned. In addition, the inspectors are not allowed to bear firearms, which is a serious impediment for the work of the forestry inspectors. Processes for communication and feedback between the Administration and the line ministries are in place. Relevant inspectorates also function at cantonal level.

The Hydrometeorological Institute of the Federation of Bosnia and Herzegovina performs monitoring in the field of meteorology, hydrology and environmental quality (air, water, soil).

Republika Srpska

The Ministry of Spatial Planning, Civil Engineering and Ecology is responsible for environmental protection. There are four departments within the Ministry: Department of Urban and Spatial Planning, Department of Construction, Department of Environmental Protection and Department of Project Coordination and Development. The Department of Environmental Protection has 11 staff members in 2017 (it had eight in 2011). Their responsibilities range from dealing with environmental protection issues (land, air, water and biodiversity) to solid and hazardous waste management. The Ministry's subordinated institutions include the Environmental Protection and Energy Efficiency Fund of Republika Srpska, the National Park "Sutjeska", the National Park "Kozara" and the Public Institution "Institute for Urbanism, Civil Engineering and Ecology of Republika Srpska".

The Ministry of Agriculture, Forestry and Water Management has five departments. The Department of Water Management is responsible for implementation of integrated water resources management, prevention of water pollution, collection and treatment of wastewater, establishment and maintenance of a water information system and issuance of water acts. The

Department for the Provision of Professional Services in Agriculture deals with providing expert advice and practical skills to farmers, including transfer of knowledge about agricultural production in order to maintain a healthy environment.

The Department of Forestry and Hunting is responsible for forest management, particularly in regard to the protection, preservation and exploitation of forests, monitoring of the situation on forestry and hunting and developing policies and legislation in these areas. The Hydrometeorological Institute of Republika Srpska and the Public Enterprise "Forests of Republika Srpska" are subordinated to this Ministry. The Public Enterprise "Vode Srpske" (Waters of Srpska), located in Bijeljina and also subordinated to this Ministry, was formed in 2013 by merging the Agency for the Sava River Basin District and the Agency for the Trebišnjica River Basin District. The competence of this new institution covers the entire territory of Republika Srpska.

The Ministry of Industry, Energy and Mining has competences, among others, in the production of chemicals; collection and primary treatment of industrial waste; electricity policy; exploitation of resources for the purpose of electricity production; granting concessions for exploration, construction and exploitation of energy installations; production and promotion of biofuels; promotion of RES; and geological exploration and exploitation of mineral resources.

Relevant competences of the Ministry of Health and Social Welfare include monitoring of the health status and health needs of the population; preparation and implementation of health policies, strategies and legislation; and the safety of water, foodstuffs and consumer goods. An important part of the Ministry's activities focuses on the use and storage of chemicals and biocides. The Institute of Public Health of Republika Srpska, with six local units, is subordinated to this Ministry.

The Administration for Inspection of Republika Srpska, formed in 2006, brings together 13 inspection services, which were previously subordinated to the line ministries. These include the Forestry Inspection Service, Water Inspection Service, and Urban Planning, Construction and Environmental Inspection Service. The Administration has six regional departments. The strategic goals of the inspection surveillance are defined and include, among other things, increased awareness of businesses of the need to respect regulations, rules and procedures.

The Inspection Management System has been in use since 2010. Its electronic knowledge database serves as a basis for preventive and corrective actions, risk assessment and identification of those business entities that persistently violate the regulations. Preventive inspection surveillance (consultative visits to large businesses) is an emerging area of work.

The Institute for Protection of the Cultural, Historical and Natural Heritage of Republika Srpska, subordinated to the Ministry of Education and Culture, provides expert support for feasibility studies for new protected areas, among other matters.

Brčko District

In the Brčko District Government, responsibilities for environmental issues continue to be vested with the Department of Spatial Planning and Property Issues, more specifically with the Subdepartment of Spatial Planning, Urban Development and Environmental Protection. In this subdepartment, four staff (up from three in 2011) are now responsible for activities related to environmental protection. They issue environmental permits and approve EIAs, issue permits for import and export of hazardous waste, perform monitoring of air quality and participate in the development of laws and subsidiary legislation.

The Department of Agriculture, Forestry and Water Management, through its Subdepartment of Forestry and Water Management, is in charge of issuing water acts, maintaining flood protection infrastructure, protection and improvement of forests, and legislation and policy development in the areas of water management and forestry.

The Department for Municipal Utility Affairs develops policies and legislation and initiates projects to improve municipal infrastructure.

The Inspectorate includes one environmental inspector, one water inspector and three municipal public utilities inspectors.

Other institutions

The Office of the High Representative continues to oversee the implementation of civilian aspects of the Dayton Peace Agreement, including governmental institution-building. It does not deal with environmental issues.

The Donor Coordination Forum in Bosnia and Herzegovina is a platform for information exchange and coordination of donor activities. It maintains an online database that details project activities funded by

about 20 leading donors in Bosnia and Herzegovina and produces an annual analytical report, which offers an overview of donor activities (<http://donormapping.ba>). Since 2009, the Ministry of Finance and Treasury of Bosnia and Herzegovina has assumed the role of the Donor Coordination Forum Secretariat. The Forum has been very active in response to the 2014 floods.

Vertical coordination

Vertical coordination remains crucial for the multi-level governance structure of Bosnia and Herzegovina. The example of the Law on Forests of the Federation of Bosnia and Herzegovina that was challenged by municipalities, abolished by the Constitutional Court and has remained non-existent at the level of the Federation since 2009, shows how difficult it is to find the balance of responsibilities between various levels. The legislation is not concise enough to delineate the responsibilities, which results in problems with enforcement of legislation adopted at various levels.

Federation of Bosnia and Herzegovina

The Federation of Bosnia and Herzegovina is composed of 10 cantons and 79 municipalities. Each canton has its own government and adopts its own laws, which should be harmonized with the legislation of the Federation of Bosnia and Herzegovina. Environmental policy and natural resource use are the responsibility of both the Government and the cantons of the Federation of Bosnia and Herzegovina. Where responsibility is not expressly granted to the

Federation of Bosnia and Herzegovina, the cantons have full responsibility. Numerous cantonal authorities deal with various environmental protection issues, as seen in the example of Sarajevo Canton (box 1.2).

There is no unique form of organization for ministries dealing with environmental issues at the cantonal level. For example, in Una-Sana Canton environmental issues are in the competence of the Ministry of Construction, Spatial Planning and Environmental Protection, whereas in Herzegovina-Neretva Canton they are in the competence of the Ministry of Trade, Tourism and Environmental Protection, while in Posavina Canton they are in the Ministry of Transport, Communications, Tourism and Environmental Protection. Cantonal administrations for inspection activities, which comprise the urban planning and environmental inspectorates, have been established in Tuzla, Sarajevo, Una-Sana, Zenica-Doboj, Bosnian Podrinje and West Herzegovina Cantons.

Cantons are composed of municipalities. The scope of work and competences of municipalities are regulated by the Law on Principles of Local Self-Government in the Federation of Bosnia and Herzegovina (OG FBiH, No. 49/06). Local government units are responsible for, among other things, drafting and implementation of spatial planning and environmental policies, management of local infrastructure, including the collection and disposal of solid waste, and the maintenance of public spaces and other areas. Municipalities have departments or sectors involved in the protection of the environment.

Box 1.2: Institutions dealing with environmental issues in Sarajevo Canton

The Ministry of Spatial Planning, Construction and Environmental Protection of Sarajevo Canton is responsible, inter alia, for planning of sustainable development and environmental policies, waste management, air protection, nature protection, preparation of regulations and administrative procedures, environmental permitting and protected natural areas in Sarajevo Canton. Its Department of Environmental Protection has 11 positions, of which seven were filled in 2016.

The Ministry of Economy of Sarajevo Canton has responsibilities in water management, agriculture, forestry, hunting and use of natural resources.

The Ministry of Municipal Economy and Infrastructure of Sarajevo Canton deals with public utilities and infrastructure and oversees public utility companies.

The Cantonal Administration for Inspection Affairs brings together eight inspectorates. The Inspectorate of Urban Construction, Environmental and Communal Affairs should employ three environmental and two nature protection inspectors, among others. In 2015, two environmental inspector posts and two nature protection inspector posts were vacant. The Agriculture, Water and Forestry Inspectorate should employ two water and four forestry inspectors, among others. In 2015, the posts of one water inspector and one forestry inspector were vacant. Other institutions with environmental competences include the Cantonal Institute for the Protection of Cultural, Historical and Natural Heritage, Institute of Public Health of Sarajevo Canton, Cantonal Public Institution for Protected Natural Areas, Institute for Development of Sarajevo Canton, Environmental Protection Fund of Sarajevo Canton and Planning Institute of Sarajevo Canton.

Source: Draft State of the Environment Report of Sarajevo Canton, November 2016.

Republika Srpska

There are 63 municipalities in Republika Srpska. According to the Law on Local Self-Government (OG RS, No. 101/04), specific competences of local self-government regarding protection of the environment and natural resources include protection and development of agricultural land, identification of erosion areas and anti-erosion measures, defining requirements for development of pasture land, management of natural lakes, springs, public wells and fountains, water supply management, publishing data on air quality and improving air quality, noise pollution prevention and noise measurement, and protection of municipal natural heritage and values. Municipalities exercise their competences in environmental protection through different municipal departments.

Inter-entity coordination

The responsibilities of the Ministry of Foreign Trade and Economic Relations include coordination and facilitating harmonization of environmental policy and legislation among the two entities and Brčko District; however, implementing these tasks has proved difficult in the absence of formal mechanisms to address diverging positions. It is not clear what can be done by the Ministry when the entities' positions are mutually exclusive.

The Inter-Entity Coordination Body for the Environment, established in 2006, has a mandate to deal with environmental protection issues, which require a harmonized approach among both entities and Brčko District. Its decisions are not legally binding. Functions of the Body are prescribed by the laws on environmental protection of the entities and Brčko District. The laws on environmental protection of Republika Srpska and Brčko District provide for participation of Brčko District representatives in the activities of the Body, but the Law of the Federation of Bosnia and Herzegovina does not. In practice, representatives of Brčko District participate in the meetings. The Body brings together the representatives of environmental authorities. Representatives of the water authorities have been regularly invited to attend its meetings. There is no public involvement in the activities of the Body. Information about its activities (agendas, meeting reports) is scarce and not accessible to the public.

The Body deals with environmental issues, which require a harmonized approach, as well as with other issues, which have been transferred to it by the entities. In practice, it deals with international treaties and programmes concerning environmental matters,

cooperation with international organizations and foreign governments, coordination of the adoption of laws and secondary legislation, and information collection and exchange. There are different opinions with regard to the efficiency of this institution. Both entities position the Body as an effective mechanism and discuss extending this experience to other areas (beyond the environment). There is no doubt that the Body has been effective in pushing through the ratification processes for several international agreements. At the same time, the Body seems to deal less and less with its core function – to facilitate the harmonization of laws and subsidiary legislation of the entities. The extent to which the environmental legislation has been diverging between the entities in recent years demonstrates the failure of this Body to continue with effective harmonization.

The Ministry of Foreign Trade and Economic Relations is regularly informed of the meetings of the Body and invited to the meetings. However, the Body seems, in a way, to be a substitute for the Ministry, which has the official competences to perform coordination.

Contacts between the Administration on Inspection Affairs of the Federation of Bosnia and Herzegovina and the Administration for Inspection of Republika Srpska on environmental compliance assurance and enforcement issues are based on good personal relations between individual inspectors and take place at a professional level when needs arise. Such cooperation is not formalized or institutionalized.

Intersectoral coordination

In the period 2002–2005, the National Steering Committee for Environment and Sustainable Development, bringing together 56 members from various governmental institutions (beyond environment) and other stakeholders, functioned under the leadership of the Ministry of Foreign Trade and Economic Relations. However, in the absence of strong political support it was discontinued when the project funding ended. No body that would regularly bring together the sectoral authorities and stakeholders to discuss broader issues of sustainable development currently exists.

Training and professional development

Civil servants undertake training on general issues of civil service organized by the Civil Service Agency. Some training is organized by the Directorate for European Integration. However, there is no systematic training and professional development of civil servants on environmental and sustainable

development issues. Training and professional development of staff of the institutions responsible for environmental issues takes place sporadically as part of international projects such as ECRAN/RENA or EnvIS, or networks such as the Themis Network. It also takes place during workshops organized in the framework of conventions. There is no system of training and professional development on environmental issues of staff in sectoral (line) ministries and in the private sector.

The expansion of public administration in the country is banned in line with the conditions imposed by the IMF. The Ministry of Foreign Trade and Economic Relations and the entity ministries with environment-related competences cannot employ additional staff to address new tasks. When existing posts become free (e.g. through retirement), recruitment is frozen and the tasks of outgoing employees are distributed among existing staff or remain unassigned to anyone. In these circumstances, training and professional development of civil servants is of the utmost importance to enable the public administration system to implement its functions.

1.6 Assessment, conclusions and recommendations

Assessment

Since 2011, efforts have been applied at all levels (state, entity/Brčko District, cantonal, municipal) to improve the legal and policy framework on environmental protection in Bosnia and Herzegovina. These efforts were driven to a large extent by aspirations of EU accession and were supported with EU funding. However, due to the complex political and institutional set-up, progress with the introduction of legal and policy measures in Bosnia and Herzegovina requires considerably greater efforts and necessitates much more time than in other countries. Bosnia and Herzegovina is at the very beginning of the process to transpose the EU environmental acquis, and each entity and Brčko District has a considerable backlog of legislation that remains to be harmonized with EU directives and regulations.

Originally, the environmental legislation of the two entities and Brčko District was highly harmonized when similar packages of environmental laws were adopted by all three in the early 2000s. However, this high degree of harmonization of environmental legislation is no longer the case. The diverging legal frameworks for SEA, forestry, hunting and chemicals are just a few examples that illustrate this. Since both entities and Brčko District aim to eventually achieve full transposition of the EU acquis, this may serve as a

catalyst for harmonization of their environmental policies and legislation in the future.

At the same time, approximation itself necessitates effective coordination and cooperation. In the absence of a state-level law on environmental protection and a strong state-level environmental authority, the current coordination is based on good will, which is not always present. The need for a state-level law on the environment and a state-level environmental agency is recognized at expert level but is not officially accepted for political reasons. Even if the adoption of a state-level law on environmental protection and the establishment of a state-level environmental agency – both called for in the first and second EPRs of Bosnia and Herzegovina – are not accepted as feasible at this point, these steps are still relevant for the country if it wishes to achieve progress with establishing a strong and coherent legal and policy framework on environmental protection with a view to becoming an EU member country in the foreseeable future.

Conclusions and recommendations

National sustainable development strategy

Bosnia and Herzegovina does not have a national sustainable development strategy or any other comprehensive development strategy adopted at the state level. The Reform Agenda 2015–2018 is a short-term document that does not touch upon all aspects of sustainable development. Also, Bosnia and Herzegovina does not have strong and effective mechanisms to enhance policy coherence for sustainable development, either in terms of intersectoral cooperation for sustainable development or in terms of cooperation between the levels of governance. The National Steering Committee for Environment and Sustainable Development was discontinued in 2005. No body that would regularly bring together the sectoral authorities and stakeholders to discuss broader issues of sustainable development currently exists. In the absence of a long-term planning document on sustainable development and a multisectoral, multi-stakeholder body on sustainable development, the country is poorly equipped for implementation of the 2030 Agenda for Sustainable Development, including its Target 17.14 (To enhance policy coherence for sustainable development).

Recommendation 1.1:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should:

- (a) *Develop and adopt a sustainable development strategy of Bosnia and Herzegovina for implementing the 2030 Agenda for Sustainable Development and Sustainable Development Goals;*
- (b) *Promote a harmonized approach towards achieving common guidelines on planning investments in the environmental field and in sustainable development;*
- (c) *Establish a multisectoral, multi-stakeholder body entrusted with promoting sustainable development.*

Sustainable Development Goals

The MDG experience of Bosnia and Herzegovina shows the importance of strong ownership of the Goals at various levels of the Government. As of April 2017, the SDG process in Bosnia and Herzegovina has been largely driven by the United Nations Country Team. In late March 2017, the Council of Ministers of Bosnia and Herzegovina appointed the Directorate for Economic Planning under the Council of Ministers to coordinate the process of SDGs implementation and monitoring. It is expected that this Directorate will be a technical body for coordinating SDGs implementation and monitoring. There is no political-level body or forum with the participation of all relevant stakeholders to guide and oversee SDGs implementation and monitoring. As of April 2017, the SDGs are not mentioned in any of the planning documents at the state and entity levels.

Recommendation 1.2:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should:

- (a) *Assume ownership of the SDGs process;*
- (b) *Identify the political-level body to guide SDGs implementation and monitoring;*
- (c) *Proceed with setting up aspirational and measurable national targets;*
- (d) *Ensure that the SDGs are integrated into future planning documents;*
- (e) *Ensure the preparation of reports on SDGs implementation.*

Inter-Entity Coordination Body for the Environment

The responsibilities of the Ministry of Foreign Trade and Economic Relations include coordination and facilitating harmonization of environmental policy and legislation among the two entities and Brčko District but implementing these tasks has proved

difficult in the absence of formal mechanisms to address diverging positions. The Inter-Entity Coordination Body for the Environment deals with environmental issues, which require a harmonized approach among the entities. Its core function is to facilitate the harmonization of laws and subsidiary legislation of the entities. However, attention to implementing this function has been decreasing in the last few years. Information about the activities of the Body is scarce.

Recommendation 1.3:

The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska and the Department of Spatial Planning and Property Issues of Brčko District should enhance efforts to harmonize the respective legislation of the entities and Brčko District by:

- (a) *Focusing the activities of the Inter-Entity Coordination Body for the Environment on harmonization of the legislation of the two entities and Brčko District;*
- (b) *Setting clear time-bound objectives to be attained in terms of harmonization of the legislation, in line with the Environmental Approximation Strategy of Bosnia and Herzegovina;*
- (c) *Regularly reviewing progress achieved in terms of harmonization of the legislation in the framework of the Inter-Entity Coordination Body for the Environment;*
- (d) *Making the meeting reports of the Inter-Entity Coordination Body for the Environment publicly available.*

Integration of environmental requirements into sectoral policies and legislation

The integration of environmental considerations into sectoral policies and legislation is at the early stages in the energy, mining, transport, agriculture, forestry and health sectors, and has yet to begin in the tourism and education sectors. Such a low level of integration is partially explained by the weak legal framework for SEA and the limited use of this tool. As of April 2017, a number of sectoral legal and policy documents are in the process of development. These include, for example, the new law on mining in Republika Srpska, new laws on tourism in both the Federation of Bosnia and Herzegovina and Republika Srpska, the new law on forests in the Federation of Bosnia and Herzegovina, the national energy efficiency plan, the state-level strategy on road safety, the forestry programme in the Federation of Bosnia and Herzegovina, the spatial plan in the Federation of

Bosnia and Herzegovina and the new spatial plan in Brčko District. This provides opportunities for deepening the integration of environmental requirements into sectoral policies and legislation.

Recommendation 1.4:

The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska, and the Department of Spatial Planning and Property Issues of Brčko District should ensure the integration of environmental requirements into sectoral policies and legislation by:

- (a) *Strengthening cooperation with sectoral ministries and proactively commenting on the drafts of sectoral legal and policy documents;*
- (b) *Enabling active use of the SEA instrument;*
- (c) *Seeking, as necessary, the assistance of other governments and relevant international organizations in sharing knowledge and information on the integration of environmental requirements into sectoral policies and legislation.*

Strategic Environmental Assessment

In 2017, Bosnia and Herzegovina became a party to the Protocol on SEA.

In the Federation of Bosnia and Herzegovina and Brčko District, the legal framework for SEA consists of a few articles in their laws on environmental protection. This is clearly not sufficient for proper regulation and implementation of SEA. Very few SEAs were done in the Federation of Bosnia and Herzegovina and none in Brčko District. In Republika Srpska, the legal framework for SEA is quite developed, with two rulebooks complementing the provisions of a dedicated section in the Law on Environmental Protection. Still, there are gaps in the legal framework on SEA in Republika Srpska with regard to the lack of requirement to obtain the opinion of health authorities and the need to strengthen provisions on public participation and consultation. In terms of practical application, Republika Srpska has more extensive experience, although this experience is limited to spatial planning documents.

In the Federation of Bosnia and Herzegovina and in Brčko District, the legislation includes no provisions on transboundary consultations. In Republika Srpska, the Law on Environmental Protection provides for the obligation to ensure the participation of relevant authorities and the public of other countries in case the

plan and programme may have an impact on their environment. The country's experience with SEA in a transboundary context is very limited.

Recommendation 1.5:

The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska, and the Department of Spatial Planning and Property Issues of Brčko District should develop procedures for transboundary notification and consultations and submit them to the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District for adoption.

Recommendation 1.6:

The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina should:

- (a) *Ensure the adoption of detailed legislation on SEA, referring to the scope of SEA, competent authorities, procedural steps, content of an SEA report, public participation, monitoring and follow-up, and other requirements;*
- (b) *Raise the awareness of sectoral authorities on SEA and facilitate their training on this issue;*
- (c) *Ensure that all documents subject to SEA undergo an SEA.*

Recommendation 1.7:

The Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska should:

- (a) *Improve legislation on SEA, in particular by adopting subsidiary legislation detailing public participation and consultation procedures;*
- (b) *Raise the awareness of sectoral authorities on SEA and facilitate their training on this issue;*
- (c) *Ensure that all documents subject to SEA undergo an SEA.*

Recommendation 1.8:

The Department of Spatial Planning and Property Issues of Brčko District should:

- (a) *Ensure the adoption of detailed legislation on SEA, referring to the scope of SEA, competent authorities, procedural steps, content of an SEA report, public participation, monitoring and follow-up, and other requirements;*
- (b) *Raise the awareness of sectoral authorities on SEA and facilitate their training on this issue;*
- (c) *Ensure that all documents subject to SEA undergo an SEA.*

Training for civil servants

There is no systematic training and professional development of civil servants on the environment and sustainable development issues. Training and professional development of staff of the institutions responsible for environmental issues takes place sporadically as part of international projects. There is no system of training and professional development on environmental issues of staff in sectoral ministries.

Recommendation 1.9:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should establish:

- (a) *A system of training and in-service training of staff in the institutions responsible for environmental issues to ensure regular and comprehensive coverage of environmental and sustainable development issues;*
- (b) *Schemes of training and in-service training on environmental issues for civil servants in sectoral ministries.*

Implementation of international agreements

There is no state-level law on environmental protection, though numerous recommendations were made to the country in the past two decades to adopt such a law. According to the 2017 Environmental Approximation Strategy of Bosnia and Herzegovina, the competences of Bosnia and Herzegovina in environmental matters include, among others, the implementation of international treaties and coordinating activities to approximate the legal system of Bosnia and Herzegovina with the EU acquis. While the adoption of a state-level law on environmental protection is not accepted as feasible at this time, formalization of responsibilities for implementation of international agreements related to the environment, including for approximation to the EU acquis, could represent a step forward.

Recommendation 1.10:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should develop and adopt a state law to formalize the framework for implementation of international agreements and other international obligations of Bosnia and Herzegovina related to the environment.

Chapter 2

REGULATORY AND COMPLIANCE ASSURANCE INSTRUMENTS

2.1 Legal and institutional framework

Legal framework

Both Republika Srpska and the Federation of Bosnia and Herzegovina have had a similar main framework Law on Environmental Protection, since 2002 (OG RS, No. 71/12, 79/15) and 2003 (OG FBiH, No. 33/03, 38/09), respectively. The Law on Environmental Protection of Brčko District of Bosnia and Herzegovina (OG BD, No. 24/04, 1/05, 19/07, 9/09) is similar to the Law in Republika Srpska because Brčko District does not have cantons and an environmental permit is issued after adoption of the location conditions.

The Laws on Environmental Protection, together with the legislation on air protection, waste management, nature protection and the environmental funds, set out the institutional and content framework for the enforcement mechanism of environmental regulations and establish the inspectorates at entity level. Inspections are regulated by specific legislation and performed by the respective administrative structures. In the Federation of Bosnia and Herzegovina, several rulebooks for environmental enforcement have been issued. Similarly, secondary legislation on environmental permitting and assessment has been adopted in Republika Srpska.

The entity-level laws on environmental protection stipulate the requirement for EIA and SEA as prerequisites for the granting of operating permits to large-scale projects with significant environmental impact. However, there are no specific regulations on EIA and SEA that establish the direct links between the permitting and environmental assessment, either at project level (EIA) or spatial planning and sectoral plan level (SEA).

Environmental Impact Assessment

Since 2011, no changes have been introduced to the EIA procedure in the Federation of Bosnia and Herzegovina, which is governed by the Law on Environmental Protection and the Regulation on plants and installations, for which environmental impact assessment is obligatory; plants and

installations may only be constructed and operated if issued an environmental permit.

In 2015, amendments were made to the provisions on EIA and environmental permits in the 2012 Law on Environment Protection of Republika Srpska.

The laws on environmental protection set out the criteria for projects subject to EIA. As a general rule, EIA is applied to large-scale projects with adverse environmental impacts. However, the laws on environmental protection in the Federation of Bosnia and Herzegovina and Republika Srpska provide the respective ministries a rather wide mandate of discretion to decide upon the prior need for EIA in the issuance of permits.

Bosnia and Herzegovina is a party to the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) and, since 2017, a party to the Protocol on SEA, which requires the country to perform environmental permitting and environmental assessment hand in hand to enable informed decision-making on granting permits to developments with likely significant environmental impact, including across its jurisdictional boundaries.

Environmental liability, insurance and compensation

At state level, the Criminal Code of Bosnia and Herzegovina does not contain a chapter on crimes against the environment. However, at the entity level, the entities' Criminal Codes contain crimes against the environment, but have not been fully harmonized with the EU Directive 2008/99/EC on the protection of the environment through criminal law.

Both entities and Brčko District provide for both accomplice liability and liability of legal persons, as required by the EU Directive 2008/99/EC on the protection of the environment through criminal law. The Criminal Code of Brčko District addresses criminal offences against the environment, agriculture and natural resources and is identical to the environmental crimes section of the Criminal Code of the Federation of Bosnia and Herzegovina.

Photo 2: Dry grass burning

In addition, the punishment for committing environmental crimes is identical to that in the Federation of Bosnia and Herzegovina. According to the 2014 legal review of environmental liability in Bosnia and Herzegovina, the legal provisions on who can initiate court proceedings for damage caused to the environment, how proceedings can be initiated, what represents such damage, how liability for such damage is determined, who is paid for such damage, and how such damage is repaired, are insufficiently specific, not precise and clear, and incomplete.

As to financial sanctions following damage to the environment by legal bodies, the applicable fines are regarded as too light to motivate permit owners not to violate the conditions of their permits. Fines ranging from €500 to a maximum of €5,000 are too small to bring about behavioural change, especially in installations in need of technological upgrading to meet the environmental standards. As to criminal offences, the Criminal Codes of Republika Srpska, the Federation of Bosnia and Herzegovina and Brčko District provide that legal bodies may be criminally sanctioned by fine, forfeiture of property or dissolution. The amount of the fine is imposed by statute and must be between 5,000 KM (€2,500) and 5 million KM (€ 2.5 million).

Pollution of air, soil, water, the sea, sea bed or underground, and pollution by waste (dumping, depositing, collecting, storing, recycling or

transporting) are regarded as criminal offences if done without an appropriate permit. Other crimes against the environment are criminalized in the Federation of Bosnia and Herzegovina though not included in the Directive. They include forest theft and destruction and a number of crimes against livestock and animals. Environmental crimes in the Federation of Bosnia and Herzegovina, if committed without a valid permit, are generally punishable by a fine or imprisonment.

The Criminal Code of the Federation of Bosnia and Herzegovina provides that pollution of air, soil or water, pollution by waste construction, operation or use of facilities or equipment that pollute the environment, causing a large number of deaths of a protected species, hunting game, the hunting of which is forbidden, or exporting protected plants or animals are regarded as criminal offences.

Environmental crimes may be punished by either a fine or imprisonment. Most crimes call for a fine or reduced prison sentence when the offence is committed through negligence or without a valid permit. The Criminal Codes assign longer prison sentence guidelines to crimes that threaten the health of humans and animals. Pollution of the environment is punishable by a fine or maximum prison sentence of two years.

When the damage threatens human and animal health, the sentence guidelines are one to five years. Pollution

by waste is punishable by a fine or maximum prison sentence of two years. When damage threatens health, the sentence is from six months to three years. Illegal operation of facilities presenting environmental risk is punishable with a fine or three months to three years imprisonment. Damage to protected natural objects is punishable by a fine and not more than three years' imprisonment, unless objects are of particularly high value, in which case the maximum sentence is eight years. Exporting protected plants or animals is punishable by a fine or not more than three years' imprisonment.

Environmental compensation

According to the Law on Environmental Protection of the Federation of Bosnia and Herzegovina, an operator who carries out activities that are environmentally hazardous shall be obliged to provide compensation for any damage through insurance or in some other way. Escalated sentencing guidelines are provided for crimes that cause severe bodily injury or property damage, and further escalation is available for crimes resulting in death. Fines or reduced sentences are imposed when crimes are committed due to negligence.

Pollution of the environment is punishable by imprisonment from three months to five years. The sentencing guidelines escalate to 1–12 years in cases where the crime is committed with a greater culpability than negligence and results in one or more deaths. Pollution by waste is punishable by a fine or imprisonment for a maximum of three years. When the crime is committed due to negligence, the maximum prison sentence is set at three months.

A possibility could be sought to develop a mutual agreement between the operator of an installation and the entity government; on the one hand, the operator would invest in environmentally sound technologies, and on the other hand, the government would provide a fixed-term period for such investments without imposing penalties for non-compliance during that period. A five-year period for such upgrading of technologies by the operator could be negotiated.

Environmental insurance

There are no legal provisions on environmental insurance in the country. An environmental insurance market for the operators of installations is non-existent. Operators may possess ordinary (damage) insurance policies.

Institutional framework

Permitting

In Bosnia and Herzegovina, there is no single authority that issues environmental permits and inspects compliance at the state level. The only state-level inspectorate is the Veterinary Office, which also has linkages with environmental issues such as animal welfare and wild animal diseases. The environmental regulations, compliance and enforcement are implemented at the entity level and below (figure 2.1).

In the Federation of Bosnia and Herzegovina, the Ministry of Environment and Tourism issues air emissions permits and waste permits. The Ministry of Agriculture, Water Management and Forestry is responsible for water management and forestry, and issues water permits and approval of forest management plans. Cantons and municipalities issue urban permits. The lowest-level environmental (urban) permits are issued by the municipalities, but the formal coordination of environmental activities between municipalities, or between the cantons is limited.

In Republika Srpska, the Ministry of Physical Planning, Civil Engineering and Ecology and the Ministry of Agriculture, Forestry and Water Management issue environmental permits. The former issues all environmental permits except for water and forest felling, which are the authority of the latter. The Ministry of Industry, Energy and Mining issues mineral extraction permits. Municipalities issue urban permits.

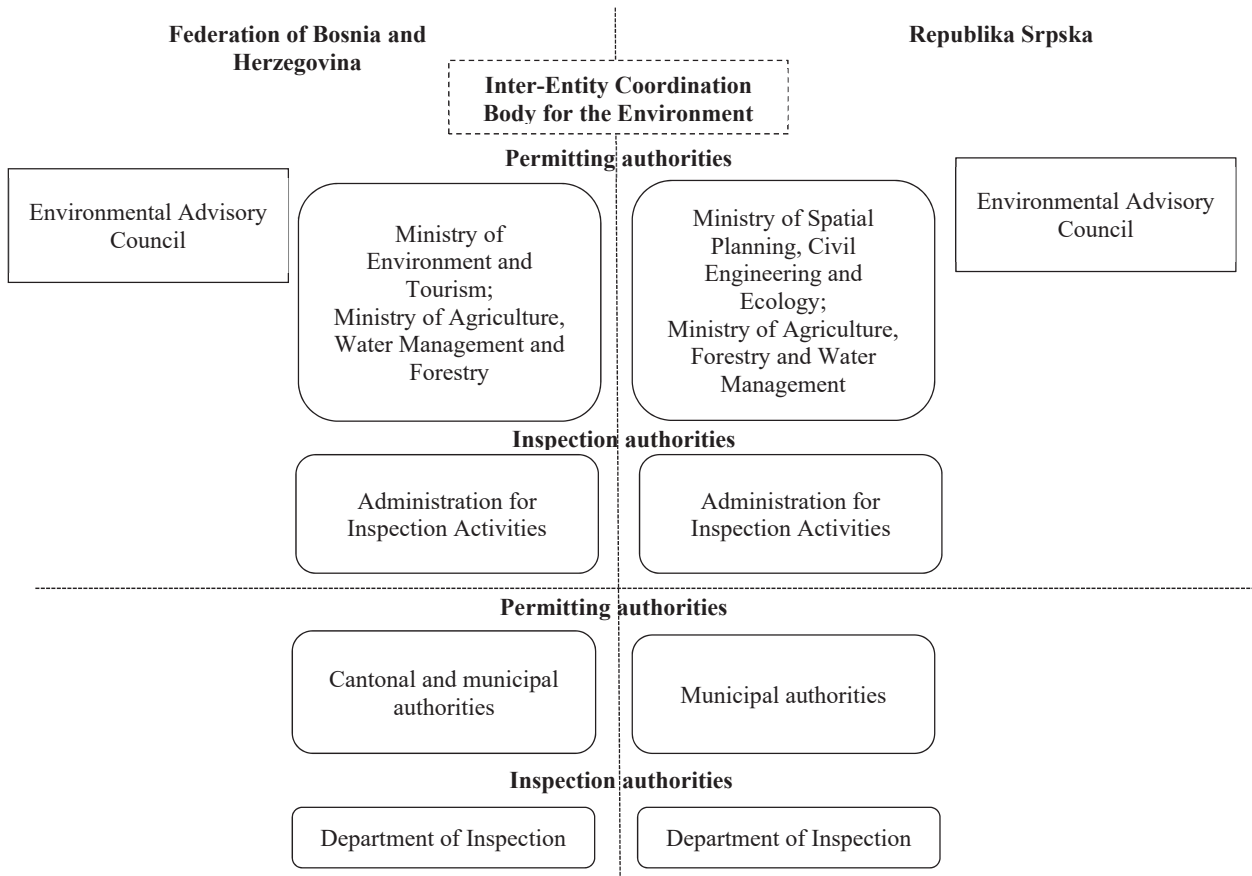
The respective administrations keep the register of permits independently.

Inspections

Both the Federation of Bosnia and Herzegovina and Republika Srpska have a single, independent body with environmental inspection authority: the Administration of Inspection Services that inspects compliance of the activities of the permit holder with the permit conditions issued by the entity-level ministries.

There are four regional units in the Federation of Bosnia and Herzegovina, with about 150 inspectors. Republika Srpska has six units with 250 inspectors. The entities' administrations of inspection services consolidate and coordinate the inspections of these units. However, the number of environmental inspectors remains small: both entities have five environmental inspectors.

Figure 2.1: Administrative structure of environmental enforcement in the Federation of Bosnia and Herzegovina and Republika Srpska



Given the divided authorities of inspectorates, health and safety, environmental and veterinary inspections are usually made independently. This could result in repeated inspections of the same operator and on the same standards, such as on air quality, by both environmental and health and safety inspectors.

It is possible to submit a complaint of illegal work done by companies or entrepreneurs via phone and, in Republika Srpska, via a web form (<http://www.inspektorat.vladars.net/prijave>). However, a single switchboard telephone number is not available at the state or entity level that would enable people to report environmental problems or obvious violations of environmental regulations. Such an entity-level direct switchboard would enable identification of the nature of the reported event and immediate action to be taken if necessary to prevent environmental and health hazards.

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, the joint Administration of Inspection Services consists of 10 inspectorates, including the Urban Planning and Ecology Inspectorate, which performs inspection supervision of the enactment of laws and regulations

relating to environmental protection, spatial planning and construction. Its competences include, among other things, supervision of spatial development, environmental protection and protection of natural resources, development and harmonization of spatial planning documents and the implementation thereof, environmental protection, protection of cultural and historic monuments and of natural heritage sites, water protection, control of used water and wastewaters and implementation of water pollution prevention plans, nature protection, and restoration and improvement of ecological quality. Other inspectorates relevant for the environment within this Administration are the Agricultural Inspectorate, Forestry Inspectorate and Water Management Inspectorate. All 10 cantons in the Federation of Bosnia and Herzegovina have their own environmental divisions, with different departments for issuing permits and undertaking inspections.

The Ministry of Health and the Department for Public Health, Monitoring and Evaluation have the relevant authority in public health and sanitary inspections. The role of the Department is to preserve the population's health by preventing the occurrence of risk factors that lead to diseases, which also includes the preservation of the environment, as far as air pollution and hazardous waste and radiation is concerned.

Republika Srpska

In Republika Srpska, the Authority for Inspection Activities comprises 13 inspectorates, including the Inspectorate on Urban Planning, Construction and Environment, Inspectorate on Water Management, Inspectorate on Forestry and Inspectorate on Food Safety.

The Inspectorate supervises the application of regulations concerning urban planning and construction, environmental protection and spatial development, waste management and surveying activities. The Forestry Inspectorate implements inspection surveillance of implementation of regulations on forest management, but also on hunting and national parks.

Brčko District

In Brčko District, the Department of Spatial Planning and Proprietary Rights issues environmental permits. However, this department does not have any inspection role.

Environmental experts

There is a system of certified technical experts based on education and working experience in the Federation of Bosnia and Herzegovina and Republika Srpska. The certified technical expert can be either a physical person or a legal person, who applies for a professional certificate in a specific field from a special body at the respective ministries in the entities.

The special body comprises five members, representing the ministry and invited experts. The special body announces calls for applications of certification by experts who then can conduct EIA and develop an EIA report. The last call was held in 2014, and a new call is expected in 2017. The applicant, either a physical or legal person, provides their CV. If the applicant is a legal person, the availability of technical capacity in terms of laboratory and measuring equipment also needs to be proven. It is also expected that a legal body hosts at least five qualifying experts. The certificate for physical persons is valid for two years, while legal persons may obtain the certificate for a lifetime.

In early 2017, there were around 200 certified technical experts in the Federation of Bosnia and Herzegovina and 100 in Republika Srpska. The certificates issued in the Federation of Bosnia and Herzegovina are also valid in Republika Srpska and vice versa.

Environmental inspectors and accredited labs

The number and qualification of environmental inspectors are critical factors to ensure the proper enforcement of conditions set by the environmental permits and thus ensure good environmental status. Given the high number of environmental permits (figure 2.2) and their relatively short-term validity (five years), a large number of inspectors is needed to meet the task. However, the Federation of Bosnia and Herzegovina and Republika Srpska have only five environmental inspectors each. The workload of 16 inspections per month per inspector in the Federation of Bosnia and Herzegovina probably needs to be reviewed by the respective ministries to ensure each inspected sector has highly qualified and continuously upgraded staff to execute these demanding tasks.

There is no state-owned accredited laboratory to take and process samples on behalf of the Government. Today, the services are outsourced to an accredited university or private laboratories.

2.2 Environmental permitting

According to the Law on Environmental Protection in both entities, the competent ministry has either 120 days (if no EIA is required) or 60 days (if EIA is required) to act on a permit application. However, there have been cases in which the competent ministry has acted after more than 12 or 24 months without a public notice.

Environmental permits are typically issued for five years. The period of validity of permits probably needs review from the point of view of the duration of the activity being on the same terms as set in the permit. Some activities may be permitted for a longer term than five years, such as the extraction of minerals. Extraction permits could be issued for the full duration of the activity, for example, until the exhaustion of the allocated resource (10 to 20 years). Relatively short-termed permits also involve an administrative aspect: they increase the burden on authorities to process developers' applications for extensions of permits and to consider the associated need for EIA.

The national ELVs are set based on BAT. In addition, the BAT and the reference documents (BREFs) are not translated into the official languages. As of 2017, only the food sector has country-specific BAT available in Bosnia and Herzegovina.

Integrated permits, such as are regulated by EU Directive 2010/75/EU on industrial emissions (IPPC Directive), have not yet been issued in Bosnia and Herzegovina, since the Directive has not yet been fully

transposed. Thus, an operator of an installation having multiple environmental impacts, e.g. on air, water and generation of waste, would need to apply for multiple individual permits from different ministries. This creates a large burden on both the permit applicant and the permitting authority to process the applications. This procedure does not allow assessment of the cumulative impacts.

The permit system addresses the activity that needs to be accommodated within the environmental limit values, but not the environmental medium that will be affected by the proposed development.

There are no environmental permits and associated EIA reports publicly available. The public database maintained by the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina lists the permit applicants and their field of business but does not describe the type or content of the permit and does not allow searching and sorting by year or type of permit. The title "environmental permit" is too broad for those outside the permitting procedure to understand the type, content and scope of a permit. In the Federation of Bosnia and Herzegovina, the permit registries at the federal and cantonal levels are linked together in a network. In Republika Srpska, the entity environmental permit registry is not linked to the municipalities' registries.

The number of issued environmental permits in the Federation of Bosnia and Herzegovina in the period

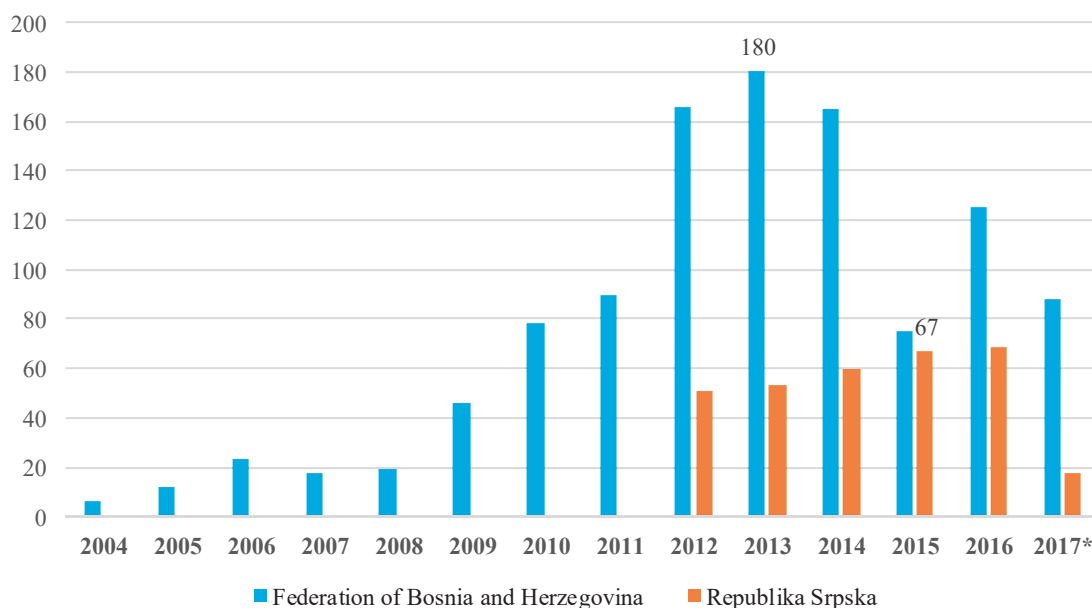
from 2004 to the first six months of 2017 demonstrates the rapid development of permitting procedures. Figure 2.2 shows the twofold increase in the number of environmental permits issued in just two years, between 2010 and 2012, mainly due to developments in the regulatory framework. The cyclical nature of permit issuance results from the five-year permit validity period, which requires renewal, plus new applications. The peak of the permitting process was in the period 2012–2014, which means that renewals are due in 2017–2019.

2.3 Environmental impact assessment

EIA is a widespread tool in the permitting process, in both the Federation of Bosnia and Herzegovina and Republika Srpska. According to the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, 50 EIAs per year are launched on average.

The environmental NGOs have argued that public involvement in the EIA process has been largely superficial and not genuine. They expect better public availability of information on EIA and permitting, the meeting of communication deadlines (i.e. that authorities provide dates of their response to the comments and proposals of civil society) and justification of the decisions made on the quality of EIA reports and environmental permits. There is no common web-based platform to facilitate such matters.

Figure 2.2: Environmental permits in the Federation of Bosnia and Herzegovina, 2004–2017, and in Republika Srpska, 2012–2017, number



Note: * = first six months of 2017

2.4 Environmental standards

Environmental standards are divided into three categories: emission standards, ambient quality standards and product standards. All those standards are legally binding and taken into account in permitting proceedings and in the respective EIAs. While the legally binding environmental standards in the Federation of Bosnia and Herzegovina and Republika Srpska follow the EU standards, there are also several voluntary but not legally binding environmental standards, such as ISO 14001 and EMAS.

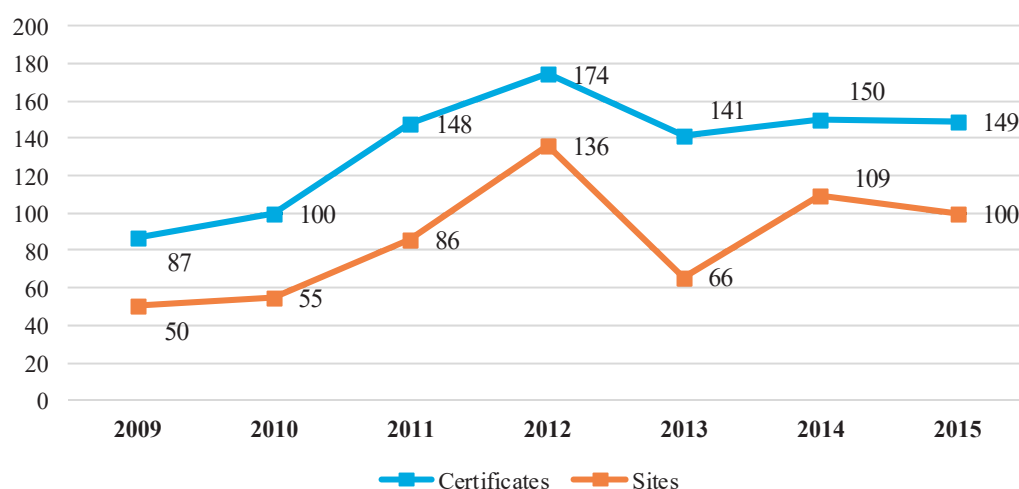
Eco-labelling of products, corporate social responsibility and voluntary environmental reporting

by companies are useful tools for implementing and promoting environmental standards. The implementation of voluntary environmental standards is best emphasized by the number of ISO 14001 certificates issued in the period 2009–2015 (figure 2.3). There is no promotion by the authorities of voluntary environmental management systems to increase the number of site operators.

2.5 Sustainable Development Goals and targets

Bosnia and Herzegovina's current position vis-à-vis Target 12.6 of the 2030 Agenda for Sustainable Development is described in box 2.1.

Figure 2.3: ISO 14001 certificates and sites, 2009–2015, number



Source: ISO Survey of Certifications to management system standards, 2016. (<http://isotc.iso.org/livelink/livelink?func=ll&objId=18808772&objAction=browse&viewType=1>).



Box 2.1: Target 12.6 of the 2030 Agenda for Sustainable Development

Goal 12: Ensure sustainable consumption and production patterns

Target 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle

Indicator 12.6.1: Number of companies publishing sustainability reports

There are no guidelines, standards or regulations for sustainability reports in Bosnia and Herzegovina.

In order to be able to report on this indicator, Bosnia and Herzegovina should:

- Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle;
- Introduce guidelines, standards or regulations on the collection of statistics in consultation with the business sector, including through business associations.

2.6 Assessment, conclusions and recommendations

Assessment

A single entity-level administration for inspection activities has been enforced since 2006. Environmental permits are issued by the Ministry of Environment and Tourism in the Federation of Bosnia and Herzegovina and by the Ministry of Physical Planning, Civil Engineering and Ecology in Republika Srpska. The entities' administrations for inspection activities inspect compliance of the activities of permit holders with the permit conditions in the respective entities. This consolidation of regulatory and inspection activities has been accompanied by an institutional separation of inspection and permit-issuing processes.

The efficiency and effectiveness of the system of regulation and compliance have not changed since 2011. There is still inadequate vertical coordination and communication between cantons/municipalities and entities but also insufficient horizontal coordination at the inter-entity and intercantonal and intermunicipal levels. In addition, the shortage of staff and funding to carry out tasks and activities in environmental permitting, assessment and inspection is today still much the same challenge as it was in 2011. ICT tools on regulatory and compliance assurance mechanisms are not widely used. However, several steps to advance the regulatory and enforcement system since 2011 have been taken; for instance, the industrial plant and pollutant register has been established, the technical expertise of expert assessors of environmental impacts is enhanced and public concerns over environmental pollution are more frequently addressed.

Conclusions and recommendations

Environmental permitting

Integrated permits, such as are regulated by EU Directive 2010/75/EU on industrial emissions (IPPC Directive), have not yet been issued in Bosnia and Herzegovina, since the Directive has not yet been fully transposed. Thus, an operator of an installation having multiple environmental impacts, e.g. on air, water and generation of waste, applies for individual permits. This creates a burden on both the permit applicant and the permitting authority to process the applications. This procedure does not allow assessment of the cumulative impacts.

The permits are valid for a maximum of five years. This relatively short period brings about a new round

of application proceedings that again encumbers the parties in the permitting process and leaves the cumulative effects unaddressed.

Recommendation 2.1:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District should:

- (a) *Simplify environmental permitting procedures in order to avoid overlapping and achieve better efficiency;*
- (b) *Take first steps in applying an integrated approach to environmental permits and abolishing separate permits;*
- (c) *Consider extending the five-year period of validity of permits when applicable.*

Best available techniques

The environmental inspectorates are currently understaffed and lack continuous training programmes. One inspector performs 16 inspections a month and covers a wide range of sectors, which workload usually requires the capacity and competences of several inspectors. Environmental inspectors do not have periodic and systematic training to update and upgrade their knowledge and skills in the changing industrial technologies and associated BREFs. There are insufficient inspectors to conduct the inspections. Bosnia and Herzegovina could also use already translated BREFs from neighbouring countries such as Croatia and Serbia.

Recommendation 2.2:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District should:

- (a) *Translate relevant best available techniques (BAT) conclusions and parts of best available techniques reference documents (BREFs) into the official languages;*
- (b) *Increase the capacity of environmental inspection in terms of staff numbers and training.*

Accredited laboratories

In the event of emergency inspections (e.g. after accidents), but also during some routine inspections, immediate sampling of air, soil, water or waste samples cannot be performed. As of May 2017, the environmental inspectorate does not have an accredited laboratory of its own nor a collaborating partner which could be requested to take samples at short notice. The entities' bodies responsible for environment inspection do not have framework

agreements with accredited laboratories to provide such a service. These services are outsourced to private laboratories, are costly and cannot respond in the event of emergencies.

Recommendation 2.3:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District should consider establishing accredited laboratories to support inspections, in particular those related to the environment.

Switchboard telephone number of environmental inspectorate

Anyone can submit a complaint of illegal work by companies or entrepreneurs via phone and, in the case of Republika Srpska, via a web form (<http://www.inspektorat.vladars.net/prijave>).

However, a single switchboard telephone number is not available at the state or entity level that would enable people to report on environmental problems or obvious violations of environmental regulations. Such an entity-level direct switchboard would enable identification of the nature of the reported event and immediate action to be taken if necessary to prevent environmental and health hazards.

Recommendation 2.4:

The Administration for Inspection Affairs of the Federation of Bosnia and Herzegovina, the Administration for Inspection of Republika Srpska and the Inspectorate of Brčko District should introduce a switchboard telephone number for the environmental inspectorate to help the public to report on violations of environmental regulations and the inspectorate to determine which notifications to forward to the health and safety inspectorate, veterinary inspectorate or any other authority for a response.

Environmental fines

The current level of financial sanctions following damage to the environment by legal bodies does not motivate the permit owners who violate permit conditions to change their behaviour. The applicable fine, ranging from €500–€5,000, is too small to bring about behavioural change, especially in installations in need of technological upgrading to meet environmental standards.

Some operators have difficulties meeting the environmental conditions set in the environmental permits or to pay the penalties for violations. Penalties are too small to motivate operators to invest in technological improvements. No agreements are in place between competent ministries and operators, by

which, for an agreed period, the operator would take responsibility to invest in the technology required to meet environmental standards and the competent ministries would waive the penalty for non-repayment of the loan advanced to the operator within the defined period.

Recommendation 2.5:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District should:

- (a) *Review environmental fines for non-compliance by permit holders since the fines are too small to motivate permit holders to take action to comply;*
- (b) *Encourage competent ministries to conclude time-bound agreements with operators allowing them to invest in environmentally sound technologies without being fined for non-repayment in the agreed time.*

Joint inspections

Although inspection activities have been consolidated under a joint administration, in both the Federation of Bosnia and Herzegovina and Republika Srpska inspections by the authorities under the joint administration are performed independently and overlaps are inevitable. Given the divided authorities of the inspectorates, health and safety, environmental and veterinary inspections are made separately or in parallel of the same operators and sites of operation. No joint inspections are carried out at the entity or district level.

Recommendation 2.6:

The Administration for Inspection Affairs of the Federation of Bosnia and Herzegovina, the Administration for Inspection of Republika Srpska and the Inspectorate of Brčko District should perform joint inspections when applicable.

Environmental impact assessment

Online platforms are not in place for the reporting of operators' self-monitoring results, inspection reports and reporting on project investments. Such online platforms for the pollutants register, permitting and enforcement data would also serve as useful tools of communication with other public authorities such as the health and safety inspectorate, veterinary inspectorate and regional and local authorities, enabling the sharing of common information across the entities. A common web-based portal of permits at the entity level would enable the authorities to have an overview of limit values and environmental measures

established for the industrial operators in neighbouring areas and consider the cumulative effects of current and planned installations. A common web portal would also serve as an educational tool, not only for the authorities but also for experts and expert organizations involved in EIAs. Such a web portal would enhance transparency and public access to environmental information and engagement in the decision-making process – the permitting process is regarded as such by the Aarhus Convention.

A clear link between the conclusions of EIA reports and permit conditions is not established. Environmental inspectors cannot refer to the concrete conditions that need to be met by the permit holder. A common, publicly accessible database on environmental permits and associated EIAs would enable the authorities and interested stakeholders to follow the process of permitting and EIA.

Recommendation 2.7:

The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska, and the Department of Spatial Planning and Property Issues of Brčko District should:

- (a) *Ensure that the conclusions of EIA reports are reflected in the permits' conditions;*
- (b) *Establish a common, publicly accessible database on environmental permits and associated EIAs.*

Environmental liability

The current formulation of what represents damage to the environment, who is determined to be liable for such damage, who can initiate court proceedings and how, who is to be sanctioned for such damage, and

how environmental damage can be repaired, are insufficiently specific, not precise and clear, and incomplete. The financial sanction for damage to the environment is regarded as not motivating of behavioural change, due to the low level of fines. Thus, there is a need for review of the legislation on environmental liability and sanctions and to raise the associated fines to levels appropriate to the damage caused to the environment.

Recommendation 2.8:

The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska and the Department of Spatial Planning and Property Issues of Brčko District should update the legislation on environmental liability and financial sanctions for damage.

Eco-labelling and corporate social responsibility

The number of operators who hold ISO 14001 certificates has been slowly increasing, but adoption and implementation of voluntary environmental management systems more widely needs further promotion by the administrations. Integrating environmental management with social responsibilities of businesses also needs boosting by well-planned promotional activities by entity administrations.

Recommendation 2.9:

The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska and the Department of Spatial Planning and Property Issues of Brčko District should promote voluntary eco-labelling and corporate social responsibility programmes.

Chapter 3

GREENING THE ECONOMY

3.1 Greening the tax and tariff system

In Bosnia and Herzegovina, the main environmental fees are levied on water resources, forests, air pollution, wastes and land uses under different regulations.

In the Federation of Bosnia and Herzegovina, general and special water fees on water resources are collected under the Law on Water (OG FBiH, No. 70/06). In Republika Srpska, special water fees are collected under the Law on Water (OG RS, No. 50/06, 92/09, 121/12).

In both entities, a 0.07 per cent tax earmarked for forestry development is levied on profits of all companies. Revenues are entirely allocated to the entity budget. There are also fees for forest land conversion paid under the Guideline on the forest conversion fee (OG FBiH, 44/10).

Further, public and private forest enterprises pay a tax to local governments, targeted to rural and forest development. In the Federation of Bosnia and Herzegovina, there is also a fee for forestland conversion into a mining zone, collected from the mining companies.

In the Federation of Bosnia and Herzegovina, air pollution fees are levied on industrial polluters under the Decree on Fees for Air Polluters (OG FBiH, No. 66/11) and at motor vehicle registration under the Decree on Special Environmental Fees (OG FBiH, No. 14/11). In Republika Srpska, there are no fees on air pollution.

In the Federation of Bosnia and Herzegovina, fees on electronic wastes, packaging and plastic bags are collected under the Law on Waste Management and Law on Amendments to the Law on Waste Management (OG FBiH, No. 72/09). In Republika Srpska, fees on packaging are collected under the Decree on Fees for Environmental Packaging Waste Burden (OG RS, No. 101/12). In both entities, fees on municipal wastes are paid to municipal enterprises under municipal regulations.

Pollution charges

Federation of Bosnia and Herzegovina

Water

The two water agencies controlled by the Ministry of Agriculture, Water Management and Forestry – the Sava River Watershed Agency in Sarajevo and the Adriatic Sea Watershed Agency in Mostar – are responsible for water management in the Federation of Bosnia and Herzegovina.

In the Federation, water services are provided by more than 70 public utility companies (PUCs) owned by the municipality or canton (Sarajevo) or a city (e.g. Mostar), which are responsible for both water supply (abstraction and distribution) and wastewater management. Usually the same PUC is involved in more than one utility (water, waste, etc.) and it is difficult to disentangle expenditures in the different sectors. The licensing procedure for water uses of public companies involves the two water agencies.

There are two kinds of water fees: general or common water fees paid by physical or legal persons at a level of 0.5 per cent of the net salary of each employee; and special water fees, paid by PUCs and industrial and agriculture users.

Special water fees are in turn distinguished by: (a) special fees for water use (e.g. public water supply, bottling, irrigation, industry, HPPs) that should generally be directly linked to the water consumption/use or pollution; (b) special fees for water protection (e.g. the special fee paid at each motor vehicle registration and the fee on wastewater); and (c) fees on extraction of materials from a watercourse (table 3.1).

Water tariffs are far from functioning as a proper economic instrument, for several reasons. Tariff-setting does not comply with the cost recovery principle as an important cost component, capital cost (depreciation of physical and financial capital) is not included in the fee and environmental costs are only very partially considered in calculating the amount of payment. Municipalities decide water tariff rates based on a draft proposal by PUCs that is based on the expenditures in the previous period, then considers

operation and maintenance costs and, only partially, investment costs.

Further, tariff rates in the Federation of Bosnia and Herzegovina are not compliant with the "consumer pays principle" for several reasons, such as:

- They are set differently for the different users (e.g. they are lower for households (0.01 KM/m³) and higher for industry (0.03 KM/m³) and in some cases the collection rate is very low, with some revenues not collected at all, as in the case of agricultural and bottling use;
- A high share of revenues is not related to the real amount of consumed/polluted water, as in the case of water tax on salary (general water fee) and water tax paid on vehicles using oil products. The latter tax is calculated based on the level of water pollution expressed in terms of population equivalent (PE)¹ and it is independent of the effective use of the vehicle. In addition, the fee on fish farming is not incentivizing production that is more efficient or water treatment and recycling, being calculated per 1 kg of fish produced. As an indication, the Sava River Watershed Agency, the biggest water agency in Bosnia and Herzegovina, collects about 86 per cent of total water revenues from fees not directly related to water consumption and pollution (general water fees and special fees for water protection, usually calculated in PE) (box 3.1);

- The special water fee on water used by HPPs is calculated based on the generated quantity of energy expressed in kilowatt-hours and is independent of efficiency. That means that it does not represent an effective economic instrument in modifying behaviours and inducing more efficiency and more resources and energy savings;
- The relationship between the fee and the real effective amount of consumed water is weakened by the fact that, beyond the often poorly calibrated water meters, blockhouses have only one water meter and apartments pay proportionally to other parameters (e.g. the number of permanent inhabitants or size in square meters).

As regards the "polluter pays principle", according to legislation in force, PUCs and industrial users must report regularly to the water agencies the pollution load in the discharged wastewater. According to the Environmental Protection Fund, the reporting procedure is regulated in detail and foresees that fee payers are obliged to carry out sample testing of wastewater at least once every two years by an authorized laboratory and deliver a copy of the certificate on findings to the water agency.

Otherwise, a pollution coefficient, depending on the sector and size of the firm, is applied. Again, the fee on wastewater discharge is based on the pollution load expressed in population equivalent, which means independent of the actual quantity of wastewater.

Table 3.1: Water fees in the Federation of Bosnia and Herzegovina

	Unit value/rate
General water fee (*)	0.005
Special water fees for water use	
Public water supply, m ³	0.010
Bottling, m ³	2.000
Irrigation, m ³	0.002
Industry, m ³	0.030
HPP, kWh	0.001
Special water fees for water protection	
Vehicles using oil/petroleum products, P.E. (**)	2.000
Wastewater, PE (**)	2.000
Fish prod., fertilizers, chemicals, kg	0.05; 0.005; 0.075
Extraction of material from watercourse, m ³	At least 1.50

Source: European Union IPA Programme 2011 (November 2015).

Note: * Paid by any physical or legal persons on the basis of the net salary of an employee.

** Population equivalent (PE) is the ratio of the pollution load produced by one person.

¹The pollution load expressed in population equivalent (PE) is the ratio of the pollution load produced by one person.

This indicator is then useful in evaluating performance but is independent of the effective water pollution.

Box 3.1: Sava River Watershed Agency financial accounts

The Sava River Watershed Agency is the biggest water agency in Bosnia and Herzegovina, collecting 55 per cent of the country's total water revenues. In 2015, the Agency received about 14 million KM from water fees (more than 76 per cent of total financial resources, amounting to about 18.34 million KM).

Other financial resources (little more than 25 per cent of total revenues) come from other revenues (about 236,000 KM), purpose funds from the Federation's budget (about 228,000 KM) and revenues from previous years (4,066,462 KM). The Sava River Watershed Agency collects revenues from general or common water fees and from special water fees.

General or common water fees are paid by physical or legal persons at the level of 0.5 per cent of the net salary of each employee and are not directly linked to water consumption. In the 2015 budget of the Agency, they represent about 37 per cent of total water revenues. Special fees are paid by PUCs and by industrial and agricultural users and are distinguished as special fees for water use, for water protection and on extraction of material from watercourses.

Special fees for water uses are paid on public water supply and on use of water for bottling, irrigation, industrial activities and hydroelectric energy production. They are theoretically linked to water consumption (even if, as discussed earlier, the linkage is often weak) and represent 14 per cent of the Agency's budget.

Special fees for water protection are paid mainly at the time of motor vehicle registration and on wastewater. They represent 49 per cent in the budget of the Agency.

At least 86 per cent of water fees are not linked to the effective water consumption and, further, fees on irrigation, fertilizers and pesticides and on fish production are not collected at all.

On the expenditure side, current payments represent 97 per cent of total expenditure. Labour and business costs amount to 4,424,400 KM, 24.8 per cent of total expenditure (about 17.7 per cent for costs of employees and 7.1 per cent for materials, inventory and services). Other current expenditure, represented by current transfers, interest payments, current reserves and other residual items, amount to 72 per cent of total current expenditure. Investments (expenditure for purchase of fixed assets) amount to 2.5 per cent.

The Agency delivers to consumers about 30 per cent of totally abstracted water for public supply, while 70 per cent is lost in water supply networks.

Table 3.2: Revenue of the Sava River Watershed Agency, 2015

	KM	% of total water fees	% of total revenues
General water fees	5 190 807	37.59	28.30
Special water fees for abstraction/use of water			
Public water supply	688 771	4.99	3.76
bottling	107 810	0.78	0.59
irrigation	..	..	..
fish farming	..	..	..
industry	974 799	7.06	5.32
other uses	..	..	..
HPP	193 583	1.40	1.06
Special water fees for water protection			
vehicles	4 018 202	29.10	21.91
wastewater	2 628 559	19.03	14.33
fish production	..	..	..
fertilizers	..	..	..
pesticides	..	..	..
Special water fee for material extracted from river	7 544	0.05	0.04
Total water fees	13 810 074	..	75.30
Other revenues			
Other revenues	45 000	..	0.25
dividends accruing from assets	153 325	..	0.84
Other	37 438	..	0.20
Over plus revenues transferred from previous years	4 066 462	..	22.17
Purpose funds from budget of Federation	227 802	..	1.24
Total revenues	18 340 101	..	..

Source: Elaborations on data from Sava River Watershed Agency, 2017.

Table 3.3 Expenditure of the Sava River Watershed Agency, 2015

	Share of total expenditure	
	KM	(%)
Labour and business costs	4 424 400	24.80
Gross wages	2 350 000	13.17
Reimbursement of costs of employees	539 400	3.02
Statutory insurance and other contributions	270 000	1.51
Materials, inventory and services	1 265 000	7.09
Current transfers and other current expenditures	12 023 361	67.38
Interest payments	52 000	0.30
Current reserves	744 089	4.17
Total current expenditure	17 243 850	96.63
Expenses for the purchase of fixed assets	437 415	2.45
Debt servicing	163 000	0.91
Total expenditure and costs	17 844 265	..

Source: Elaborations on data from Sava River Watershed Agency. 2017.

Finally, levels of special water fees are not price indexed and are not modified very often, so their real value changes with the rate of change in the price level, decreasing in the presence of positive inflation.

In accordance with the Law on Water of the Federation of Bosnia and Herzegovina, which sets the allocation of water fees (table 3.4) and the way they should be spent, 40 per cent of collected water fees is allocated to the water agencies for: (i) the duties and tasks of agencies in accordance with the Law on Water; (ii) maintenance of protected facilities owned by the Federation; and (iii) other tasks and activities that are by the Law delegated to the water agencies as well as financing their work. The 45 per cent of collected special water fees allocated to the cantons is used to co-finance the construction and maintenance of water facilities as well as other activities related to water management such as issuing concessions or preparing technical documentation. The remaining 15 per cent of collected special water fees is allocated to the Environmental Protection Fund of the Federation of Bosnia and Herzegovina and is used for conducting the tasks delegated by the Law on Water to the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina for co-financing the infrastructure for water protection in the Federation.

Other sources for financing water supply and wastewater services include funds from local government (canton and municipality) budgets, from the Environmental Protection Fund and from a portion of VAT charged on water services, collected at the state level.

Table 3.4: Water fees allocation in the Federation of Bosnia and Herzegovina, percentage

	(%)
Water agencies	40
Cantons	45
Environmental Protection Fund	15

Source: Law on Water of the Federation of Bosnia and Herzegovina.

In any case, tariffs are the dominant funding source of the water management sector and they are insufficient to cover operation and maintenance expenses, which represent 72 per cent of sector costs. Data from the World Bank indicate that in the Federation of Bosnia and Herzegovina only 32 per cent of total revenues would be proportional to the effective water consumption/pollution (14 per cent from water use and 18 per cent from wastewater).

Water supply and wastewater services are not financially self-sustainable and the infrastructures for water management and provision are obsolete. The low levels of tariffs and of collection rate are not effective in incentivizing water saving and water loss reduction. Furthermore, they do not encourage private investments and do not provide enough financial resources to cover operating and maintenance costs nor for infrastructure renewal and development.

Better compliance with the cost recovery principle is desirable – accounting for the affordability principle, reinforcing the use of economic instruments to reduce water consumption/pollution.

On the other side of the equation, water losses and operating costs (costs of labour, energy, current maintenance) are high, further reducing the availability of financial resources for investment.

Finally, the fees structure in most cases does not comply with the polluter pays principle, being not directly linked to effective water consumption or pollution, making it inadequate in inducing the behavioural changes required to bring about better use of water. The following actions are required: linking the fees structure to the effective use of water and eliminating the cross-subsidization between households and non-household users, and regularly revising tariff rates accounting for inflation and efficiency improvements (actual fees have been settled in 2007). Regarding the allocation of resources, data on PUCs and cantonal expenditures is scarce.

Forests

Public forest management activities involve the cantons and, in turn, the cantonal forest companies (there is one in each canton), which are generally publicly owned (with the exception of Tuzla Canton), while wood processing industries are mainly private companies.

Financial resources for forest management come mainly from selling wood. Aggregating the eight public forest enterprises in the Federation of Bosnia and Herzegovina, revenue from cutting represents 91 per cent of total revenue while a limited amount comes from taxes and fees, recently defined in the Rulebook on the method of payment of public revenues to the budget and extrabudgetary funds of the Federation of Bosnia and Herzegovina (OG FBiH, No. 33/16).

The price of wood is settled by law and the profitability rates of public enterprises are very low. According to official sources, many companies report negative financial results permanently or periodically and almost all have a surplus of employees.

Under-profitability of forest management enterprises limits the resources available for infrastructural and equipment investments in forest management and remediation and discourages private capital flows into the sector, leading to a gradual degradation of forest heritage and endangering the development of forest-related economic activities and exports.

Private forest owners pay a tax to the cantonal public forest administration before any harvesting operation in their forests (Rulebook on the method of payment of public revenues to the budget and extrabudgetary funds of the Federation of Bosnia and Herzegovina). To discourage illegal deforestation, fines have been introduced, but official estimates indicate that their collection rates are very low, on average 5.4 per cent, with important differences among cantons.

Air pollution

Fees on fossil fuels, a fee on vehicles (special environmental fee) and the tax on air pollution are the main economic instruments implemented in the Federation of Bosnia and Herzegovina. The level of tax and fee rates are decided at the federal level and established by a federal decree. No price indexation mechanism is provided; current rates were fixed in 2011 and have not changed since then.

It is commonly agreed that energy prices are low and do not reflect the total cost of production and provision. As a consequence of the low level of tariffs, financial resources to maintain and develop infrastructures are scarce and infrastructures face progressive deterioration. Further, the low per-unit prices of fossil fuel sources and electricity make it difficult to influence behaviours and cross-subsidization further hampers proper functioning of the instrument.

Setting energy prices in such a way as to reflect the total costs of energy should, on the one hand, grant the sustainability of energy supply and encourage energy efficiency, energy saving and the introduction of cleaner energy sources. On the other hand, increases in energy prices conflict with the affordability criteria due to, on the households' side, the low income levels and the high relative share of income spent on energy and transport (table 3.5) and, on the businesses' side, the effects on production costs and competitiveness.

The special environmental fee is paid at the time of motor vehicle registration. From April 2013, a correction coefficient has been introduced to account for the different types of engine and fuel, and vehicle age, aiming to better price environmental damage from emissions. However, the linkage of the fee with actual pollution, depending on vehicle use, is still weak.

Photo 3: Infrastructure development: slope protection measures**Table 3.5: Energy-related household annual expenditure**

	Share of total expenditure	
	KM	(%)
Transport	172.50	16.3
Energy, Gas, Water, and other fuels	151.09	12.4
Total	323.59	28.7

Source: USAID Bosnia and Herzegovina, Sustainable development/clean energy sector assessment from 2011 national household budget survey, September 2016.

The tax on emissions is linked to the actual emissions into the atmosphere by enterprises. It is paid based on a report that operators are obliged to present annually based on the results of continuous monitoring at the point of emissions and certifications from laboratories accredited by a state institute. For small polluters there is no continuous monitoring (certified by laboratories), but a computing procedure fixed by law. Fees are progressive, being higher for bigger polluters.²

As for the building sector, which is the second largest contributor to air pollution (absorbing more than 40 percent of total energy) and is characterized by high levels of energy inefficiency, only publicly owned buildings (schools, public offices, hospitals, etc.) received significant investment and technical

assistance from international donors. Residential buildings have received much less attention and only few mechanisms, often ineffective, have been introduced to foster energy efficiency. Further, the low cost of energy sources reduces the future financial benefits for households from investing in the improved energy efficiency of their houses, and discourages energy saving or the use of cleaner energy sources. Finally, the low level of household income reduces the availability of the financial resources needed to improve energy efficiency and to switch towards cleaner technologies and energy sources; few financial mechanisms are available to small businesses or individuals, and those that are available, such as loans from commercial banks, are poorly subscribed due to the high interest rates, transaction fees and collateral requirements.

² According to information from the Environmental Protection Fund of the Federation of Bosnia and Herzegovina, about 90 per cent of emissions from economic

activities are produced by 15 big polluters. Further, about 85 per cent of those emissions are from two publicly owned TPPs.

Publicly owned and district heating utilities use coal, gas and, to a lesser extent, biomass. Individual houses not connected to the district heating utilities have few affordable clean energy and energy-efficient options for heating and use coal and oil as they are much cheaper than cleaner sources (gas and biofuels). To promote energy production with renewables, the Federation has implemented a feed-in tariffs system.

In general, the Federation is lacking appropriate economic incentives for energy efficiency in most relevant sectors (e.g. residential buildings), support schemes for renewable energy and appropriately designed measures (i.e. the feed-in tariffs system does not take into account the lower costs for renewable technologies, leading to largely ineffective public spending). The 2017 Law on Energy Efficiency has mainly introduced regulatory instruments, setting obligations for public procurements, and enforcement measures, in particular the obligation to submit an energy certificate for new buildings, which was already foreseen but not observed in practice.³

Given the absence of effective financial mechanisms and the high interest on loans from the banking system, investments in the industrial sector to reduce emissions, i.e. in efficient cogeneration, are scarce and not satisfactory.

Waste

In the Federation of Bosnia and Herzegovina, fees for municipal waste collection are proposed by municipal enterprises and approved by the municipality. The rate is fixed by the cantonal government on the basis of dwelling size (m²) or number of residents. As fees are not directly linked to the actual wastes produced, they are not effective in fostering waste reduction. Further, both fees and collection rates are low and, together with the high companies' operational costs, threaten cost recovery and the financial sustainability of municipal companies and do not provide financial resources for investment.

There are no incentives for reducing waste production nor to separate or recycle waste.

Non-municipal waste collection and disposal are managed by individual private enterprises or consortia of enterprises. Industries have to give wastes to the

consortium or to recycle or dispose of it themselves (with the exception of electronic wastes).

Currently, in the Federation of Bosnia and Herzegovina there are special fees on plastic bags, packaging and electronic wastes.

Regarding plastic bags and bottles, several measures have been introduced, such as a deposit-refund scheme⁴ for recycling, economic incentives for selected collection and fines and penalties in the event of non-compliance, but their use should be reinforced.

Electronic wastes represent the best example of good practice, as operators are obliged to compile detailed reporting forms and issue invoices for each movement, making traceability possible from production, to recycling or final disposal.

For packaging, the situation is clearly worse: packaging materials go to landfills without any treatment; there is no separate collection and no recycling.

Collected revenues from special fees on plastic bags, packaging and electronic waste are divided among the budget of the Federation of Bosnia and Herzegovina (15 per cent), Environmental Protection Fund (30 per cent) and consortia (35 per cent). According to official sources, resources allocated to the Environmental Protection Fund are used for financing projects in waste management, while consortia do not provide precise information on how these resources are spent.

Republika Srpska

Water

In Republika Srpska, water services are provided by about 60 PUCs, some of which are partially privatized, responsible for both water supply (abstraction and distribution) and wastewater management.

The licensing procedure for water uses of public companies involves the Public Enterprise "Vode Srpske", controlled by the Ministry of Agriculture, Forestry and Water Management. Vode Srpske defines the amount to be paid by PUCs and industrial users based on the quantity of used water and tariff rates and collects the relative revenues.

packaging, etc.) is returned for recycling. In the Federation of Bosnia and Herzegovina a deposit-refund scheme is in place for some glass bottles, for example, and in Canton Sarajevo, for plastic.

³ The 2017 Law on Energy Efficiency prescribes monetary fines (ranging from 500 KM to 15,000 KM depending on the severity of the violation) for failures to comply with the Law.

⁴ A deposit-refund scheme consists in a rebate of the payment when the product subject to the fee (bottle,

Table 3.6: Packaging fees in the Federation of Bosnia and Herzegovina, 2016

Packaging material	(KM/ton)	(€/ton)
Glass	25	12.78
Metal	18	9.20
Paper	25	12.78
Plastic	35	17.89
Wood	16	8.80
Multilayer, and/or other materials	30	15.33
Packaging containing and/or contaminated by hazardous materials	550	281.21

Note: A packaging fee is paid by business entities that put packaging or packaged products into circulation on the territory of the Federation of Bosnia and Herzegovina (these are mainly producers of packaging materials and importers of packaging materials and packaged products).

Companies involved in water management must regularly report to Vode Srpske on the abstracted quantity of water and the amounts of pollution load in the discharged wastewater.

As stated in the Law on Water of Republika Srpska, resources for water management are provided from special fees for water use (e.g. public water supply, bottling, irrigation, industry, HPPs), special fees for water protection (e.g. a special fee paid on motor vehicle registration and a fee on wastewater) and special fees on extraction of material from a watercourse, while there are no general water fees such as those in the Federation. Other revenue sources from water in Republika Srpska are those based on the lease of public water property and transfers from the entity and local government budgets.

As settled in the Law on Water of Republika Srpska, about 60–65 per cent of total revenues from water fees is allocated to Vode Srpske. The level and structure of water tariffs, reporting procedures and the amount of water fees to be paid are regulated in detail.

As in the Federation of Bosnia and Herzegovina, tariff-setting in Republika Srpska does not fully respond to basic economic principles; is it not compliant with either the cost recovery principle or the consumer pays principle. As a result, water tariffs are just sufficient to cover operational and maintenance costs.

In particular, water tariffs are settled differently for the different users – lower for households (0.01 KM/m³) and higher for industry (0.03 KM/m³) – and, in several cases, revenues are not collected at all.

Further, a high proportion of revenue is not related to the real amount of used or polluted water. Water taxes paid on vehicles using oil products (38 per cent of total revenues) and on wastewater discharge are both calculated on the basis of the level of water pollution expressed in terms of population equivalent (PE) and independently of the effective use of the vehicle and the quantity and quality of wastewater. Special water fees on fish production and on water used by HPPs are calculated on the basis of the final product (per 1 kg of fish produced and for kWh of generated energy, respectively) and do not change if efficiency changes.

As a result, less than 21 per cent of total water revenues collected by Vode Srpske is linked to effective water consumption, while 79 per cent does not incentivize water savings, as a proper economic instrument should. Tariffs are the dominant funding source of the water management sector and there is strong consensus that water supply and wastewater services are not financially self-sustainable, that tariff levels and structure are inadequate, and that water losses and operating costs (costs of labour, energy, current maintenance) are too high.

Table 3.7: Water fees allocation in Republika Srpska

	Environmental		
	Water agency (%)	Municipality (%)	Fund (%)
Fees under Article 189 except special water fees on vehicles, wastewater and cultivated fish	70	30	-
Special water fees on vehicles, wastewater and cultivated fish	55	30	15

Table 3.8: Water fees in Republika Srpska

	Rate (KM)
Special water fees for water use	
Public water supply, m ³	0.010
Bottling, m ³	2.000
Irrigation, m ³	0.002
Industry, m ³	0.030
Other, m ³	0.010
HPP, kWh	0.001
Special water fees for water protection	
Vehicle using oil/petroleum products, PE (*)	2.000
Wastewater, PE	2.000
Fish products, fertilizers, chemicals, kg	0; 0.005; 0.075
Extraction of material from a watercourse, m ³	At least 1.50

Note: * PE = population equivalent

Table 3.9: Collected water fees in Republika Srpska

	2015		2016 (planned)		Change
	KM	(%)	KM	(%)	(%)
Special water fees for abstraction/use of water	3 704 734	19.28	4 605 502	22.79	24.31
Public water supply	616 470	3.21	528 027	2.61	- 14.35
Bottling	87 180	0.45	117 596	0.58	34.89
Irrigation	1 209	0.01	4 809	0.02	297.77
Fish farming	21 662	0.11	48 921	0.24	125.84
Industry	589 573	3.07	538 953	2.67	- 8.59
Other uses	20 294	0.11	172 847	0.86	751.71
HPPs	2 368 346	12.33	3 194 349	15.81	34.88
Special water fees for water protection	13 031 118	67.83	13 211 368	65.38	1.38
Vehicles	7 132 322	37.12	7 531 379	37.27	5.60
Wastewater	5 503 192	28.64	5 156 475	25.52	- 6.30
Fish production	117 609	0.61	137 286	0.68	16.73
Fertilizers and chemicals	277 995	1.45	386 228	1.91	38.93
Special water fee for material extracted from a watercourse	2 476 333	12.89	2 390 023	11.83	- 3.49
Total	19 212 185	..	20 206 893	..	5.18

Source: Public Enterprise Vode Srpske, 2017 budget.

In 2015, total collected water fees amounted to 19,212,185 KM and 20,202,893 KM (+5.2 per cent) had been planned for 2016 (table 3.9). In 2015, 67.8 per cent of revenues came from special taxes for water protection – mainly vehicle registration fees (37.1 per cent) and wastewater fees (28.6 per cent); 19.3 per cent came from special water fees for water use and 12.9 per cent from extraction fees. Of special fees for water use (12.3 per cent), the highest share was paid by HPPs. An increase of about 5 per cent in revenues from all water fees was planned for 2016, due to the strong increase in fees collected for water use (more than 24 per cent, with the relative share increasing from 19.3 per cent to 22.8 per cent) and a slight increase in fees collected for water protection (1.4 per cent), which were only partially compensated for by the reduction of 3.5 per cent in fees for extraction.

As for the use of revenues from water, in 2015, 94.5 per cent of Vode Srpske's total expenditure was current expenditure; only 5.5 per cent was capital expenditure for investment in non-financial assets (table 3.10). For 2016, a 7.5 per cent increase in total expenditure was planned, with a significant increase in investment (from 445.014 KM to 1.351.194 KM, from 5.5 per cent to 15.4 per cent of total expenditure) and wages (from 2.540.000 KM to 3.572.50 KM, from 31.1 per cent to 40.7 per cent of total expenditure), and a 25 per cent decrease in purchase of goods and services (from 5.127.833 KM to 3.854.951 KM) (from 62.8 per cent to 43.9 per cent of total expenditure).

No detailed information about the use of water revenue collected by municipalities is available.

Forests

In Republika Srpska, there are 24 public enterprises involved in forestry activities and most of their revenues (about 91 per cent) come from selling wood products. The Government settles the price of wood; the current price was fixed in 2013.

Public enterprises pay 10 per cent of their revenue to local municipalities for rural development. Ten per cent of net revenue is used for the reproduction of the state forests and 90 per cent for salaries and profits (table 3.11).

Currently, the public forestry enterprises are economically underperforming and providing limited resources for forest management improvements and infrastructural investment, which risks leading to the progressive deterioration of the valuable forest heritage and damage to all related economic activities.

Air pollution

No air pollution tax is operative in Republika Srpska and payments from energy and energy tariffs, representing the main source for financing investments in energy saving, efficiency and infrastructure, do not provide sufficient financial resources. On the other hand, an increase in tariffs conflicts with the problem of household affordability and with the negative effects on the competitiveness of energy-intensive national enterprises and on electricity exports, which currently represent a relatively positive item in Bosnia and Herzegovina's balance of payments.

The unavailability of financial mechanisms represents one of the key obstacles to the implementation of energy efficiency measures and to financing or incentivizing investment in green energy production. The limited financial resources available have been mainly addressed to improving the energy efficiency of public buildings, financed within international projects: 17 buildings have been fully reconstructed in Republika Srpska, leading to significant savings in expenses (between 40 per cent and 50 per cent) and the Government is currently planning to implement further energy efficiency projects in 31 public buildings, which will be financed from a World Bank loan (US\$13 million with a repayment period of 25 years and interest rates below 1.5 per cent). The potential of the Clean Development Mechanism has not been considered.

Very low attention and investment has been devoted to stimulating private energy savings and efficiency, reducing emissions from transport and encouraging greener energy production.

According to official sources, the owners of many private buildings would be willing to invest their financial resources in energy efficiency and are asking for public co-financing or bank loans. However, no public resources are currently available for the private sector and interest rates on bank loans are too high.

The main interventions actually under examination are the design of revolving funds devoted to co-financing private interventions in the energy sector and the use of geothermal water in the heating systems of public institutions, using savings to reduce emissions.

Table 3.10: Vode Srpske's expenditure in Republika Srpska

	2015		2016 (planned)		Change (%)
	KM	(%)	KM	(%)	
Current expenditure	7 719 786	94.55	7 427 521	84.61	- 3.79
Salaries and wages	2 540 000	31.11	3 572 570	40.70	40.65
Goods and services	5 127 833	62.80	3 854 951	43.91	- 24.82
Grants	51 953	0.64	..	0.00	- 100.00
Non-financial assets	445 014	5.45	1 351 194	15.39	203.63
Total	8 164 800	..	8 778 715	..	7.52

Table 3.11: Taxation of forests and forestland use in Republika Srpska, KM

	2010	2011	2012	2013	2014	2015
Revenues aimed for development of underdeveloped parts of municipality	13 068 327	14 349 133	13 503 336	14 822 134	15 149 760	17 130 529
Revenues going to public forests	9 307 492	10 049 490	9 660 524	10 844 950	11 353 707	13 041 800

Note: Calculation: 10 per cent of total sum of sold wooden "sortiment" (line of products/timbers).

Waste

Waste collection fees are largely determined by municipal decisions and differ from municipality to municipality. A recent study found that, for example, in the 51 municipalities analysed, the per-person fee ranges from 0.64 KM to 3.10 KM, the per-household fee varies from 4.60 KM to 15 KM and the fee calculated per square meter from 0.09 KM to 0.137 KM.

In addition, enterprises use different accounting methods and most of them combine their fees with other communal charges such as water supply; thus, it is not possible to disentangle costs and revenues associated with waste services from other services provided by the same company.

Along with the lack of regulations, the use of economic instruments to incentivize virtuous behaviour, which would also allow pricing of the separate collection, recycling and reuse of waste, is not widespread in Republika Srpska.

Large financial funds are required to overcome major problems, represented by inadequate structure and illegal landfills and dumpsites. Significant funds would be required to significantly improve waste management structures and to close and remediate illegal landfills and wild dumps. According to information from EnvIS 2014 (Landfill Directive Specific Implementation Plan for Bosnia and Herzegovina–EuropeAid), the financial resources required for remediation of illegal landfills amount to €4,238,970 and for remediation of local landfills to €6,163,112. Some progress in waste management has been made recently through the initiative by private waste companies and within international projects and funding. Progress has been mostly in respect of industrial waste, while almost nothing has been done in respect of household waste.

Only one special fee is currently in force in Republika Srpska, the fee on packaging, paid mainly by importers. The fee revenue goes mainly to the Environmental Protection and Energy Efficiency Fund, which uses it to co-finance projects mobilizing private sector financial resources. According to the Fund, the rate of mobilization is usually high: last year the Fund spent 1.6 million KM of public resources for co-financing projects on waste separation and mobilized about 1.7 million KM of private investment in infrastructures – a mobilizing rate higher than 100 per cent. Thematic working groups comprised of representatives of the environmental funds of both the Federation of Bosnia and Herzegovina and Republika

Srpska are working on the issue of special wastes other than packaging to be included in the Law on Waste.

A useful financial support, also from the Environmental Protection and Energy Efficiency Fund, is for co-financing municipalities for landfill sanitation. Resources are assigned 70 per cent of the basis of public input (called for once a year, more or less) and 30 per cent by the Government for strategic projects.

The Fund also contributed to one small project to finance small households. As an example of good practice, in 2014 the Fund co-financed (€30,000 from Fund and €140,000 from a private company) a project to install a machine for the burning and melting of sanitary wastes from the biggest hospital in Banja Luka.

Actions are required to develop the separate collection, recycling and recovery, treatment and pre-treatment of waste. They could be financed by revenues from waste producers or by environmental taxation. But in Republika Srpska, as in the rest of Bosnia and Herzegovina, these opportunities conflict with the low income of households and the affordability problem, the same problems that are definitely at the origin of the illegal dumpsite development and low fee collection rates.

The inadequate capability of the domestic funding system requires, especially in the waste sector, attracting financial resources from abroad. Funding requirements in the shorter term should rely mainly on international projects and donors or on general taxation.

On the other hand, improvements in efficiency management and progress towards market liberalization should in future gradually provide a further source of finance for technological improvements and infrastructural investment.

3.2 Greening the subsidies system

In Bosnia and Herzegovina, price subsidies and cross-subsidization characterize electricity, water and fossil fuel consumption. As a consequence, the effects of implemented pricing measures (tariffs, fees) on behaviour is limited and their proper functioning as effective economic instruments for environmental protection is hampered. Rationalization of the tax/subsidies system is required, taking into account affordability issues, i.e. the implementation of fiscal reforms reducing the fiscal burden on other sources and increasing it on environmentally harmful practices.

3.3 Investing in environmental protection and green economy

Environmental funds and other environment-related funds

At the entity level, the environmental protection funds collect a share of environmental revenues and allocate resources for environmental projects. Revenue collection and allocation are defined by several different regulations.

Federation of Bosnia and Herzegovina

The Environmental Protection Fund of the Federation of Bosnia and Herzegovina was established under the Law on the Environmental Protection Fund of the Federation of Bosnia and Herzegovina and began operation in 2010. In accordance with the Law, the Fund is a structured, non-profit, financial institution with the status of a legal entity with rights, obligations and responsibilities set out in the Law and the Statute of the Fund.

Under the Law, the Fund is responsible for collecting revenues as well as stimulating and financing the preparation, implementation and development of programmes, projects and similar activities pertaining to environmental protection and preservation, and sustainable use and improvement of the state of the environment, for the purpose of achieving the objectives set out in the Environmental Protection Strategy of the Federation of Bosnia and Herzegovina.

The purpose of the Fund is reinvesting the revenue collected from charges into local communities through implementation of environmental programmes and projects adhering to the principle of maximizing environmental benefits while making the best use of available resources.

As a central federal mechanism for environmental protection financing, the Fund has had a number of achievements, allocating approximately KM 55 million to the implementation of 441 projects.

In addition, pursuant to the Law on the Environmental Protection Fund, the Fund has allocated 70 percent of collected fees, to the tune of 43.4 million KM. The Fund proved to be a support to the authorities at all levels and to the economy, in times of economic crisis, natural disaster and floods. Tasks ahead of it include the establishment of revolving funds to finance projects in energy efficiency, water protection and waste recycling.

3.4 Legal and policy framework for greening the economy

Legal framework

Federation of Bosnia and Herzegovina

Law on Energy Efficiency in the Federation of Bosnia and Herzegovina

The Law on Energy Efficiency entered into force on 1 April 2017. It aims to achieve sustainable energy development and mitigate adverse environmental impacts, increasing the security of the energy supply. The main purpose of the Law is to increase energy efficiency and, in this respect, it introduces several important novelties.

First, the Law introduced the establishment of an agency for energy efficiency, authorized to operate to enhance rational use and savings of energy and to increase energy efficiency. The Law also introduced obligations for public procurement: when public procurement is financed with funds from the federal budget, cantons and municipalities are obliged to take into consideration the energy efficiency of the goods and services as an additional selection criterion.

According to the Law, energy audits will be performed only by legal and natural entities licensed by the Ministry of Spatial Planning of the Federation of Bosnia and Herzegovina.

Furthermore, sellers or lessors must indicate the energy characteristics of the building or the building unit they are going to sell or lease or rent out. For new buildings, the builder will be obliged to submit energy certificates for the energy use permit. This obligation was already foreseen in the Rulebook on energy certification, but it was not observed in practice due to the lack of penalty provisions.

The energy certificate shall be issued by an entity licensed to perform energy audits and shall be valid for a period of 10 years after its issuance. The Agency for Energy Efficiency will maintain the register of issued certificates.

Finally, the Law on Energy Efficiency introduces enforcement measures, prescribing monetary fines (in a range of 500–15,000 KM depending on the severity of the violation) for failures to comply with the Law.

Regarding forests, in spite of their economic and environmental relevance, the Federation does not yet have a forest law, although an advanced draft is currently in the approval process.

Table 3.12: Environmental Protection Fund of the Federation of Bosnia and Herzegovina, KM

Revenue	Expenditure		
	2015	2016 (planned)	2017 (planned)
Water fees (Law on Water)	6 562 880	6 759 767	6 962 560
Special water fees	4 254 629	4 382 268	4 513 736
General water fees	2 308 251	2 377 499	2 448 824
Water fees (vehicles)	14 945 540	15 393 912	15 855 730
Legal entities	5 064 830	5 216 775	5 373 278
Individuals	9 880 710	10 177 137	10 482 452
Air pollution fees	6 500 000	7 000 000	7 350 000
Waste	1 533 267	1 640 500	1 737 800
Plastic bags (legal entities)	330 000	300 000	309 000
Plastic bags (individuals)	267	500	500
Electronic waste	638 000	780 000	851 500
Packaging	565 000	560 000	576 800
Interest	169 720	162 000	162 000
Revenues of bank services (revolving fund)	0	14 167	51 160
Other revenue	54 024	615 930	20 000
Donations	21 831	20 000	20 000
Total current revenue	29 787 262	31 606 276	32 159 250
Revolving fund	0	0	161 292
Surplus transfer from previous year	13 713 131	15 826 769	13 150 387
Total revenue	43 500 393	47 433 045	45 470 929
Employee compensation	1 552 677	1 680 630	1 709 819
Salaries and allowances for employees	163 777	173 540	178 746
Contributions charged on employers			
Cost of materials	1 159 708	1 548 043	1 589 938
Current			
Project for Government of the Federation of Bosnia and Herzegovina	24 717 468	41 805 832	39 892 432
Water	4 167 361	6 419 662	6 700 000
Studies	313 533	2 519 597	2 792 351
Network monitoring air quality	150 000	250 000	200 000
Projects for inter-entity collection	0	200 000	200 000
Projects on environmental protection	0	500 000	600 000
Projects on land protection and remediation	0	881 967	903 920
Other projects on environmental protection	3 386 140	10 418 017	6 300 000
Improvement in energy use	0	1 400 000	2 000 000
Emergency projects	1 359 265	1 930 000	2 000 000
Projects co-financed by international institutions	70 000	1 272 500	1 607 500
Capacity-building	0	100 000	100 000
Current transfer to cantons	15 243 069	15 886 089	16 460 661
Refunded resources for wrong	28 000	28 000	28 000
Total current expenditure	27 593 630	45 208 045	43 370 935
Purchasing of fixed assets	80 000	225 000	100 000
Loans form revolving fund	0	2 000 000	2 000 000
Total expenditure	27 673 630	47 433 045	45 470 935

Republika Srpska

Together with the Law on Environmental Protection, the 2013 Law on Waste Management introduces the polluter pays principle, and the obligation for a waste holder to take adequate measures for the management of waste and to provide basic measures for the prevention of waste, recycling and treating waste for reuse, extraction of raw materials and energy recovery, and safe disposal of waste. But beyond these first basic steps, progress is limited and waste management is still at a very early stage. Implementation of by-laws is hampered by several appeals to the Constitutional Court. Due to the lack of regulations in Republika Srpska, waste is managed in different ways in the different municipalities, by companies with different organizational structures and different revenue collection mechanisms and rules, varying both from municipality to municipality and in different areas of the same municipality (i.e. urban and rural areas). A study conducted in 2014 (Topic), analysing 51 municipalities in Republika Srpska, found three different methods in use to calculate fees for waste services. The most common was the per-household fee (20 municipalities) and the fee calculated per square meters of living space (19 municipalities), while a per-person fee is applied in 12 municipalities. Regarding air pollution, no emission limits exist in Republika Srpska, no air pollution tax is operative and, in general, market instruments are limited.

*Policy framework*Federation of Bosnia and Herzegovina

The Water Management Strategy of the Federation of Bosnia and Herzegovina 2010–2022 clearly expresses an economic concept of water price: "The water tariff should facilitate the recovery of costs and rationalize water use". It also foresees the harmonization of prices for households and business entities and the establishment of public–private partnership. In practice, however, these economic principles are not yet fully adopted.

Republika Srpska

The Strategy for Integrated Water Management of Republika Srpska for the period 2015–2024 clearly expresses an economic concept of water price: "The water price should provide full recovery of all costs of simple production, to cover investment and current maintenance costs of the system as well as full protection of the springs; and further, a certain part of expanded production, which refers to the research and planning of new systems." It also assesses that the polluter pays and consumer pays principles should guide tariff-setting to rationalize water consumption. Further, the Strategy foresees other measures: reduction of water losses in the distribution network and household installations, and upgrading the monitoring function in water supply systems.

Republika Srpska promotes power production from RES mainly through a feed-in tariff and prioritizing connection to the grid by renewable energy producers. However, the feed-in tariff does not follow the decreasing costs for renewable technologies (tariff digression), so it is ineffective in promoting technological cost reduction and results in large public expenditure.

There are no effective incentive programmes to stimulate the use of biomass or waste in the production of electric power, nor incentive schemes for biofuel, nor financial instruments to enhance industry investment in efficient cogeneration or household investment in energy efficiency. The only financial mechanism is loans from local commercial banks, but interest rates are too high relative to expected gains. No air pollution tax is operative in Republika Srpska and payments from energy and energy tariffs, representing the main source for financing investment in energy saving, efficiency and infrastructure, do not provide sufficient financial resources.

Sustainable Development Goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis relevant targets is described in box 3.2.



Box 3.2: Selected targets of the 2030 Agenda for Sustainable Development

Goal 1: End poverty in all its forms everywhere

Target 1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance

Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

Goal 5: Achieve gender equality and empower all women and girls

Target 5.a: Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws

Goal 10: Reduce inequality within and among countries

Target 10.1: By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average

Target 10.b: Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes

To reduce poverty is a key goal for ensuring sustainable development and requires attention being given to economic, social and environmental dimensions. Poverty reduction can be seriously harmed by inequalities, and reducing inequalities is both a goal of sustainable development and a means to realize it. Indeed, inequalities threaten long-term social and economic development and can breed social and environmental degradation, and sustainable development cannot be achieved if people are excluded from opportunities and services.

Bosnia and Herzegovina is one of the poorest countries in Europe. Acute poverty and high unemployment are widespread phenomena in the country but hit rural areas and women in particular. To consider gender equality and rural development in policymaking is fundamental – the basic key to social and economic development. The Government of Bosnia and Herzegovina, in cooperation with the Governments of Republika Srpska and Brčko District, should create an enabling environment to support inclusive growth and well-being and generate productive employment and job opportunities for poor and disadvantaged people, in particular in rural areas and for women, while not harming the environment.

A large range of targeted measures can be used to spur the development of green economic activities and reduce poverty and inequalities, safeguarding the country's valuable heritage of natural resources. In particular, the Government of Bosnia and Herzegovina, in cooperation with the Governments of Republika Srpska and Brčko District, should develop microfinance and introduce incentives for green economy start-ups, green jobs development and landowners associations, to spur sustainable economic growth based on the sustainable exploitation of natural resources and activities for greening the high-polluting traditional sectors.

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Target 8.3: Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

Increasing labour productivity, reducing unemployment, creating quality job opportunities and decent working conditions for all and improving access to financial services and benefits are essential components of sustained and inclusive economic growth.

To fill investment gaps in key sectors (including infrastructure, small and medium-sized enterprises (SMEs) and green economic activities), widening opportunities for private capital is essential to moving towards a more dynamic, sustainable and innovative economic system and allowing targets to be reached.

The Government of Bosnia and Herzegovina, in cooperation with the Governments of Republika Srpska and Brčko District, should attract private resources, both foreign and domestic, and improve investment conditions to direct them towards green economy initiatives. The Governments should develop proper institutional measures, implement economic instruments (i.e. fiscal reforms aiming to move the fiscal burden from good inputs, such as labour, to environmentally harmful inputs, such as natural resources consumption or pollution), improve the efficiency and profitability of public enterprises and develop infrastructure.

Target 8.4: Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Target 15.a: Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems**Target 15.b: Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation**

Improve natural resources efficiency and develop sustainable economic activities as means to reduce or improve the trade-off between socioeconomic and environmental dimensions, spurring economic growth and safeguarding the environment.

The country has an extremely valuable natural heritage and many national economic activities are based on the exploitation of natural resources, such as those related to forests (wood and wood products industries) and to water (energy sector).

Economic growth could be hampered both by degradation of natural capital and by limiting expansion of economic activities to protect natural resources. Bosnia and Herzegovina should modify current highly polluting consumption and production behaviours and spur green economic activities, including sustainable tourism, together with increasing expenditures for the preservation, protection and conservation of all of its natural heritage, and strengthening efforts to mobilize national and international financial resources.

Goal 12: Ensure sustainable consumption and production patterns**Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse****Target 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle****Target 12.7: Promote public procurement practices that are sustainable, in accordance with national policies and priorities****Target 12.c: Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.**

The country should ensure socioeconomically and environmentally sustainable consumption and production patterns as means to increase the quality of life while reducing the use, degradation and pollution of resources.

Waste and air and water pollution represent serious problems in the country. The Government of Bosnia and Herzegovina, in cooperation with the Governments of Republika Srpska and Brčko District, should address them by using a large range of available instruments, such as awareness campaigns and implementation of all measures effective in modifying behaviours and inducing households and businesses to adopt sustainable practices.

3.5 Conclusions and recommendations**Set-up of economic instruments**

Progress has been made since 2011 with regard to legislation considering economic instruments for environmental protection, but their implementation is limited and often not compliant with efficiency and effectiveness principles, while policies to exploit Bosnia and Herzegovina's green economy potential are substantially lacking.

Three main groups of issues have been identified that are not sufficiently addressed by the country's authorities. Addressing them would be useful to improve the efficiency and effectiveness of measures and to ensure satisfyingly sustainable economic growth:

1. The complex administrative structure, involving a high level of fragmentation and overlapping of responsibilities and competences;
2. The scarcity of available financial resources and the affordability problem;

3. The non-proper use of economic instruments for environmental protection and development of green activities.

The complexity of the administrative structure makes environmental policymaking particularly unwieldy in Bosnia and Herzegovina and necessitates strong coordination efforts to ensure consistency, effectiveness and synergy of environmental measures, including economic instruments.

Since 2011, progress has been made, with stronger exchange and collaboration efforts among entities and the more intense activity carried out by the Inter-Entity Coordination Body for the Environment. It was established in 2006, comprising eight members equally nominated by the entities' governments and meeting periodically.

However, further strengthening of central coordination would be desirable and appropriate to avoid the overlapping of plans and measures and to allow implementation of effective countrywide strategies.

In addition, the absence of a proper countrywide legal framework for data reporting and collection gives rise to a relevant issue of data transparency, homogeneity and availability. This problem is particularly relevant for economic instruments implemented at different levels of government and administration and prevents authorities from having a complete picture of the current situation and from adequately evaluating the socioeconomic effects of different measures, hampering effective and efficient policy formulation.

Recommendation 3.1:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should strengthen its role in:

- (a) *Monitoring and coordinating the design and implementation of economic instruments and planning coordinated and effective projects within the international cooperation framework;*
- (b) *Elaborating the legal framework for data reporting and accounting rules and supporting the establishment of databases;*
- (c) *Promoting studies and analysis on the effects of economic instruments and green economy.*

Implementation of economic instruments

A major issue that Bosnia and Herzegovina currently faces in the implementation of economic instruments for environmental protection and in the adoption of measures to support green economy developments is the shortage of available financial resources and the intractable affordability issues.

Weak economic conditions and the large presence of an inefficient and often unprofitable public sector, in particular in natural resources management and public utilities provision, limits the availability of financial resources for environmental protection, creating a vicious circle.

Inefficiencies and the underprofitability of the public sector largely reflect the need to support employment and national product competitiveness (e.g. the wood and wood processing industries maintain wood prices at low levels). In turn, inefficiency and underprofitability limit the resources available to allocate to environmental protection and discourage private capital flows, causing a progressive deterioration of natural capital and, given that the most important activities in Bosnia and Herzegovina are based on natural resources exploitation (wood, energy,

quarries and mines), a worsening of economic growth potential. In addition, the need to support household incomes and to keep production costs low conflicts with the implementation of measures that are fully compliant with efficiency and effectiveness principles and results in fees and tariffs being too low, the underpricing of natural resources and tolerance of activities damaging the environment (e.g. illegal logging).

In order to arrest this vicious cycle, it is necessary to attract private investment, increase the flow of international cooperation and environmental funding and spur green economic growth for strategically beneficial results.

Recommendation 3.2:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should:

- (a) *Organize the collection of detailed financial and technical data and elaboration of significant performance indicators and establish exhaustive databases of economic instruments implemented for environmental protection and green economy;*
- (b) *Reduce privileges and pursue the efficiency principle in public enterprises and gradually open up natural resources management to private operators;*
- (c) *Introduce incentives (e.g. tax reduction/exemption in the first years of activity or financial subsidies, grants and microcredit) for the starting-up of sustainable economic activities (e.g. sustainable tourism, fishing and fish farming, hunting, forest food production, organic agriculture);*
- (d) *Reinforce the use of economic instruments for environment protection in a context of fiscal reform, to move the fiscal burden from "good" inputs to "bad" inputs to improve the trade-off between environmental protection and socioeconomic issues, keeping in mind compensating for increases in fees and tariffs on natural resources by a reduction in the current high level of social contributions;*
- (e) *Strengthen efforts to promote flows of international funds, for example by boosting the use of the Clean Development Mechanism for investment in the most polluting traditional sectors and, given the role of forests as a carbon sink, in forest management and for rehabilitation of mined forestlands.*

Use of economic instruments

Laws and strategies generally clearly indicate the efficiency and effectiveness principles (consumer pays, polluter pays and cost recovery) as guidelines for environmental policies. In practice, however, the use of economic instruments to protect natural resources and to incentivize green economy growth has limited results and is often not compliant with these basic principles. Accounting for affordability and competitiveness issues, policymakers in Bosnia and Herzegovina should gradually reinforce and improve their use.

Recommendation 3.3:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should gradually:

- (a) *Improve accounting rules (in particular in local governments, public enterprises, PUCs and industrial waste consortia) to increase the transparency of revenue and expenditure and enable the calculation of performance indicators for each entity and for the different sectors (water, waste, etc.);*
- (b) *Fix fees and tariffs considering total costs, including capital costs;*
- (c) *Better link fee structures to the actual use or pollution of natural resources;*
- (d) *Eliminate cross-subsidization between different users and for improvements in metering systems (e.g. water consumption, emissions) and strengthen incentives towards rationalization of natural resources consumption;*
- (e) *Introduce regular revisions of tariff rates, accounting for inflation and efficiency improvements.*

Foreign investment

Fragmentation of private ownership and the presence of mined areas hamper proper forest management and represent major obstacles for the development of green economic activities in forestlands.

Recommendation 3.4(a):

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should strengthen efforts to attract foreign investments for technological innovations and infrastructural improvements related to forest activities and management, through participation in international projects and exploiting

the opportunities offered by international mechanisms.

Incentives

Recommendation 3.4(b):

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should:

- (a) *Incentivize the introduction of financial incentives for private forestlands owners e.g. public grants and microcredit, amendments to the tax systems to incentivize start-ups, particularly in green economic activities, and payments for ecosystem services provided by forests;*
- (b) *Incentivize the use of biomass for energy production, providing further financial resources for forest management and infrastructural investment and for forest-related economic activities;*
- (c) *Promote private forest owners associations.*

Tax on industrial air pollution

Recommendation 3.5:

The Governments of Republika Srpska and Brčko District should introduce a tax on industrial air pollution.

Law on forests and tariff digression

Recommendation 3.6:

The Government of the Federation of Bosnia and Herzegovina should:

- (a) *Approve the law on forests;*
- (b) *Introduce tariff digression in feed-in tariff design in order to account for decreasing costs of renewables technologies.*

Renewables and energy efficiency

Recommendations 3.7:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should:

- (a) *Introduce or extend the use of revolving funds and incentive mechanisms for the private sector, for both households and businesses, in particular for the use of biomass, waste and biofuels as energy sources and for investing in cogeneration plants;*

- (b) *Incentivize (and/or make investments) to spur the utilization of geothermal water as an energy source, in particular in aquaculture, agriculture and heating of settlements;*
- (c) *Address energy efficiency in the housing sector by applying new technologies and tax incentives;*
- (d) *Strengthen efforts to attract foreign capital, through donors and international projects, opening up to private enterprises and exploiting the opportunities offered by environmental international instruments.*

Waste management

Major issues facing Republika Srpska in the development of waste management are the absence of adequate infrastructure for the separate collection,

treatment and recycling of waste, illegal landfills and the lack of effective measures to incentivize reduction of waste production.

Recommendation 3.8:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should introduce:

- (a) *Economic incentives to spur forces towards circular-economy developments, modifying behaviours and fostering the separate collection and treatment of waste to stimulate its reuse and recycling, and also in energy production;*
- (b) *Extended producer responsibility;*
- (c) *Adequate enforcement measures (fines and controls) against illegal landfills and to provide resources for their remediation.*

Chapter 4

ENVIRONMENTAL MONITORING, INFORMATION, PUBLIC PARTICIPATION AND EDUCATION

4.1 Environmental monitoring

Monitoring networks

Little progress has been made since 2011 in developing a cohesive and comprehensive monitoring system or developing an environmental information system at the state level, including the development of a central database for environmental information. Data exchange between different public institutions is limited.

There is no standardized system of environmental data transfer and reporting of environmental data and statistics at the state level. There are individual systems of collecting and reporting data on the environment. The effect has been policy incoherence between the state and entity level as well as between entities.

Some achievements are to be highlighted, namely, strengthening the air quality monitoring network, improving water monitoring, emission monitoring of large emitters, establishing a pollutant emission cadastre, and developing pollution release and transfer registers (PRTRs).

Air

At present, there are 10 locations in Bosnia and Herzegovina that conduct air quality measurements. These locations include automated measuring stations to provide continuous monitoring in both urban and suburban environments, covering 16 automatic air quality measurement stations in the Federation of Bosnia and Herzegovina and 12 in Republika Srpska. The air quality monitoring system covers the following parameters: SO₂, NO, NO₂, NO_x, O₃, PM₁₀.

Recent progress includes the establishment of a website where it is possible to obtain information on the real-time state of air quality at the available measuring points in Bosnia and Herzegovina. The United Nations Environment Programme (UNEP) has recently opened two new air monitoring stations in Bosnia and Herzegovina (in Prijedor and Gorazde) and brought two existing ones (in Ivan Sedlo and Banja Luka) back to full function since 2011.

Even though progress has been made since 2011, monitoring of air quality is limited and done according to different methodologies. For instance, the Hydrometeorological Institute of the Federation of Bosnia and Herzegovina uses the CORINAIR methodology, while the Hydrometeorological Institute of Republika Srpska uses the IPCC methodology. There is consequently no aggregated air quality data available for the entire country. This might be aggravated by the low number of monitored locations (10) and the lack of cooperation and communication between the respective entities in charge of collecting air quality data. In addition, full implementation of quality control (QC) and quality assurance (QA) in Bosnia and Herzegovina is still lacking. The country also lacks estimates of the optimal number of monitored locations and air monitoring stations.

Water

There are at present 134 active hydrological stations, of which 119 are automatic gauging stations. The quality of groundwater is monitored only in areas where water is abstracted for public water supply. This means that the quality of groundwater resources is also only assessed based on the data on groundwater quality used for public water supply. The monitoring of bathing waters is not performed systematically, but according to needs and available funds.

Water monitoring in Bosnia and Herzegovina includes information and data on water abstraction and flow (including hydraulic geometry), microbiological quality, biochemical oxygen demand (BOD₅), calcium carbonate (CaCO₃), calcium (Ca), magnesium (Mg), iron (Fe), copper (Cu), chrome (Cr), nickel (Ni) and cadmium (Cd) in rivers, as well as microbiological quality and nutrients in fresh water (e.g. nitrate (NO₃), nitrogen (N), phosphorus (P)). Physical properties of water quality (e.g. temperature, pH, conductivity, dissolved oxygen) are collected for both rivers and fresh water.

Soil

The lack of systematic soil monitoring, a soil and land information system, and information on soil

contamination is primarily linked to the lack of specific laws at the state or entity level that address soil protection and/or monitoring. The limited information available is restricted to basic land structure and use, soil classes and land ownership structures.

Noise

No data on ambient noise are available in Bosnia and Herzegovina, since monitoring of noise is not carried out.

Vibration

There is no systematic collection of data on vibration being carried out in Bosnia and Herzegovina. Requirements to monitor vibrations may nonetheless be part of environmental permitting and associated measures for vibration management.

Radioactivity

There are 11 automatic stations in Bosnia and Herzegovina distributed across the entities, which perform continuous measurement of ionizing radiation in ambient air.

Biodiversity

No biodiversity monitoring system is in place to provide quality data on the status of biodiversity in the country (chapter 11).

Analytical laboratories

Accredited laboratories in Bosnia and Herzegovina are governed by the Law on Accreditation and the Institute for Accreditation of Bosnia and Herzegovina (BATA), the only national accreditation body. BATA is responsible for the accreditation of conformity assessment bodies (e.g. testing and calibration laboratories, bodies providing certification of quality and environmental management systems) that provide testing, certification and inspection services to state and/or entity administrations in Bosnia and Herzegovina, in accordance with BAS EN ISO/IEC 17011. There are at present 30 accredited laboratories throughout Bosnia and Herzegovina. BATA maintains an active database with all accredited laboratories in Bosnia and Herzegovina.

The Institutes of Public Health of the Federation of Bosnia and Herzegovina and Republika Srpska use standard international methods, such as EN ISO/IEC 17025, EPA and APHA, and the use of methods recommended by the equipment manufacturer HACH.

The Institutes, furthermore, implement and organize interlaboratory comparison tests at national and international levels and perform confirmatory analyses.

There are also accredited calibration laboratories, nominated metrology laboratories (in the field of verification) and bodies for conformity assessment of measuring instruments, which provide services for the Institute of Metrology of Bosnia and Herzegovina, e.g. covering testing of petroleum and natural gas and physico-chemical parameters of petroleum and organic pollutants.

Legal, policy and institutional framework

Legal and policy framework

There is legislation relevant to environmental monitoring at the state level, namely the Law on Statistics (OG BiH, No. 26/04); Regulation on inspection monitoring in the field of radiation and nuclear safety (OG BiH, No. 65/10) and Law on Accreditation (OG BiH, No. 19/01).

The Environmental Protection Laws of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District prescribe the obligation of monitoring and preparation of regular reports about the environment.

Laws on air protection in the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District set out the requirements for air monitoring.

According to the water acts in Republika Srpska, water agencies are obliged to organize, establish and manage a water information system for their management areas.

According to the Law on Water of the Federation of Bosnia and Herzegovina, the water agencies are obliged to organize hydrological monitoring and monitoring of water quality, monitoring the ecological status of surface waters, and monitoring groundwater, prepare a report on the status of waters and propose necessary measures. Meteorological activities are carried out by two entity institutes that together form a National Reference Centre for quality of water and air in Bosnia and Herzegovina. Hydrometeorological data produced by these institutes are essential for biodiversity management and effective nature conservation.

The Laws on Nature Protection in the Federation of Bosnia and Herzegovina and Republika Srpska prescribe the formation of a specialized institution on

nature conservation in the Federation of Bosnia and Herzegovina and Republika Srpska. This is implemented by the Institute for Protection of Cultural-Historical and Natural Heritage in Republika Srpska, while in the Federation of Bosnia and Herzegovina, this provision has not been implemented to date.

Institutional framework

State level

The Ministry of Foreign Trade and Economic Relations has no competence with regard to monitoring the environment.

The State Regulatory Agency for Radiation and Nuclear Safety oversees the regulatory control and safety of radiation sources, radioactive waste, storage and transportation. It is an independent administrative organization that executes its activities under direct supervision of the Council of Ministers of Bosnia and Herzegovina. It is located in Sarajevo, with regional offices in Republika Srpska (in Banja Luka) and the Federation of Bosnia and Herzegovina (in Mostar).

There is a memorandum of understanding (MoU) on mutual cooperation and support as regards the establishment of a national environmental monitoring system in Bosnia and Herzegovina, and the process of collection and preparation of statistics about the environment for reporting to the European Environment Agency (EEA) and European Environment Information and Observation Network (Eionet), managed by the Agency for Statistics of Bosnia and Herzegovina. The Agency for Statistics gathers data from stakeholders that are authorized to report certain environmental indicators (National Resource Centres), using a provisional set of indicators. A core set of indicators to be used for official reporting in Bosnia and Herzegovina has not been adopted to date.

Entities and Brčko District

Environmental monitoring is the responsibility of the Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Forestry and Water Management of Republika Srpska and the Department of Agriculture, Forestry and Water Management of Brčko District.

Air quality monitoring is carried out by meteorological institutes, namely, the

Hydrometeorological Institute of the Federation of Bosnia and Herzegovina and the Hydrometeorological Institute of Republika Srpska,⁵ and at times at the cantonal level, such as by the Department of Public Health of Sarajevo Canton, which operate local air monitoring stations and publish the data on measured pollutants.⁶

Water monitoring is under the competence of the Sava River Watershed Agency in Sarajevo (Federation of Bosnia and Herzegovina), Adriatic Sea Watershed Agency in Mostar (Federation of Bosnia and Herzegovina), Sava River District Water Agency in Bijeljina (Republika Srpska) and Trebišnjica River District Water Agency in Trebinje (Republika Srpska).

The entities and Brčko District are responsible for the monitoring of forests. In Republika Srpska, the Forestry Department within the Ministry of Agriculture, Forestry and Water Management is responsible for forest monitoring. In the Federation of Bosnia and Herzegovina, the Forest Office and the cantonal authorities are responsible for monitoring the forest sector.

Reporting on ionizing radiation in ambient air is done on an annual basis by the Hydrometeorological Institute of the Federation of Bosnia and Herzegovina and the Institute of Public Health of Republika Srpska.

Nature conservation in Republika Srpska is carried out by the Institute for Protection of Cultural-Historical and Natural Heritage of Republika Srpska, which maintains a Register of Protected Natural Resources and other data of importance for nature conservation, including operating its own database. No similar organization with comparable authority exists in the Federation of Bosnia and Herzegovina.

Participation in international agreements and processes

Bosnia and Herzegovina has participated in the regular meetings of the ECE Working Group on Environmental Monitoring and Assessment and the Joint Task Force on Environmental Statistics and Indicators since 2011.

Bosnia and Herzegovina has ratified the Convention on Nuclear Safety, which means that it also has to monitor ionizing radiation in accordance with the provisions of the Convention. The body responsible for this is the State Regulatory Agency for Radiation and Nuclear Safety.

⁵ See <http://www.fhmzBosniaandHerzegovina.gov.ba>.

⁶ See <http://air-monitoring.ba>.

4.2 Environmental information and public participation

Availability of information

Statistical data

The Agency for Statistics of Bosnia and Herzegovina, the Office of Statistics of the Federation of Bosnia and Herzegovina and the Institute of Statistics of Republika Srpska are responsible for some environment-related statistical information, including the collection and processing of environmental statistical data, provision of statistical forms and publication and dissemination of environmental statistics. The state and entity institutions post data on websites and publish data in the form of monthly, quarterly and/or annual publications. Indicators of environmental statistics are specified in the Publishing Programme and Calendar of statistical data and the publications of the Agency for Statistics of Bosnia and Herzegovina, following the European Statistics Code of Practice.

There is no standardized system of data transfer and reporting of data and statistics on the environment in Bosnia and Herzegovina. There are individual systems of collecting and reporting data in the environmental field. For instance, statistical institutions in Bosnia and Herzegovina collect data on the state of the environment through the implementation of the annual programme of statistical surveys. This is in line with the MoU on mutual cooperation and is meant to support the establishment and functioning of a national environmental monitoring system in Bosnia and Herzegovina.

Databases

There is no operational database with environmental information at the state level in Bosnia and Herzegovina. Therefore, there is only limited information available on the state of the environment and associated databases.

Available databases (not all publicly available) include:

State level

- State registry of radioactive sources;
- List of accredited laboratories in Bosnia and Herzegovina;
- Inventory of the post-war situation of land resources;
- Water Information System for Europe (WISE) database for Bosnia and Herzegovina.

Entity level

- Pollutant release and transfer register;
- Inventory of chemicals;
- Cadastre and land registry;
- Municipal and production waste database.

Environmental indicators

Environmental indicators for all areas of monitoring are published in a number of monthly, quarterly and yearly reports. Progress in producing and sharing the ECE core set of environmental indicators was reported on in 2014, where Bosnia and Herzegovina shared seven of the eight reviewed core indicators online. This was also reviewed in 2015 for the first progress report on the establishment of a shared environmental information system (SEIS), which found that Bosnia and Herzegovina share 42 of the 67 data sets underlying all the ECE environmental indicators online. This covers a set of 23 environmental indicators across seven thematic areas (air pollution, air quality and ozone depletion, climate change, water, biodiversity, land and soil, energy and waste), as part of an agreed list of environmental indicators.

Implementation of SEIS principles

The national SEIS performance score for Bosnia and Herzegovina, as reported in the first progress report on the establishment of an SEIS, was 58 per cent in 2016. While this performance score reflects an increase in the overall accessibility of environmental indicators, the generally limited access to relevant environmental information and data in Bosnia and Herzegovina remains significant.

Environmental reporting, publication of environmental data, indicator-based assessment reports

Bosnia and Herzegovina produced its first national State of the Environment Report in 2012. The report provides limited information on the state of the environment. This is principally due to the significant lack of relevant information and data (e.g. on biological diversity, climate change and land resources) on the environment.

The report links results on the state of environment with environmental policies and legislation in place and makes references to strategic documents. The report is in line with the ECE Guidelines for the Preparation of Indicator-Based Environment Assessment Reports in Eastern Europe, Caucasus and Central Asia. For instance, the State of the Environment Report follows the recommended

DPSIR framework and provides concrete and clear policy recommendations for the future.

The State of the Environment Report is accessible for free in printed and digital forms. However, the legislation that would oblige the State to prepare state of the environment reports at the state level in Bosnia and Herzegovina is not yet fully established and harmonized.

Official biodiversity data repositories are not established in Bosnia and Herzegovina. There is no adopted set of national indicators, no nature protection information systems in the Federation of Bosnia and Herzegovina and Brčko District, and no databases on inventory and identification of species and populations of invasive animals, etc. While Red Lists have been developed and approved at the entity level, there is no Red List at the state level which shows the status of threatened plant and animal species.

The absence of a Red List at the state level is due to the lack of harmonization, e.g. of methodologies used for compiling the Red Lists, and the entities do not follow the internationally recognized IUCN Red List Methodology. In addition, insufficient human capacities, including expert associates for nature protection (in all entity and cantonal ministries, professional institutions, managers of protected areas and NGOs) persist throughout Bosnia and Herzegovina.

Data on biodiversity and nature are not represented in the spatial data infrastructure databases of the Federation of Bosnia and Herzegovina and Republika Srpska, even though both these systems have the necessary functionality to embed biodiversity data (e.g. borders of protected areas) with other available geospatial data.

International obligations for biodiversity reporting in Bosnia and Herzegovina are carried out regularly; however, the absence of an organized system for collection, storage, processing and analysis of biodiversity data means that data is collected on an ad hoc basis.

Current data and information on forest resources in Bosnia and Herzegovina is comprised of statistical information based on the data from public forest enterprises and agencies for statistics, and the National Forest Inventory (NFI). Information on forest resources is based on taxation of forest stands under the responsibility of public forest enterprises. This data does not provide a comprehensive overview of forest resources (being limited to forest area and growing stock). The last NFI data are from 1964–

1968. These data have been used for national and international reporting on forest resources to date.

The Federation of Bosnia and Herzegovina is presently developing an integrated information system for forest management, which aims to standardize the data being collected on forests and improve the exchange of information within and between institutions responsible for forests. Republika Srpska also does not have a system to collect, store and analyse information on forests.

Access to information

Bosnia and Herzegovina is a party to the ECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention). The First National Aarhus Convention Implementation Report on Bosnia and Herzegovina was prepared in 2011. Efforts have been made by relevant environmental authorities, at the state, entity and canton levels, to increase public awareness with regard to citizens' rights to environmental protection and environmental issues. Examples include the preparation of promotional materials for Earth Day, World Water Day and the World Day for Environmental Protection.

The Laws on Environmental Protection of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District provide individuals and organizations with the opportunity to participate in decision-making processes. This includes obligations to encourage public awareness and participation as well as to facilitate access to relevant environmental information. Furthermore, there are judicial and administrative procedures in place through which the general public and/or organizations can take appropriate steps to initiate court proceedings. Finally, the Law on Environmental Protection requires the creation of environmental advisory councils that assist in the evaluation of SEAs and environmental plans and programmes, which should allow for input from individuals and organizations.

Laws related to access to information establish a general right of the public to access the information held by public authorities, including a general obligation of making all relevant information public. Access to public information applies to information held by all public bodies, regardless of format. It does not apply to private organizations and companies. The laws entitle every person to access to public information. The prescribed period of time for obtaining the requested information is 15 days from the submission of the request. Under the freedom of

information laws, public authorities are both obliged to provide access to documents and records and to publish the most important information without a request having to be made.

One major problem with regard to the freedom of information laws in Bosnia and Herzegovina is the weakness of the provisions for appeal procedures in the event a request is rejected. For instance, the freedom of information law of Republika Srpska does not stipulate an appeal procedure at all. Another problem concerns the lack of compliance with other existing laws that exclude or reduce the right to free access to information, in both the Federation of Bosnia and Herzegovina and Republika Srpska. Only a small number of public bodies comply with the obligation to publish information on the number of questions received related to freedom of information on a regular basis.

Access to justice

The High Judicial and Prosecutorial Council of Bosnia and Herzegovina was set up as an independent and autonomous institution in 2004 with the mandate to maintain an independent and accountable judiciary in Bosnia and Herzegovina, including ensuring equal access to justice (OG BiH, No 25/04, 93/05, 48/07, 15/08).

Access to justice is, however, not guaranteed in Bosnia and Herzegovina, principally due to the lack of harmonized legislation and a systematic approach to

developing legal standards at the state level. This is particularly the case, for example, for certain marginalized segments of the population in the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, where free legal aid is only available in a limited number of jurisdictions, even though the general public has rights to free legal aid services.

Progress has nevertheless been made with regard to access to justice in environmental matters. For instance, Aarhus Centres have been opened in Sarajevo, Tuzla and Banja Luka in the last few years. These Centres have improved communication between the public and relevant institutions at the entity level and provided the opportunity to involve the public in decision-making that has a direct impact on the environment. Examples include the legislation on freedom of access to information, which helps to ensure legal accountability and access to environmental justice, setting out the conditions by which the public should be able to access information and how they can pursue litigation (e.g. appeals and lawsuits) to promote justice.

But despite progress being made in reforming the justice sector, the rule of law in Bosnia and Herzegovina remains weak. Continued efforts are needed to strengthen the ability of judicial institutions to provide access to justice on environmental matters, such as improving cooperation between state and entity justice sector actors.



Box 4.1: Target 12.8 of the 2030 Agenda for Sustainable Development

Goal 12: Ensure sustainable consumption and production patterns

Target 12.8: By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

Goal 12 will require a strong national framework for sustainable consumption and production in Bosnia and Herzegovina, a framework that is integrated into national and sectoral plans and business practices in order to have an impact on citizen behaviour. This would have to be coupled with the implementation of international norms as regards the management of hazardous chemicals, waste and air pollution, etc.

There is a lack of various indicators and environmental information and data to create an overall image of the state of the environment in Bosnia and Herzegovina. Nor is there a joint (or central) programme for environmental monitoring and information management at the state level that could provide a consolidated overview of all citizens and legal residents in Bosnia and Herzegovina. Consequently, environmental information is not only fragmented and incomplete but also difficult for citizens to access and understand as it is spread across institutions and platforms.

In order to achieve Target 12.8, Bosnia and Herzegovina should:

- (a) Improve accessibility to environmental information and data with regard to sustainable development and raise awareness of how citizens might improve their lifestyles in harmony with nature;
- (b) Raise awareness based on environmental information;
- (c) Ensure dissemination of environmental information to the public.

Photo 4: Informal collection of waste for recycling

Sustainable Development Goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis Target 12.8 is described in box 4.1.

Public participation

NGOs

Environmental activities are regulated by state laws on associations and foundations (OG BiH, No. 32/01, 42/03, 63/08, 76/11, 94/16). These laws provide NGOs with rights that range from being able to operate across entities to initiating court procedures.

Some NGOs contribute to enforcing the law on access to public information and to monitoring its application and collecting relevant data through the submission of freedom of information requests as well as starting appeal procedures. Examples include the Balkan Investigative Reporting Network (BIRN), Transparency International and Center for Investigative Reporting. Most of the activities carried out by NGOs, however, are focused on awareness-raising and education with regard to the environment.

The participation of NGOs in environmental policy formulation and development is at a low level (e.g. participating in EIA). For instance, NGOs do not participate in meetings of the Inter-Entity

Coordination Body for the Environment nor the supervisory boards of the environmental funds, and do not receive any financial support from environmental authorities at the entity level.

4.3 Environmental education and education for sustainable development

Integration of environmental education and education for sustainable development into curricula

Primary and secondary schools

The Common Core Curriculum (minimal common contents that should be included in all curricula) for the subjects in the social-humanist field (OG BiH, No. 3/16) states that one of the cornerstones of teaching is training for environmental protection and environmental improvement. The Common Core Curriculum for schools determines education related to ecology. Education on sustainable development is principally linked to education on environmental protection through school subjects such as Biology and "Nature and society", as well as through the work of school clubs.

General environmental education is part of the curricula for preschool, primary and secondary education. In programmes for preschool education, preschool children learn about nature and environmental protection (including excursions and

various ecological activities). The school curriculum for pupils aged 6 to 10 offers subjects such as "My environment", "Nature", "Knowing nature" and "Nature and society". The objective of these subjects is to develop ecological consciousness and accountability towards the environment, as well as developing interests and readiness for learning about the environment, including its protection.

In higher grades, at the age of 11 to 14, children learn about the environment through subjects such as "Biology of flora", "Fauna", "Ecology" and "Endangered species in Bosnia and Herzegovina and the Balkans". For instance, in the 8th grade, children learn about ecosystems, protected areas, Red Lists and various kind of pollutants, including their negative influences on nature and people. The main objective of the Core Curriculum in Bosnia and Herzegovina is to provide students with comprehensive knowledge of ecological principles and to develop ecological consciousness (e.g. building a positive attitude towards the role of people in environmental protection). For example, the curricula for gymnasia in the canton of Sarajevo apply a multidisciplinary approach with regard to environmental protection to develop knowledge on ecology and biodiversity.

Vocational training

Some vocational education and training schools, such as the Secondary School for Wood Design and Ecology in Sarajevo, offer programmes for occupations linked to ecology and nature, e.g. for ecological technicians and rangers.

Higher education

Faculties for Nature Sciences and Forestry (e.g. University of Sarajevo, University of Mostar, University of Banja Luka and University of Tuzla) offer study programmes for ecology within Biology or Forestry, or separately as Ecology or Ecology and Environmental Science in the first cycle of studies. Students deepen their knowledge through various Master and PhD programmes, such as the sustainable management of forests, plant ecology, etc. Private and international universities in Bosnia and Herzegovina also offer study programmes and have faculties for ecology (e.g. in Travnik and Banja Luka) and programmes on tourism and the environment (European University of Brčko).

Training of teachers

No information or evidence could be found that teachers are receiving continued training on environment-specific and sustainable-development-

related topics. The continued training of teachers on environmental topics principally includes their participation in expert bodies for teachers and collective research activities within topics important to the teacher's professional development. This is supported by the European Training Foundation, which has stated that continued training of teachers principally consists of teachers undertaking research on their topic of specialization (e.g. literature reviews) and basic discussions and presentations that would, if applicable, relate directly to the environment.

Training and retraining of civil servants

Training remains principally supply driven and largely dependent on external financing. No information or evidence could be found that civil servants are receiving continued training on environment-specific and sustainable-development-related topics.

Informal and non-formal education

No information or evidence could be found on informal and non-formal education with regard to environment-specific or sustainable-development-related topics.

Participation in international agreements and processes

Even though education for sustainable development seems not to be reflected in any national policy document, Bosnia and Herzegovina participates and reports on the implementation of the ECE Strategy for Education for Sustainable Development.

4.4 Assessment, conclusions and recommendations

An integrated environmental monitoring and information system is not in place. Bosnia and Herzegovina does not have an adopted set of indicators. The country lacks necessary data for creating possible indicators. There is a lack of databases and information systems that would structure the environmental information and data and enable dissemination, vertical and horizontal cooperation for the operational and official flow of data, communication and coordination, including the exchange of data among the institutions that collect data for international reporting.

Access to information, public participation and access to justice

Members of the public have access to limited environmental information and data. There is a lack of

coordination between the various agencies responsible for environmental monitoring and protection, such as the inter-agency entities.

Recommendation 4.1:

In line with the provisions of the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should:

- (a) *Enhance legislative and institutional frameworks to ensure effective access to information, public participation and access to justice;*
- (b) *Conduct training for relevant authorities to build their capacity to organize effective public participation procedures.*

Integrated environmental monitoring systems

Enhancing air quality monitoring will be fundamentally important to improving overall air quality throughout Bosnia and Herzegovina, and to ensuring that the public has access to relevant information and data. This is particularly important given that Bosnia and Herzegovina has the highest European mortality rates attributed to indoor and ambient air pollution according to the 2017 WHO statistics. It would be relevant to continue developing and advancing the information system technologies underlying the air quality monitoring system.

Significant improvements in making environmental information and data available on the state of the environment are required. It would be particularly relevant to ensure that the ECE set of environmental indicators is being produced and published. Among other things, this would require that the relevant ministries address the significant environmental data gaps (e.g. on land and soil) as well as improved data collection, application and exchange between environmental information systems to ensure that environmental monitoring in the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District is harmonized.

Recommendation 4.2:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should:

- (a) *Establish integrated environmental monitoring systems based on a harmonized*

methodology, including all missing media, such as forests, land use, soil and environmental noise, and make data publicly available;

- (b) *Assess social, economic and health impacts from environmental pollution and make results available.*

Environmental monitoring and data collection

Environmental monitoring is not systematic. It is important that all relevant entity authorities establish a harmonized programme for environmental monitoring and information management that is in line with the principles of a shared environmental information system (SEIS), including the strengthening of environmental statistics.

Information and data are either partially or completely lacking for many environmental indicators. Some data are not measured and/or collected. There are no harmonized (administrative and methodological) approaches, legislative frameworks relevant to the environment and agreement among the statistical agencies on the types of information relevant to the planning and design of environmental monitoring and method of processing data, including the establishment of data validation systems.

The general lack of environmental information and indicators makes it difficult to provide an overall image of the state of the environment in Bosnia and Herzegovina. A mandatory set of environmental indicators (in compliance with international methodologies) across the entities has not been adopted.

NGOs are not usually engaged to help in improving the collection of environmental information and data. The Association for Research and Conservation of Biodiversity did contribute towards establishing a system for collecting information on the state of biodiversity in Republika Srpska. Harnessing such collaboration could contribute towards improving the overall environmental monitoring system.

Recommendation 4.3:

The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska and the Government of Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina and other relevant public authorities, should:

- (a) *Establish a joint programme for environmental monitoring and information management;*
- (b) *Adopt a common set of environmental indicators in compliance with international methodologies;*
- (c) *Extend open access to environmental data and information in line with the principles of a shared environmental information system;*
- (d) *Continue the implementation of a shared environmental information system to decrease the segregation of information systems and data flows;*
- (e) *Strengthen capacity for the collection of data on the state of the environment;*
- (f) *Establish a data validation system that would be used to check all the environmental data and information collected, as well as the way in which they have been collected;*
- (g) *Strengthen cooperation with relevant environmental NGOs to enhance data collection capabilities.*

Environmental education and education for sustainable development

Most of the environment-related education in school curricula is in the natural science area. Education on sustainable development has been reduced to education on environmental protection through school subjects (e.g. Biology, "My environment", "Nature and society") and through extra-curricular school activities. The limited education on sustainable development, and awareness on the state of the environment, would have to be improved. It would be necessary to take into consideration all sustainable development principles, such as participation in democratic decision-making and economic aspects of education for sustainable development.

Recommendation 4.4:

The Ministry on Foreign Trade and Economic Relations of Bosnia and Herzegovina and all other relevant authorities at the entity and cantonal levels should increase the relevance of awareness development about environmental protection and conservation in the educational sector and educational strategies for sustainable development in the country.

**PART II: DOMESTIC – INTERNATIONAL
INTERFACE**

Chapter 5

IMPLEMENTATION OF INTERNATIONAL AGREEMENTS AND COMMITMENTS

5.1 Global and regional agreements

Participation

Bosnia and Herzegovina is party to a number of global and regional multilateral environmental agreements (MEAs), and has stepped up efforts in recent years to ratify several agreements, including recent ones such as the Paris Agreement.

Bosnia and Herzegovina is usually represented at the most relevant meetings of MEA decision-making bodies by one representative, though in some cases, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), its participation is not regular. NGO representatives are never included in the Bosnia and Herzegovina delegations, neither are they involved in the preparation of the Bosnia and Herzegovina position for international meetings. NGOs are rarely involved in the preparation of national reports on the implementation of MEAs.

There is a general absence of information provided to the public by the environmental authorities on the status of participation of Bosnia and Herzegovina in global, regional and bilateral agreements and on the implementation of those agreements, including the reports submitted.

Conservation and sustainable use of biodiversity and nature

Convention on Wetlands of International Importance Especially as Waterfowl Habitat

Bosnia and Herzegovina has been party to the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) since 1992.

The designated Administrative Authority is the Ministry of Foreign Trade and Economic Relations, and the Ministry of Physical Planning and Construction of Herzegovina-Neretva County is the designated National Focal Point. The country has not yet designated focal points for matters relating to the scientific and technical review panel nor for matters

relating to the programme on communication, education, participation and awareness. The country has complied with the reporting obligations under the Ramsar Convention.

Currently, there are three Ramsar Sites in Bosnia and Herzegovina, with a surface area of 56,779 ha: Hutovo Blato, since 2001; Bardaca Wetland, since 2007; and Livanjsko Polje, since 2008. These sites categorized as Wetlands of International Importance have all been designated as Important Bird and Biodiversity Areas (IBAs). In the Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina 2015–2020, the intention to confer to Livanjsko Polje the status of protected area is assumed. However, the law on protected landscape has not yet been adopted and therefore the intention regarding Livanjsko Polje has not yet been realized.

Hutovo Blato, which was declared a Nature Park in 1995, was listed in the Specially Protected Areas of Mediterranean Importance in compliance with the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention), due to its importance for migration to a large number of wetland birds. Although hunting has been forbidden in Hutovo Blato since 1995 (except for some species in very specific circumstances), due to a lack of staff and inadequate control between 2008 and 2013 illegal hunting occurred. Since 2013, the monitoring of illegal activities has been intensified and better cooperation with local communities, hunting associations and the police has been established, which led to a decrease in illegal hunting activities. The decrease in illegal hunting had very positive effects in the improvement of the situation for migrating birds. Monitoring of birds and of illegal hunting in Hutovo Blato are performed by the Ornithological Society "Naše ptice" (Our Birds).

Bosnia and Herzegovina is part of the Mediterranean Wetlands Initiative (Medwet) under the Ramsar Convention. Within this framework, some activities have taken place in Bosnia and Herzegovina with the support of several organizations such as WWF Adria, EuroNatur, Ornithological Society "Naše ptice",

Youth Centre Livno, Dinarica and Centre for Environment.

In its reports to several conventions – mainly the Convention on Biological Diversity (CBD) and United Nations Framework Convention on Climate Change (UNFCCC) – Bosnia and Herzegovina recognizes the importance of preserving wetlands and the challenges they face in terms of vulnerability, for instance to climate change. Nonetheless, and even though some activities have been developed in recent years, in particular in the promotion of wetlands awareness, scientific research and monitoring, several shortcomings remain with regard to the Ramsar Sites and their management. Bosnia and Herzegovina does not have a national wetland inventory or inventories at the state or entities level. None of the three Ramsar Sites has a management plan.

The project Mainstreaming Karst Peatlands Conservation into Key Economic Sectors – KARST, implemented by UNDP in the period 2009–2013, provided inputs for the implementation of the Ramsar Convention. Its main objective was to strengthen the policy and regulatory framework for mainstreaming the requirements for conservation of karst and peatland biodiversity into productive sectors (mining, water use) and spatial planning at cantonal level.

The main priorities in the context of implementation of the Ramsar Convention are raising awareness, improving the management and updating information of Ramsar Sites and wetlands in general, fostering strategic networking and cooperation at regional level and maintaining the ecological character of Ramsar Sites and of all the wetlands in Bosnia and Herzegovina.

Convention on International Trade in Endangered Species of Wild Fauna and Flora

Bosnia and Herzegovina acceded to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2009. The Department of Environmental Protection of the Ministry of Foreign Trade and Economic Relations is the Managing Authority (MA). The Scientific Authority has not yet been designated.

From 2009, one biennial report on legislative, regulatory and administrative measures taken to enforce the Convention was submitted covering the period 2013–2014. The CITES MA developed an electronic tool to monitor and report on data on legal and illegal trade, which supports the country in fulfilling its obligations regarding the submission of annual reports on CITES trade. The MA has also

engaged in exchange of information with the MA of Croatia and Serbia.

The country does not have in place a legal framework for complying with CITES and therefore does not have a solid basis for its implementation. To fill the existing gap, a Decision on the conditions and procedures of the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora in Bosnia and Herzegovina was adopted by the Council of Ministers of Bosnia and Herzegovina in March 2017 but will only be in force after publication in the *Official Gazette*. The Decision regulates conditions and requirements for import, export, entry, exit or transit, trade and breeding of endangered and protected plant and animal species, their parts and derivatives; issuance of permits and other documents (certificates, opinions); marking of animals and shipments; supervision, registration and reporting.

In view of the significant delay in the implementation of the Convention, it is essential that an effective licensing system and an efficient institutional model be put in place simultaneously with the entry into force of the 2017 Decision. Moreover, it is crucial to identify the training needs of all actors who will have to be involved in CITES implementation, from the MA staff to the focal points at the entity level, customs officials, the police and inspection authorities. The early identification of capacity and training needs will facilitate receiving technical and financial assistant support.

Convention on the Conservation of European Wildlife and Natural Habitats

Bosnia and Herzegovina ratified the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) in 2008. Focal points have not been designated for the Bern Convention nor for the several groups of experts operating under the Bern Convention.

The country participated in some of the activities of the Convention and has hosted meetings, such as the ninth meeting of the group of experts on biodiversity and climate change held in Mostar in 2016. Reporting is compulsory for parties making exceptions to the provisions of the Convention, which was not the case of Bosnia and Herzegovina. Additional voluntary reports on the national implementation of the Convention have not been presented by the country, though it responded to the questionnaire on the mid-term review of the implementation by parties of the Tunis Action Plan 2013–2020 for the eradication of illegal killing, trapping and trade of wild birds.

In 2020, it is expected that the Emerald Network of Areas of Special Conservation Interest will be fully operational to guarantee the long-term survival of all species and habitats of European interest, including appropriate management, monitoring and reporting tools, compatible with Natura 2000, and that procedures for continuous updating of the data and evaluation of the long-term survival of the species and habitats have been put in place. The Emerald Network project in Bosnia and Herzegovina was initiated in December 2004 and resulted in the identification, in 2006, of 29 Areas of Special Conservation Interest (ASCIs) covering 4.9 per cent of the territory of Bosnia and Herzegovina. These 29 sites are currently included in the list of officially nominated candidates for Emerald Network sites, following the acceptance of the Standing Committee of the Bern Convention at its thirty-fifth meeting in 2015.

In addition, the Strategy of Bosnia and Herzegovina and Action Plan for the Protection of Biological and Landscape Diversity for 2008–2015 (in effect the first NBSAP) defined as one of its main pillars the development of the ecological network Natura 2000, while the NBSAP for 2015–2020 establishes as one of its key goals to map and evaluate the benefits from forest, agricultural and water ecosystems, and strengthen the environmental permit mechanism and supervisory inspection within protected areas, areas of special interest and areas in the Natura 2000 ecological network plan. Despite the change in the focus of the goal with regard to Natura 2000, its development in the country is still ongoing, including the identification of the most important areas for each individual species and type of habitat with a view to complying with the Birds and Habitats Directive in the context of the EU accession process.

Red Lists were developed and approved at the entity level. In 2012, Republika Srpska approved the Red List of Endangered Species of Flora and Fauna (OG RS, No. 124/12). In 2014, the Federation of Bosnia and Herzegovina approved the Red List of Endangered Wild Species and Subspecies of Plants, Animals and Fungi (OG FBiH, No. 7/14) (chapter 11).

Bosnia and Herzegovina has no provisions in place at either the state or entity level aimed at combating the illegal killing of birds. There are no actions aimed towards the conservation of bird species and implementation of measures, including legal measures, to reduce and monitor illegal hunting, taking and trade of wild birds.

Convention on the Conservation of Migratory Species of Wild Animals

Bosnia and Herzegovina is not a party to the Convention on the Conservation of Migratory Species of Wild Animals nor to the Agreement on the Conservation of African-Eurasian Migratory Waterbirds. There is no indication that the country has any intention of acceding to those instruments, even though it is crossed by a very important highway of waterbirds, especially in the coastal area adjacent to the Adriatic.

Agreement on the Conservation of Populations of European Bats

Bosnia and Herzegovina is a non-party range State to the Agreement on the Conservation of Populations of European Bats (EUROBATS). The Administrative Authority is the Ministry of Physical Planning and Environment of the Federation of Bosnia and Herzegovina, in collaboration with the Ministry of Urbanism, Civil Engineering and Ecology of Republika Srpska and the Speleological Association of Bosnia and Herzegovina. Reports were submitted for the years 2004, 2005, 2006 and 2009.

Before the 21st century, Bosnia and Herzegovina was one of the least studied countries considering bats in Europe. In the last 15 years, there has been a considerable increase in knowledge about bats and their distributions following the undertaking of systematic surveys on bats. The studies were initiated by bat researchers from Serbia, Slovenia and Poland and followed up by local researchers. The increase in data and findings on bats in Bosnia and Herzegovina was mainly due to the commitment of NGOs and academic research centres. These organizations also supported the drafting of national reports submitted to EUROBATS and promotion of awareness-raising initiatives for the conservation of bats in the country. The most active organization is the Centre for Karst and Speleology Sarajevo, which, under the project Protection of Bats in the Neretva River Catchment Area financed by the Critical Ecosystem Partnership Fund, created in 2013 a network of volunteer bat monitors to provide accurate data on the occurrence and activity of bat species in the Neretva Catchment.

Twenty-seven species of bats were identified in Bosnia and Herzegovina up until 2009; since then, three additional species have been identified, the most recent being the Pond Bat, in 2016. Although knowledge about bats in the country is much higher today than in the past, the conservation status of bats species is still far from well known.

Bosnia and Herzegovina is the only country in the region that is not a party to EUROBATS and does not have any specific legislation for protection of bats and their habitat, which also poses significant challenges for the conservation of these mammals.

Convention on Biological Diversity

Bosnia and Herzegovina ratified the Convention on Biological Diversity (CBD) in 2002. The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina is the Primary National Focal Point. The Faculty of Science at the University of Sarajevo is the national focal point for three different bodies, namely, the Subsidiary Body on Scientific, Technical and Technological Advice, Global Taxonomy Initiative and Global Strategy for Plant Conservation. The Protected Areas National Focal Point is the Faculty of Mechanical Engineering at the University of Sarajevo. In 2011–2012, Bosnia and Herzegovina chaired the Subsidiary Body.

The country has complied with its reporting obligations. The Fifth National Report was elaborated with the support of UNEP between 2013 and 2014, under the Global Environment Facility (GEF)-funded project Support to Bosnia and Herzegovina for the Revision of the National Biodiversity Strategy and Action Plan (NBSAP Bosnia and Herzegovina) and Development of the Fifth National Report to the United Nations Convention on Biological Diversity (UNCBD), and was submitted in 2014.

The country adopted the NBSAP for the period 2015–2020 in 2016. The NBSAP is the strategic framework for the implementation of the CBD's Strategic Plan 2013–2020 and the Aichi Biodiversity Targets. Five strategic goals are drawn from the Global Strategic Plan; 21 SMART targets are set, including monitoring indicators developed with support provided by the Biodiversity Indicators Partnership. For each target, measures, implementation timelines, activity levels (i.e. state, entity, district, canton, municipality), implementation holders, other participants and funding sources are defined. An Implementation Plan has also been prepared comprised of four separate plans: Communication Plan; Capacity Development Plan; Scientific Technology Development Plan and Resource Mobilization Plan.

The first NBSAP was prepared for the period 2008–2015. However it was only adopted in 2011 and its implementation fell short of what was defined. Nevertheless, progress was made with regard to the development of Red Lists for both entities, the establishment of gene banks, development and strengthening of biological and landscape diversity

conservation activities through the water management sector and raising public awareness on biodiversity. Progress has been achieved towards Aichi Target 1 (awareness increased), Aichi Target 2 (biodiversity values integrated) and Aichi Target 17 (NBSAPs). Areas in which progress was weaker relate to Aichi Target 3 (incentives reformed) and Aichi Target 10 (pressures on vulnerable ecosystems reduced), while modest progress was made towards the remaining targets.

Moreover, in 2013, the national Clearing-House Mechanism (CHM) was established, aiming to provide comprehensive biodiversity information through effective information services directed to all stakeholders, including the public and decision makers, and facilitate technical and scientific cooperation. At the 13th Conference of Parties to the CBD, in 2016, Bosnia and Herzegovina received an award for the best newly established CHM, by the decision of the special jury formed by the CBD Secretariat.

The strengthening of the legal framework in Bosnia and Herzegovina at the entity level must also be underlined. The Law on Environmental Protection of the Federation of Bosnia and Herzegovina was adopted in 2013 and the Law on Nature Protection of Republika Srpska in 2014, both of which aim at being in compliance with the EU Directives on Habitats and Birds.

There were residual improvements with regard to protected areas. There are currently 23 areas in Bosnia and Herzegovina that are officially protected, covering 100,455.02 ha, which constitutes 1.96 per cent of the territory. The percentage of protected areas increased from 0.55 per cent in 2003, to an estimated 0.84 per cent in 2011 and 1.96 per cent in 2014. However, it is still a small area in relation to the global average (17 per cent) and regional level (e.g. in Croatia, protected areas cover 8.44 per cent of the total territory and in Serbia 6.02 per cent of the territory is protected).

Both entities have included the intent to expand significantly the areas subject to a protection status. The Federation of Bosnia and Herzegovina, in its Spatial Plan (2008–2028), envisages the establishment of 14 new protected areas with a total spatial coverage of 18.5 per cent of the territory of the Federation. The Spatial Plan of Republika Srpska, in its initial phase (1996–2015), targeted placing 15 to 20 per cent of its territory under protection. Beyond the coverage, effective management of these areas does not seem to take place since they do not have management plans, specific budgetary allocations or sufficient (in number and capacity) staff. The absence of an adequate

biodiversity monitoring system in Bosnia and Herzegovina impairs the management and conservation of existing areas and weakens the appointment of new ones.

Although legal and programmatic reforms constitute positive steps, and despite efforts that have been made by the country to implement CBD requirements, challenges remain, the biggest of which will be the effective implementation of the NBSAP for the period 2015–2020.

Cartagena Protocol on Biosafety

In 2009, Bosnia and Herzegovina acceded to the Cartagena Protocol on Biosafety. The country is not yet a party to the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol. The Department for Safety of Production at the Food Safety Agency of Bosnia and Herzegovina is the Cartagena Protocol Primary National Focal Point. The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina is the Biosafety Clearing-House National Focal Point. The National Focal Point for Article 17 (Unintentional Transboundary Movements and Emergency Measures) is the Department on Pathogenic Microorganism at the Food Safety Agency of Bosnia and Herzegovina. The country complied with the reporting obligations under the Protocol, having presented its Second National Report in 2015. However, it has not provided up-to-date information to the Biosafety Clearing-House.

The country has never received an application/notification; neither has it taken a decision regarding intentional transboundary movements of GMOs for intentional introduction into the environment. The legal framework for full compliance with the Cartagena Protocol, comprised of the 2004 Law on Food and the 2009 Law on Genetically Modified Organisms, still requires completion, namely, regulating decision-making processes regarding domestic use, including placing on the market and imports of GMOs, transboundary movements of GMOs, and handling and use of GMOs that are pharmaceuticals, and operation of the Advance Informed Agreement procedure of the Protocol. The country has also not yet established a mechanism for taking decisions regarding the first intentional transboundary movements of living modified organisms (LMOs) for intentional introduction into the environment, nor for monitoring potential effects of LMOs that are released into the environment.

The country does not have a coordinating structure for dealing with the implementation of the Cartagena Protocol. The Food Safety Agency is the institution in charge of giving permission for the release on the market of food and feed which contains or consists of GMOs, according to the 2004 Law on Food. Several other institutions are involved in the work related to GMOs, including the Veterinary Office and the Plant Health Protection Directorate, as well as entities, cantonal and Brčko District authorities responsible for agriculture, forestry and water management, and authorities responsible for health and for environmental protection.

Completing the legal framework for full compliance with the Cartagena Protocol, through the adoption of the missing regulations, is the first priority for the country. Capacity-building in the areas of risk assessment and other scientific and technical expertise, risk management, information exchange and data management (including participation in the Biosafety Clearing-House), identification of LMOs (including their detection), implementation of the documentation requirements under Article 18.2 of the Protocol, handling of confidential information and measures to address unintentional and/or illegal transboundary movements of LMOs are also significant challenges that will require a step up in the country's efforts in the near future.

Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization

Bosnia and Herzegovina is not yet a party to the Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (Nagoya Protocol). Accession to the Nagoya Protocol is under consideration.

The country has benefited in 2013 and 2014 from the UNEP project Global Support for the Ratification and Entry into Force of the Nagoya Protocol on Access and Benefit Sharing (ABS), which supported the country in speeding up its efforts towards ratification of the Nagoya Protocol. This project was financially supported by the Nagoya Protocol Implementation Fund. The main achievements of the project were: translation of the Nagoya Protocol into the official national languages (Bosnian, Croatian and Serbian); organization of two workshops aimed at raising awareness on Protocol-related issues for a number of interested stakeholders, including decision makers, private sector actors, NGOs and local community representatives; policy and legal gap analysis (preparation of a baseline and roadmap with necessary legal and policy adaptation for the implementation of

the Protocol in the country, as well as a scoping study and a timeline for policymakers to evaluate implications of the ratification); and organization of the parliamentary session on the Protocol for ministries and decision makers.

The NBSAP acknowledges that there is insufficient control of the use and export of various products arising from the use of local genetic resources, and also that there is no sufficient control of the use and export of medicinal, vitaminized and aromatic species, as well as other ecosystem goods to which Bosnia and Herzegovina claims its sovereign rights and identifies the need to regulate profits obtained from the use of local biological diversity.

Furthermore, the NBSAP states that ratification of the Nagoya Protocol will take place after the adoption of the national legislation on genetic resources. However, no timeframe for such adoption is established.

Convention concerning the Protection of the World Cultural and Natural Heritage

Bosnia and Herzegovina acceded to the Convention concerning the Protection of the World Cultural and Natural Heritage in 1993. The National Commission of Bosnia and Herzegovina for UNESCO operates under the Ministry of Civil Affairs. The Commission was established in 2009 as an advisory body to the Council of Ministers by the Decision on the Establishment of the National Commission of Bosnia and Herzegovina for cooperation with the United Nations Educational, Scientific and Cultural Organization (UNESCO) (OG No. 77/09).

Currently, the country has three properties inscribed in the World Heritage List under the cultural category: Old Bridge Area of the Old City of Mostar (2005); Mehmed Paša Sokolović Bridge in Višegrad (2007) and Stecci Medieval Tombstones Graveyard (2016). Stecci Medieval Tombstones Graveyard is a transboundary property comprising 28 sites located in Bosnia and Herzegovina, western Serbia, western Montenegro and central and southern Croatia. The two properties that were the first to be included in the World Heritage List have a management plan. In addition, Bosnia and Herzegovina has eight properties submitted under UNESCO's tentative list, four of which are under the mixed cultural and natural category.

There are no biosphere reserves in Bosnia and Herzegovina.

Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa

Bosnia and Herzegovina became a party to the Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD) in 2002. The National Focal Point is the Ministry of Agriculture, Forestry and Water Management of Republika Srpska. The Faculty of Agriculture and Food Science Institute of Soil Science at the University of Sarajevo is the Science and Technology Correspondent and also a member of the Science-Policy Interface (SPI), which was established in 2013 to promote dialogue between scientists and policymakers on desertification, land degradation and drought. The country has submitted national reports in 2007, 2010, 2012 and 2014.

Land degradation stands out as one of the most critical environmental problems in Bosnia and Herzegovina. Inadequate and unsound land planning practices, unreasonable exploitation of mineral raw materials, and excessive erosion caused by deforestation and inadequate treatment of steep slopes are among the main causes of land degradation in the country.

As a party to the UNCCD, Bosnia and Herzegovina was required to ensure the implementation of the UNCCD 10-Year Strategy in its strategic and planning documents at both the national and lower administrative levels (entities, cantons, municipalities) but this work only began in 2013 when the GEF-funded project Support to Bosnia and Herzegovina for Development of National Action Programmes Aligned to the UNCCD 10-Year Strategy and Reporting Process under UNCCD was implemented (UNEP was the implementing agency). The project aimed at supporting Bosnia and Herzegovina in meeting its obligations under the UNCCD, namely the development of a National Action Programme (NAP) in line with the 10-Year Strategy for integration into individual government sectors in Bosnia and Herzegovina (at entity and Brčko District level) and improvement of the related reporting and review process within the framework of the Fifth Reporting and Review Process under the UNCCD Secretariat.

The NAP, which was adopted by the Council of Ministers in May 2017, sets out strategic and operational objectives that are in compliance with the basic commitments and objectives of the UNCCD – more specifically, the objectives of the UNCCD Strategy. The strategic objectives focus on improvement of the legal and institutional framework,

implementation of measures for improving land management and increasing public awareness. Overseeing NAP implementation and ensuring the fulfilment of its goals is the main task of the UNCCD National Coordination Body.

Although significant steps were taken to improve implementation of the Convention, many challenges remain. Insufficient institutional capacities, lack of consistent policy to deal with land degradation and inexistent monitoring systems are the key challenges.

European Landscape Convention

Bosnia and Herzegovina ratified the European Landscape Convention in 2012. The Ministry of Civil Affairs of Bosnia and Herzegovina, Ministry of Education and Culture of Republika Srpska, and Ministry of Spatial Planning, Civil Engineering and Ecology of the Federation of Bosnia and Herzegovina are the national contacts responsible for the implementation of the European Landscape Convention.

Protected landscapes are one of the categories of protected areas in Bosnia and Herzegovina. The country has developed considerable work regarding landscapes, including identifying which landscapes are highly vulnerable to climate change.

Water

Convention on the Protection and Use of Transboundary Watercourses and International Lakes and the Protocol on Water and Health

Bosnia and Herzegovina acceded to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) in 2009 and to the Protocol on Water and Health in 2011. The national focal point for the Water Convention is the Department for Water Resources of the Ministry of Foreign Trade and Economic Relations. The Department for the Protection and Use of Water of the Sava River Watershed Agency is the national focal point for the Protocol on Water and Health.

There is a comprehensive legal framework on water management in the country, comprising laws on waters of the two entities and of Brčko District, which derives from the fact that water management is under their jurisdiction. The country's mosaic of national policies, action plans and strategies that include measures to prevent, control and reduce any transboundary impact includes several documents at the state and entity levels, such as the Action Plan for

Flood Protection and River Basin Management in Bosnia and Herzegovina 2014–2017, Climate Change Adaptation and Low-Emission Development Strategy of Bosnia and Herzegovina, Environmental Approximation Strategy of Bosnia and Herzegovina, Water Management Strategy of the Federation of Bosnia and Herzegovina 2010–2022, Environmental Approximation Programme of the Federation of Bosnia and Herzegovina (and of Republika Srpska and of Brčko District), and Strategy for Integrated Water Management of Republika Srpska for the period 2015–2024.

Bosnia and Herzegovina has met the reporting obligations under the Protocol on Water and Health. A matter still pending is the establishment of targets and respective timeframes for fulfilling the obligations deriving from Article 6 of the Protocol. Arrangements for coordination among competent authorities for setting targets in accordance with the Protocol have not yet been established.

Regional agreements on water

Bosnia and Herzegovina is party to a number of regional agreements. These include the Convention on Cooperation for the Protection and Sustainable Use of the Danube River, to which Bosnia and Herzegovina acceded in 2005, and the Framework Agreement on the Sava River Basin (FASRB), of which Croatia, Serbia and Slovenia are also contracting parties. International cooperation in the Sava River Basin is quite advanced and effective, namely within the International Commission for the Protection of the Danube River (ICPDR).

Within the FASRB, Bosnia and Herzegovina has signed four protocols to further focus and guide the four countries in the Sava River Basin: the Protocol on Prevention of Water Pollution caused by Navigation to FASRB, the Protocol on Flood Protection to FASRB, the Protocol on Sediment Management to FASRB and the Protocol on Policy Exchange of Hydrological and Meteorological Data and Information in the Sava River Basin. An additional protocol on emergency situations is currently being developed.

Convention on the Law of the Non-navigational Uses of International Watercourses

Bosnia and Herzegovina is not party to the Convention on the Law of the Non-navigational Uses of International Watercourses and there is no indication that the country has any intention of acceding to it.

Protection of the marine environment

Bosnia and Herzegovina has been a contracting party to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) since 1994. It is also a party to several protocols to the Convention, except for the Offshore, Hazardous Waste and Integrated Coastal Zone Management (ICZM) Protocols. In the framework of the Barcelona Convention, Bosnia and Herzegovina has committed to the Mediterranean Strategy for Sustainable Development for the period 2016–2025.

Under the Barcelona Convention umbrella, a Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership) between 2009 and 2015 was developed in several countries, including Bosnia and Herzegovina.

Bosnia and Herzegovina also participated, between 2012 and 2015, in the project Integration of Climatic Variability and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean ("ClimVar and ICZM"). The objective of the project was to promote the use of ICZM in countries sharing the Mediterranean, as an effective tool to deal with the impacts of climate variability and change (CVC) in coastal zones, by mainstreaming them into the ICZM process. Its main achievements were identification of the key national institutions monitoring and hosting data related to CVC and ICZM and of data gaps, promotion of discussions between local authorities, local and national stakeholders and institutions, and developing a methodology to identify coastal "hotspots".

Bosnia and Herzegovina also participates in the 2014 EU Strategy for the Adriatic and Ionian Region, which aims at promoting economic and social prosperity and growth in the region by supporting blue growth, improved connectivity of transport/energy networks, better environmental quality and sustainable tourism activities.

Bosnia and Herzegovina became party to the United Nations Convention on the Law of the Sea, by succession, in 1994.

Air protection, ozone layer protection and climate change

Convention on Long-range Transboundary Air Pollution

Bosnia and Herzegovina became a party to the Convention on Long-range Transboundary Air

Pollution (CLRTAP, or the Air Convention), by succession, in 1993. In 1993, it also became a party to the Protocol on Long-term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP). The national focal points have not yet been designated.

Progress towards the implementation of the Air Convention has been minor, though it is expected to improve in the near future due to the country's current efforts to transpose EU legislation on air. Bosnia and Herzegovina does not provide emissions data under the Air Convention.

In 2013, UNEP opened two new air monitoring stations in Bosnia and Herzegovina and brought two existing ones back to full function, significantly helping the country monitor climate and air quality. At present, air quality monitoring is performed in Sarajevo, Tuzla, Banja Luka, Kakanj and Brčko. There is also an EMEP monitoring station at Ivan Sedlo. Data on the main air pollutants are available online through the Central Data Repository of Eionet.

Convention for the Protection of the Ozone Layer

Bosnia and Herzegovina became party to the Convention for the Protection of the Ozone Layer (Vienna Convention) and to the Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol), by succession, in 1993. The country has acceded to all amendments, except for the very recent 2016 Kigali Amendment, which adds hydrofluorocarbons (HFCs) to the list of controlled substances. The Focal Point for the Vienna Convention and the Montreal Protocol is the Ministry of Foreign Trade and Economic Relations. The National Ozone Unit also operates under the Ministry of Foreign Trade and Economic Relations. The participation in both agreements has led the country to assume relevant functions in their governing bodies. Currently, Bosnia and Herzegovina is a member of the Executive Committee.

Implementation of the Vienna Convention and Montreal Protocol is progressing well. The national ozone-depleting-substances (ODS) phase-out plan to phase out chlorofluocarbons (CFCs) was approved in 2003, taking into account an action plan approved at the Fifteenth Meeting of the Parties to reduce the country's CFC consumption, from 243.6 ODP tons in 2002 to 3 ODP tons in 2007 and to zero ODP tons in 2008. The country has complied with zero consumption of CFCs since 2009. There were some difficulties in complying with the target established

for 2008 (zero consumption) but they were overcome one year later. In the following years, the country established a robust licensing and monitoring system for ODS imports and exports.

In 2012, the hydrochlorofluorocarbons (HCFCs) phase-out management plan (HPMP) was approved, committing the country to follow the Montreal Protocol phase-out schedule for HCFCs for the duration of stage I of the HPMP, i.e. achieving all control measures up to the 35 per cent reduction in HCFC consumption on time. HPMP activities included the conversion of Alternativa and the six SMEs, which represent the entire HCFC-based manufacturing sector. It also included conducting legislative, training and awareness-raising activities. The complete phase-out of consumption of HCFCs was intended for 2035, with interim steps of a 92 per cent reduction by 2025 and a 97.5 per cent reduction by 2030. This schedule was considerably more ambitious than the Montreal one.

The starting point for sustained aggregate reduction in HCFC consumption is the baseline is 4.7 ODP tons, calculated using actual consumption of 5.8 ODP tons and 3.51 ODP tons reported for 2009 and 2010, respectively, plus 3.5 ODP tons of HCFC-141b contained in imported preblended polyol systems, resulting in 8.2 ODP tons. The country committed to banning imports of HCFC-141b, both pure and contained in preblended polyols, no later than 1 January 2016, and put the ban in place.

In 2016, the Executive Committee approved the third tranche of the Bosnia and Herzegovina HPMP. In 2015, HCFC consumption in Bosnia and Herzegovina was 2.11 ODP tons, 55 per cent below the baseline, which is due to all the activities undertaken, particularly the investment projects in the foam and refrigeration assembly sectors, which reduced the demand for HCFCs. The country has met the consumption targets specified in the HPMP for 2014 and 2015.

In 2015, the Decision of Council of Ministers on the procedures for the implementation of the Montreal Protocol, which supports an enforceable licensing and quota system for the import and export of HCFCs, was amended to introduce licences for HFCs and establish a ban on the import of equipment using HCFCs and HCFC blends. A ban on the import of pure HCFC-141b (as of 1 January 2015) as well as HCFC-141b contained in imported preblended polyols (as of 1 January 2016) has already been implemented.

A significant number of activities have been implemented in recent years, ranging from awareness-

raising and capacity-building, certification of service technicians and publication of a list of certified service providers, to providing equipment for demonstrating good practices to 20 training centres and equipping a licensed refrigerant recovery and recycling enterprise to become an ODS waste management centre.

Several activities are foreseen for the coming years, such as updating legislation to include HCFCs in the customs tariff and classification of goods, initiating a new act for determining the border crossing points for ODS import/export with neighbouring countries and establishing national codes of good practice in the refrigeration and air conditioning sector.

United Nations Framework Convention on Climate Change

Bosnia and Herzegovina has been party to the United Nations Framework Convention on Climate Change (UNFCCC) since 2000 and ratified the Kyoto Protocol in 2007 and the Paris Agreement in 2017. The National Focal Point for the three agreements is the Ministry of Planning, Civil Engineering and Ecology of Republika Srpska.

National communications were submitted in 2010, 2013 and 2017. Bosnia and Herzegovina is a non-Annex I party to the UNFCCC and therefore has to submit its national communications on climate change every four years and its biennial update reports on GHG emissions in Bosnia and Herzegovina every two years. The First Biennial Update Report on GHG emissions was submitted in 2014. The Third National Communication included the Second Biennial Report and was developed with the support of UNDP and GEF.

The Third National Communication includes a GHG inventory for the period 2002–2009, and for 2012 and 2013, with 1990 as the base year. Agriculture, water management, health, forestry and tourism, as well as water resources and protected areas, are identified as the sectors most vulnerable to climate change. Several priority measures related to GHG reduction and adaptation to climate change are identified in the Third National Communication.

In 2014, the Council of Ministers adopted the Decision on Amendments to the Decision establishing the Designated National Authority (DNA) for the implementation of Clean Development Mechanism (CDM) projects under the Kyoto Protocol to the UNFCCC in Bosnia and Herzegovina, which, in addition to the existing activities of the DNA, has added development, receipt and approval/rejection of Nationally Appropriate Mitigation Actions (NAMAs).

A mechanism for approval and submission of NAMAs to the UNFCCC Registry was established, the purpose of which is to record demand for international support for the implementation of NAMAs in order to facilitate the obtaining of funds, technology and support through capacity-building by applying these measures.

Three CDM projects have been approved (chapter 6). The first two were the N₂O reduction project at the nitric acid plant of Global Ispat Koksna Industriia d.o.o. Luvakac and Amitea Small Hydro in 2012, followed by HPP Ulog in 2014. The areas with the greatest potential for climate change mitigation are defined, along with the identified NAMAs, in the Climate Change Adaptation and Low-Emission Development Strategy. The first NAMA project has been submitted to the DNA Secretariat, namely the sustainable and energy-efficient building of the Faculty of Architecture, Civil Engineering and Geodesy of the University of Banja Luka, with the Faculty itself as the implementing agency.

In 2015, the country submitted to the UNFCCC Secretariat its Intended Nationally Determined Contribution (INDC). The country committed unconditionally to reduce CO₂ emissions by 2 per cent by 2030, compared with the baseline scenario. However, the country is willing to pursue a 3 per cent reduction by 2030 if it is granted access to international development/financial mechanisms and if the relevant institutions are willing to absorb and cost-effectively use international mechanisms to implement a significant set of mitigation activities.

One of the activities included in the conditional commitment is to enact primary and secondary legislation aligning Bosnia and Herzegovina's legislation with the EU acquis, including strategies and action plans for all relevant sectors. This alignment will have to take place in the context of progress towards accession to the EU, as stated in the 2016 Progress Report. The Report underlines that implementation of the 2013 National Climate Change Adaptation and Low-Emission Development Strategy, consistent with the EU 2030 framework on climate and energy policies and well integrated into all relevant sectors, should be a priority.

Bosnia and Herzegovina has taken an active part in the Environment and Climate Regional Accession Network programme and in the Belgrade Initiative on Climate Change.

The country has made a number of efforts to establish political, institutional and legal frameworks to meet the commitments of the climate change agreements.

However, implementation of these agreements, including the Paris Agreement, requires further steps. Implementation of the INDC will require substantial changes in the policy sphere and investment of resources within the climate change segment of Bosnia and Herzegovina. The Climate Change Adaptation and Low-Emission Development Strategy, which is currently being implemented, should provide a comprehensive response to climate change in Bosnia and Herzegovina.

Waste and hazardous chemicals

Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

In 2001, Bosnia and Herzegovina ratified the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention). The Focal Point is the Ministry of Physical Planning and Environment of the Federation of Bosnia and Herzegovina. The Competent Authorities are the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska and the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina. The country has complied with its reporting obligations.

In addition to wastes listed in Annexes I, II and VIII of the Basel Convention, the definitions of hazardous waste in the entities' and Brčko District legislation also cover the European List of Waste (Commission Decision 2000/532/EC). Due to the absence of adequate means for processing and disposing of waste, the management of hazardous waste constitutes a challenge in Bosnia and Herzegovina. Hazardous waste is, for the most part, exported to other countries.

The entities and Brčko District have legislation on waste management in place, which forms the legal framework for implementation of the Basel Convention. Within the EnvIS project, developed between 2012 and 2014 with EU assistance, some gaps were identified in the existing legal framework with regard to definitions, which would prevent the country from fully meeting the Basel Convention's obligations.

According to the legislation in force, hazardous wastes that are the object of export and transboundary movements are subject to control and require an authorization from the Ministry of Physical Planning and Environment of the Federation of Bosnia and Herzegovina. A written consent from the competent authority of the importing country is required. No distinction is made between waste for recovery or final disposal.

There are no restrictions on the transit of hazardous waste and other waste through the territory. The import of hazardous waste is prohibited, which derives from the absence of capacity in the country for its recovery or disposal.

Waste management, including transboundary movements, emerges as an insufficiently consolidated body of legislation with specific territorial coverage at the level of each entity and Brčko District. The existing legislation and reports do not identify which are the main goals for action in this field in Bosnia and Herzegovina, even if they are considered at entity and Brčko District level.

Priorities for action in the near future include preparing border control for the purpose of export/import/transit of hazardous wastes and other wastes and capacity-building for customs officers. There is no a Basel Convention electronic system for transboundary movements, which could also improve coordination among the authorities involved.

Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

Bosnia and Herzegovina acceded to the Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention) in 2007. The Administration for Health Plant Protection is the Contact Point and the Designated National Authority for industrial chemicals and pesticides.

Republika Srpska has put in place a legal and institutional framework to implement the Rotterdam Convention, which has proved it able to comply with the Convention's requirements. Control of import and export of dangerous chemicals and biocides is performed on the basis of the Law on Chemicals and the Law on Biocides.

Republika Srpska has also adopted the following legal acts to regulate limitations and bans on chemicals and biocides:

- Rulebook on the conditions for limitation and ban on production, placing on market and usage of chemicals (OG RS, No. 100/10, 63/13, 33/17);
- Rulebook on the procedure for preliminary notification and procedure of issuance of approval based on preliminary notification of export and import of certain chemicals and products (OG RS, No. 33/13);
- Rulebook on the list of active substances allowed in biocide products (OG RS, No. 32/10, 72/11, 85/12, 14/15, 24/16);

- Rulebook on the list of active substances that are not allowed in biocide products (OG RS, No. 32/10, 74/11, 85/12, 13/15).

Despite progress in implementing the Rotterdam Convention obligations, further steps are required to ensure successful coordination and harmonization of activities relating to the approximation of chemicals management in Bosnia and Herzegovina to the EU *acquis* on chemicals.

Convention on Persistent Organic Pollutants

Bosnia and Herzegovina ratified the Convention on Persistent Organic Pollutants (POPs) (Stockholm Convention) in 2010. The Ministry of Foreign Trade and Economic Relations is the National Focal Point. The country has complied with its reporting obligations.

The National Implementation Plan (NIP) for Reduction and Disposal of Persistent Organic Pollutants was adopted in 2016. The NIP was developed between 2014 and 2016 within the project Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Bosnia and Herzegovina, funded by the GEF and implemented by the United Nations Industrial Development Organization (UNIDO).

The country has progressed, notably in developing the main foundations for implementation of the Convention. A preliminary inventory of POPs was developed in 2013 by the POPs inventory groups established by the National Executive Agency (NEA) in cooperation with the Ministry of Foreign Trade and Economic Relations. The inventory comprised POPs pesticides, PCBs, PCDD/PCDFs and PBDEs/PFOS. The six working groups were tasked to determine the regulatory status of the management of POPs as chemicals and/or when their useful life is complete, as wastes, and to determine their production in Bosnia and Herzegovina, import, export, transport, use, stocks, waste containing POPs and possible locations in Bosnia and Herzegovina contaminated with POPs. The preliminary inventory provided robust and comprehensive information for preparation of the NIP.

Through the NIP, the country has committed to several relevant goals, such as: strengthening institutional capacity; establishing a legal framework to ensure adequate management of POPs; establishing control over the traffic and use of POPs; gradual reduction and elimination of the deliberate use of POPs and the reduction of unintentionally produced emissions; establishing control over the management of

chemicals and hazardous waste; improving the monitoring of POPs; and ensuring public access to information by all target groups and the public.

Bosnia and Herzegovina has prohibited the import of all 10 POP pesticides. The country has no regulatory and assessment schemes for existing pesticides or industrial chemicals, except in Republika Srpska where there are procedures for registration of pesticides (plant protection products and biocides) and industrial chemicals in accordance with the Law on Plant Protection Products (OG RS, No. 52/10), Law on Biocides and Law on Chemicals. Product evaluation is carried out within registration procedures prior to their placing on the market.

The country has been participating in a number of regional projects related to POPs, such as Capacity Building for Local Implementation of the Stockholm Convention in Bosnia and Herzegovina, developed between 2009 and 2012, and Cooperation and Capacity Building on Implementation of the Stockholm Convention in Bosnia and Herzegovina, developed in 2013, both financially supported by the Norwegian Institute for Water Research.

Due to its transversal nature, Bosnia and Herzegovina compliance with international commitments on chemicals management requires a strengthening of efforts towards coordination among all entities involved – more than 10 institutions at state and entity levels. NIP implementation will have to overcome the existing key challenges, namely, the lack of adequate legislation in the field of POP pesticides and discrepancy in the adoption of laws and by-laws in the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, inadequate customs tariffs for the monitoring of imports of POP pesticides, lack of a fully established system for handling empty and used packaging of pesticides, inadequate monitoring of POP pesticides, and clear and non-conflicting allocation of responsibility for the management, control and monitoring of POP pesticides among all the institutions involved.

Convention on Mercury

Bosnia and Herzegovina is not a party to, nor has signed, the Convention on Mercury (Minamata Convention). However, the country is currently receiving support to undertake a Mercury Initial Assessment to enable the Government to determine the national requirements and needs for becoming a party to the Convention and establish a national foundation to undertake future work towards its implementation. The support is being provided by

UNDP and financing by GEF was approved in 2015. The expected outcomes are estimated for 2017.

Mercury pollution and its hazards have not yet been appropriately addressed in Bosnia and Herzegovina. In Republika Srpska, legislation on chemicals (Regulations 1907/2006, 1102/2008 and 649/2012) regulates mercury in accordance with the EU legislation.

The country does not dispose of specific data and information on mercury imports or imports of mercury-containing products, the use of mercury in various industrial processes or important release sources of mercury. For this reason, it is very important to assess the country's situation related to the management of mercury, to enable it to start addressing its main priorities in this respect.

Strategic Approach to International Chemicals Management

The Ministry of Health and Social Welfare of Republika Srpska is the National Focal Point for the Strategic Approach to International Chemicals Management (SAICM). Bosnia and Herzegovina does not have a National Chemicals Management Profile or any equivalent framework for the implementation of SAICM. Republika Srpska has the Chemical Safety Strategy for the period 2012–2016, which includes goals and measures for the protection of the environment in terms of ensuring comprehensive security in the management of chemicals. The Strategy complies with the basic principles and recommendations of the International Programme on Chemical Safety, the Intergovernmental Forum on Chemical Safety and SAICM.

Industrial accidents and environmental impact assessment

Convention on the Transboundary Effects of Industrial Accidents

Bosnia and Herzegovina acceded to the Convention on the Transboundary Effects of Industrial Accidents in 2013. The National Focal Point is the Ministry of Foreign Trade and Economic Relations. No significant progress has been achieved in implementing the obligations under the Convention. No self-assessment or action plan towards increasing the level of the implementation of the Convention has been submitted in line with the country's commitments as an Assistance Programme beneficiary country. Bosnia and Herzegovina does not have in place mechanisms for consultation with neighbouring countries on the identification of hazardous activities.

The absence of coordination and cooperation regarding the identification of hazardous activities, and their eventual notification to neighbouring and riparian countries, are major shortcomings in the Convention's implementation.

Convention on Environmental Impact Assessment in a Transboundary Context

Bosnia and Herzegovina acceded to the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) in 2009 and, in 2017, to the Protocol on Strategic Environmental Assessment. The contact point for notifications on transboundary impacts is the Ministry of Foreign Affairs. The National Focal Point for administrative matters is the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska. The country has regularly submitted its national implementation reports and, before ratification of the Protocol on SEA, provided a voluntary report on its implementation.

The legal framework on EIA builds on the Laws on Environmental Protection of the Federation of Bosnia and Herzegovina, of Republika Srpska and of Brčko District. However, although there is already a well-developed legal framework for implementation of EIA in accordance with the Espoo Convention, some provisions regarding EIA procedures in the entities and Brčko District are not in line with the requirements of the Espoo Convention.

Since 2014, the Implementation Committee under the Convention has been examining the compliance of Bosnia and Herzegovina with its obligations under the Convention, with respect to the planned extension of a TPP in Uglejevik, close to the border with Serbia, and the construction of a new TPP in Stanari, close to the border with Croatia; this process is still ongoing. The following transboundary SEA procedures were initiated between 2013 and 2015: SEA on transboundary cooperation between Croatia, Montenegro and Bosnia and Herzegovina, 2014–2020; SEA of the 2014–2020 Adriatic/Ionian transnational programme; Report on the SEA of the Physical Plan of Kotor Varos Municipality 2011–2030; and SEA of the 2014–2020 programme of transnational cooperation on the Danube.

The main challenge in the near future is to ensure coordinated and proper application of the SEA instrument in key sectors of the economy.

Access to Information, Public Participation in Decision-making and Access to Justice

Bosnia and Herzegovina acceded to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) in 2008. The country is not yet a party to the Protocol on Pollutant Release and Transfer Registers (PRTR Protocol), although it signed it in 2003. The Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina is the National Focal Point. The country has complied with its reporting obligations.

The legal framework for complying with the Aarhus Convention is composed of several laws at the state, entity and Brčko District levels and is quite comprehensive, though some inconsistencies and insufficiencies persist. Implementation is progressing but still there is room for improvement. Advisory councils on both entities have been established but are either not operational or are subject to criticism from NGOs for not following transparent principles in the selection of NGOs. Availability of information on official websites and the provision of requested information are not always ensured.

The access to justice pillar is the domain where progress on implementing the Convention was more limited. The country has begun to collect statistics and decisions on judicial review cases to have an overview of the development of jurisprudence. The Civil Service Agency has introduced an online learning course on transparency in environmental governance, which will be part of the general training curriculum for civil servants.

GIZ is financially supporting this project and the Organization for Security and Co-operation in Europe (OSCE) Mission to Bosnia and Herzegovina is providing training material.

Currently there are three Aarhus Centres in Bosnia and Herzegovina: the first opened in Sarajevo in 2012. One year later, it was followed by the Aarhus Centres in Tuzla and Banja Luka. Aarhus Centres support the country in reporting on the national implementation of the Aarhus Convention as well as on boosting interaction among citizens, the State and the private sector.

The OSCE Mission to Bosnia and Herzegovina, with financial support from Germany, has technically supported the elaboration of the national reports on implementation of the Aarhus Convention.

The efforts made on improving access to information, public participation in decision-making and access to justice in environmental matters are significant. However, many challenges remain. An integrated environmental management system is not yet established. Public institutions do not always provide requested information or inform the requester of the reasons for not providing it.

Sustainable Development Goals and targets relevant to this section

Bosnia and Herzegovina's current position vis-à-vis Targets 11.4 and 14.c is described in box 5.1.

5.2 Bilateral cooperation on environment and sustainable development

The management of transboundary watercourses is the main priority for bilateral cooperation. Bosnia and Herzegovina has signed agreements with Croatia and joint work has been undertaken.

An Agreement between Bosnia and Herzegovina and Croatia on Water Management Relations was signed in 1996, and is implemented through a joint commission, which is also the key bilateral mechanism for transboundary cooperation in the Neretva and Trebišnjica Basins. A Memorandum on Cooperation on the Neretva River was signed by Bosnia and Herzegovina, Croatia, the Principality of Monaco and the Coordination Unit of the Mediterranean Wetlands Initiative of the Ramsar Convention (MedWet) in 2003. Pollution in the delta of the Neretva River, hydropower utilization and water supply were among the priority themes.

Within the chapeau of the 1996 Agreement, Bosnia and Herzegovina and Croatia have also signed memoranda of understanding with regard to joint financing, maintenance and operation of the regional wastewater system Komarna-Neum-Mljet channel, and rights and obligations for the use of public water supply systems crossing the States' borders. Bosnia and Herzegovina is working with two other neighbouring countries, Montenegro and Serbia, in the development of bilateral agreements on transboundary water management with the aim of having those approved between the end of 2017 and the beginning of 2018.

In Bosnia and Herzegovina, the multiple levels of administration involved make coordination of international and bilateral cooperation challenging. This results in considerable delays in coordination, and difficulties in entering international agreements. A GEF/World Bank project was implemented aiming at

supporting integrated water resources management in the Drina River Basin, by harmonizing management approaches and legal frameworks across the two countries, and by ensuring improved stakeholder participation at all levels. The EU Water Framework Directive principles and guidelines are used for the preparation of the river basin management plan. The European Commission has been involved in the project preparation and will oversee its implementation.

In 2016, an agreement between Bosnia and Herzegovina and Serbia was signed to enhance cooperation in the field of environmental protection and sustainable development. The two countries commit to cooperate in the following areas: transposition of European legislation in the field of environmental protection; climate change; air, water (management and treatment of wastewater) and land; management and treatment of solid waste; management and treatment of chemicals; nature conservation and protection of biodiversity and geodiversity; and education in the field of environmental protection. MoUs on cooperation in environmental protection were signed between Republika Srpska and Serbia in 2011 and 2013.

Implementation of the Agreement between Bosnia and Herzegovina and Serbia will be coordinated by a joint commission for which each party will appoint three members, from the Ministry of Agriculture and Environment of Serbia and, in Bosnia and Herzegovina, from the Ministry of Foreign Trade and Economic Relations and entity ministries responsible for environment protection. The commission will meet at least once a year. Representatives have not yet been appointed.

In 2016, an Agreement between Bosnia and Herzegovina and Croatia was also signed to foster cooperation in the field of environment protection and sustainable development. The two countries commit to cooperate in the following areas: the process of approximation towards the EU; climate change; air, water and soil; waste management; water and wastewater; treatment of chemicals; conservation and protection of nature; and environmental education. The institutional setting established for the coordination of implementation of this Agreement is equivalent to that established within the Agreement between Bosnia and Herzegovina and Serbia.

The 2014 IPA II Cross-border Co-operation Programmes for the period 2014–2020 would provide a valuable platform for enhancing transboundary cooperation on environmental matters in the coming years.


Box 5.1: Targets 11.4 and 14.c of the 2030 Agenda for Sustainable Development

SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage

Indicator 11.4.1: Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)

Bosnia and Herzegovina has appropriate legal measures in place for the protection of cultural heritage, in particular the 2002 Law on Implementation of Decisions of the Commission to Preserve National Monuments, the 1985 Law on the Protection and Use of Cultural, Historical and Natural Heritage of SR Bosnia and Herzegovina and the 2006 Law on Spatial Planning and Land Use of the Federation of Bosnia and Herzegovina, accompanied by other related laws and regulations. The country also has inventories for cultural heritage in place, at the state and entity levels.

Challenges remain in effectively ensuring that development pressures do not threaten conditions of integrity and the conservation of the properties. To this effect, heritage protection services need to have the necessary measures in place to prevent and mitigate potential negative impacts.

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Target 14.c: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS [the United Nations Convention on the Law of the Sea], which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want

Indicator 14.c.1: Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources

Bosnia and Herzegovina is a party to UNCLOS by succession. UNCLOS is seen as the "sea constitution", which is supported by a number of conventions in all sectors (such as those of the International Maritime Organization, the Barcelona Convention and the Convention on Biological Diversity), which means that any ratification contributes to the implementation of UNCLOS. In this regard, the ratification of the 1995 Amendments to the Barcelona Convention and its protocols will help Bosnia and Herzegovina to progress in the achievement of Target 14.c.

In the definition of the domestic indicator and its corresponding target, Bosnia and Herzegovina may wish to take into consideration activities towards the implementation of UNCLOS, such as the elaboration and effective implementation of a management plan for the coastal area.

Sustainable Development Goals and targets relevant to this section

Bosnia and Herzegovina's current position vis-à-vis Target 6.5 is described in box 5.2.

5.3 Participation in non-binding processes related to the environment, sustainable development and green economy

United Nations Forum on Forests and Forest Europe

Bosnia and Herzegovina is a signatory State of the United Nations Forum on Forests and has provided input for the reporting cycles. Bosnia and Herzegovina has significant forest resources in terms of their distribution and biological diversity. Forests cover 2,709,769 ha, or about 53 per cent of the total land area of the country.

The first large-scale forest inventory in Bosnia and Herzegovina was carried out in the period 1964–1968. A second inventory was initiated in 2006 and is currently in the final stage of creation. Development of the forestry programme is currently under way in the Federation of Bosnia and Herzegovina; the draft programme has been adopted by the Government of the Federation. It was then sent to the Parliament of the Federation of Bosnia and Herzegovina for adoption but is not yet formally adopted since there is no law on forests, which would provide the legal basis for this. In 2012, Republika Srpska adopted the Forestry Development Strategy for the period 2010–2020. The legal framework consists of the Law on Forests in Republika Srpska and in Brčko District (OG BD, No. 14/10). In the Federation of Bosnia and Herzegovina, the Law on Forests was abolished by the Constitutional Court in 2009. The development of the new law on forests started in 2010 but no such law had been adopted as of April 2017 (chapter 1).



Box 5.2: Target 6.5 of the 2030 Agenda for Sustainable Development

Goal 6: Ensure availability and sustainable management of water and sanitation for all

Target 6.5: By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

Indicator 6.5.2: Proportion of transboundary basin area with an operational arrangement for water cooperation

Bosnia and Herzegovina is active in transboundary water cooperation. However, not all transboundary waters shared by Bosnia and Herzegovina are covered by transboundary water agreements. The Drina River Basin is not covered by water arrangements between Bosnia and Herzegovina, Serbia and Montenegro.

In the definition of the domestic indicator and its corresponding target, the Government may wish to take into consideration the globally agreed Indicator 6.5.2, as this would constitute an important and needed driver to strengthen integrated water resources management at transboundary level.

The Strategic Plan for Harmonization of Agriculture, Food and Rural Development for the period 2008–2011 states that there is an evident lack of sustainable forest management and identifies the forestry sector's biggest challenges: illegal logging; forest fires; powerful attacks of pathogens and insect pests; large areas of mined forests and forest lands; a large accumulation of waste materials in forests and watercourses; poor openness of forest areas to communications; and poor forest road infrastructure.

The NBSAP includes an ambitious goal to be pursued in the forest domain, including certifying all state-owned forests in Bosnia and Herzegovina and conducting forestation of degraded forest ecosystems with indigenous species by 2020.

Environment for Europe process

Bosnia and Herzegovina has not submitted any voluntary commitments under the two initiatives endorsed by the Ministers at the Eighth Ministerial Conference (Batumi, Georgia, 8–10 June 2016): the Batumi Initiative on Green Economy and the Batumi Action for Cleaner Air.

Sustainable Development Goals and targets relevant to this section

Bosnia and Herzegovina's current position vis-à-vis Target 12.1 is described in box 5.3.

5.4 Legal, policy and institutional framework

Legal framework

The international agreements that Bosnia and Herzegovina ratifies or accedes to do not apply directly in Bosnia and Herzegovina or take precedence

over Bosnia and Herzegovina's legislation pursuant to the country's Constitution (with the exception of the Convention for the Protection of Human Rights and Fundamental Freedoms (European Convention of Human Rights) and its Protocols, which is specifically referred to by the Constitution as having supremacy over domestic legislation). However, the Constitution also establishes that the general principles of international law shall be an integral part of the legal order of Bosnia and Herzegovina and the entities, therefore assuming that compliance with the obligations accepted by Bosnia and Herzegovina through ratification of international treaties is considered an obligation. Although there are in the Constitution opposite provisions with regard to the application and precedence of international agreements over legislation, taking into account the whole set of constitutional provisions, it can be concluded that the legislation and those of the entities cannot be contrary to the provisions of international treaties that Bosnia and Herzegovina is a party to.

Pursuant to the Constitution, the Presidency of Bosnia and Herzegovina has the responsibility for negotiating, denouncing, and, with the consent of the Parliamentary Assembly of Bosnia and Herzegovina, ratifying international treaties, while the Parliamentary Assembly of Bosnia and Herzegovina has the responsibility for deciding whether to consent to the ratification of treaties. The Law on the Procedures for the Conclusion and Implementation of International Agreements of Bosnia and Herzegovina (OG BiH, No. 29/00 and 32/13) regulates the process of preparing and concluding ratification and accession processes. In accordance with this Law, international treaties shall be concluded by the Presidency of Bosnia and Herzegovina, which may authorize the Council of Ministers and other competent bodies to execute the agreement.



Box 5.3: Target 12.1 of the 2030 Agenda for Sustainable Development

Goal 12: Ensure sustainable consumption and production patterns

Target 12.1: Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries

Indicator 12.1.1: Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies

Bosnia and Herzegovina does not have action plans at state or entity level on SCP, neither has SCP been mainstreamed in national policies' strategic documents. The country also does not participate in the 10-Year Framework of Programmes (10YFP) on Sustainable Consumption and Production Patterns. Bosnia and Herzegovina should establish national or entity-level action plan/s on SCP, with specific targets and indicators.

The Council is responsible for overseeing the implementation of international treaties through the authorized state and entity institutions. The authorized state administrative bodies monitor the implementation of these treaties and report to the Council.

The initiative for concluding an international treaty may be submitted by Bosnia and Herzegovina institutions, entities, cantons and other regional and local communities, as well as enterprises, institutions, NGOs and other legal entities. The initiative should be submitted to the Council of Ministers through the competent ministry. The proposal for negotiating and signing of international environmental treaties has to be submitted to the Ministry of Foreign Trade and Economic Relations. The Ministry of Foreign Trade and Economic Relations is responsible for evaluating the proposal and, if it is considered positively by the Ministry of Foreign Trade and Economic Relations, Ministry of Foreign Affairs, Ministry of Finance and Treasury, and Ministry of Justice, the Ministry of Foreign Trade and Economic Relations prepares a proposal for triggering the procedure, providing in addition the following elements: identification of constitutional ground(s); explanation of reasons; draft of the treaty; opinion of the Ministry of Foreign Affairs regarding the foreign policy assessment of the reasons for concluding the treaty and its compliance with the provisions of international contractual law; opinion of the competent entity bodies in cases where the treaty regulates issues in the exclusive competence of the entities; composition of the delegation in charge of the negotiation; the authorization to sign the agreement; an estimate of the means (resources) required and their sources; an assessment of whether the proposed treaty requires the adoption of new legislation or amendments to the existing legislation in Bosnia and Herzegovina; and a proposal for applying

the entire treaty, or a part thereof, temporarily until its entry into force.

At the entity level, following the submission of the proposal by the Ministry of Foreign Trade and Economic Relations to the entity-level ministries responsible for environmental protection issues, in the Federation of Bosnia and Herzegovina, the initiative shall be submitted to the Government of the Federation of Bosnia and Herzegovina for approval, whereas in Republika Srpska, the competent entity ministry(ies) shall submit the proposal previously to the relevant Republika Srpska institutions, and thereafter (with the collected opinions of the relevant institutions) the proposal shall be submitted to the Government of Republika Srpska for approval. Following the approval of both entity Governments, the competent entity ministries shall submit their positive opinions on the proposed initiative to the Ministry of Foreign Trade and Economic Relations.

The detailed actions established for ratifying international agreements provide added value in ensuring a clear understanding of the paths to follow towards the ratification of agreements and fulfilment of the required procedures by all actors involved.

Policy framework

Until very recently, Bosnia and Herzegovina did not have a national policy and strategy on the environment. With the approval of the Environmental Approximation Strategy of Bosnia and Herzegovina in May 2017 (supplemented by Environmental Approximation Programmes of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District), the country has a strategic framework for all entities and Brčko District, and sector and cross-sector strategies and programmes. In June 2017, the Government of Republika Srpska issued a Resolution

on conditional acceptance of the Environmental Approximation Strategy of Bosnia and Herzegovina, requiring its urgent revision in accordance with the comments from the Ministry of Health and Social Welfare of Republika Srpska and the Ministry of Economic Relations and Regional Cooperation of Republika Srpska (chapter 1).

There is no strategic document that sets clear priorities for international cooperation on environmental issues. There are a number of strategies on climate change, biodiversity, landscape protection and radioactive waste management, at the state, entity and Brčko District levels.

Institutional framework

The responsibilities on international environmental cooperation are mainly entrusted to the Ministry of Foreign Trade and Economic Relations, at the state level, and to the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina and the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska. The involvement of different levels of administration in international environmental cooperation follows closely the assignment of responsibilities between those in the environmental domain. While the state level is responsible for, among other matters, cooperation with international organizations and institutions in Bosnia and Herzegovina and abroad within its scope of competence in the area of environmental protection, especially in the implementation of the international obligations of Bosnia and Herzegovina and for the monitoring and coordination of the preparations for signing and implementation of the international treaties that Bosnia and Herzegovina accedes to in the area of environmental protection, environmental protection and the use of natural resources fall under the jurisdiction of the two entities and Brčko District, and thus the entities are responsible for the implementation of environmental policy, including that of international environmental agreements ratified or acceded to by Bosnia and Herzegovina.

Taking into account this division of competences, the focal points for environmental global agreements are mostly staff of the Ministry of Foreign Trade and Economic Relations, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina and the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska. There are, however, a number of environmental agreements to which Bosnia and Herzegovina is a party that do not have a nominated focal point in Bosnia and Herzegovina. This situation was already verified in 2011 and long before that, and did not improve,

although the nomination of a focal point is among the most basic duties of a country when it becomes a party to any international agreements. In the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (SWD (2016) 365 final), one of the three main recommendations is that Bosnia and Herzegovina should in 2017 "formalize the procedures for appointment and the functions of the National Focal Point for Bosnia and Herzegovina for the implementation of environmental conventions".

The lack of appointment of focal points is one of the repercussions of coordination difficulties in Bosnia and Herzegovina regarding international cooperation on the environment. The decentralized nature of environmental responsibilities is not an impediment to institutional solutions that ensure compliance with the demands and requirements associated with international cooperation. However, it requires the establishment of mechanisms and rules that regulate the role and responsibilities of each of the actors, the actions to be taken and the inherent decision-making processes. Bosnia and Herzegovina does not have such mechanisms and rules in place, though attempts were made in the past to create structures to coordinate the implementation of international environmental agreements, such as the Steering Committee established in 2002 by the Council of Ministers.

Currently, the practice is to define implementation arrangements for each environmental agreement on a case-by-case basis, and in some situations through a Council of Ministers decision. The case-by-case approach allowed Bosnia and Herzegovina to make significant progress in some environmental agreements, such as in the ozone, climate change and biodiversity clusters, but it has not provided an efficient response for all.

Bosnia and Herzegovina lacks an efficient institutional framework for addressing international cooperation. There is no executive body in charge of governing/coordinating, at the executive level, the implementation of international environmental agreements and promoting the articulation among the relevant institutions, including those in sectors outside the environmental sector and external to the public administration. There are no provisions that regulate the steps to take to comply and enforce international environmental agreements, including reporting obligations for national follow-up on implementation. An agreement on principles of attribution of responsibilities in international cooperation, including with regard to focal points and respective duties,

among different levels of governance, has not yet been adopted.

The persistent weaknesses in Bosnia and Herzegovina in relation to the fulfilment of its obligations under international environmental agreements becomes more acute in the process of complying with the Stabilization and Association Agreement, especially with regard to the environmental treaties to which the EU is a party, the requirements of which have been incorporated into the EU *acquis*.

5.5 International technical assistance on environment

The development of environmental policy and its implementation and enforcement in Bosnia and Herzegovina has been supported by many donors, among which the EU has become predominant.

In 2005, 17 leading donor organizations and international financial institutions established the Donor Coordination Forum (DCF) in Bosnia and Herzegovina. Between 2005 and 2008, UNDP and the Office of the United Nations Resident Coordinator in Bosnia and Herzegovina served as the DCF Secretariat. The DCF initiated the Donor Mapping Exercise in Bosnia and Herzegovina (DME) in 2006 as a tool to improve the management of aid information and to synchronize and enhance cooperation of the donor community in Bosnia and Herzegovina. The DME has two components: the online database that details project activities funded by the now 20 leading donors in Bosnia and Herzegovina, and the analytical report, which offers an overview of donor activities contributing to sectoral reforms.

In order to have better insight into donor activities, and to strengthen the leading role of Bosnia and Herzegovina governments in defining the country's development, the Ministry of Finance and Treasury assumed the role of the DCF Secretariat in January 2009. The Ministry has taken over the management of the DCF online database that also provides information for the DME/Donor Mapping Report (DMR). This was a significant move towards establishing partnerships among Bosnia and Herzegovina governments and the donor community, as well as towards government leadership in defining the country's development priorities and directing international financial assistance in order to achieve stable and equally distributed economic development.

Since 2013, DMRs have been prepared, on a yearly basis, by the Ministry of Finance and Treasury's Sector for Coordination of International Economic Aid (SCIA), in cooperation with representatives of the

Ministry of Finance of the Republika of Srpska, the Ministry of Finance of the Federation of Bosnia and Herzegovina, and other relevant entities, institutions and donor members of the DCF. The DMR provides comprehensive information and analysis of current official development assistance (ODA), which donors/DCF members channelled in the priority sectors in Bosnia and Herzegovina, as well as their future activities.

Between 2007 and 2015, there has been a steady increase of ODA inflows in the environment and climate change sectors, with the exception of 2010, 2011 and 2012.

Between 2011 and 2015, the most significant donors in the environment and climate change domains were Croatia, the Czech Republic, Germany, Hungary, Italy, Japan, Sweden, the Netherlands, Norway, Slovenia, Switzerland, the United Kingdom, the United States of America, the European Bank for Reconstruction and Development (EBRD), the EU, the World Bank, UNDP and UNICEF.

In 2015, the total amount allocated by donors in these domains was €77.22 million, €37.94 million in the form of grants and €39.28 million in the form of loans. Total disbursement amounted to €85.13 million. In 2015, several ongoing projects were supported by the donor community. Some of them are listed in Table 5.1.

The valuable work undertaken by the DCF provides a platform for overall coordination between donors and public institutions and comprehensive information on ODA. However, it is not a sectoral, formalized, donor coordination mechanism. Therefore, donor coordination on the environment and sustainable development is not covered by any formal or stable mechanism. All institutions from various levels of government have their own coordination meetings with donors active in these domains, which means that coordination meetings are *ad hoc*, project based and mostly bilateral.

Implementation of the 2008–2013 national IPA programmes is in its final stage. A new framework programme under IPA II, covering the period 2014–2017 and providing for some €160 million, as well as over €40 million for further flood recovery measures, was adopted in December 2014 and is being implemented. However, due to the absence of countrywide strategies in many sectors, the IPA II Country Strategy Paper is restricted to the period 2014–2017. The approval of the Bosnia and Herzegovina Approximation Strategy will help the country to benefit fully from IPA funding.

Table 5.1: Selected projects, 2015

Project	Donor/financial institution	Total project value (€ million)	Implementation timeframe
Flood Emergency Recovery Project	World Bank	71.56	2014–2018
Green Economic Development Project (Energy Efficiency)	Sweden	47.00	2015–2018
Sarajevo Waste Water Management Project	World Bank	35.11	2009–2017
Second Solid Waste Management Project	World Bank	33.70	2008–2017
Irrigation Development Project	World Bank	28.62	2012–2019
Sava Waterway Rehabilitation Project	World Bank	25.24	2014–2018
Co-financing environmental infrastructure projects with the EIB	Sweden	13.00	2012–2016
Plava Voda regional water supply	EBRD	11.00	2015–2017
Green Economic Development – Environment	UNDP	10.63	2009–2018

Photo 5: Petrol station



5.6 Assessment, conclusions and recommendations

Assessment

Bosnia and Herzegovina is a party to a number of international environmental agreements (annex II). Since 2011, the country became party to the European Landscape Convention (in 2012), the Convention on the Transboundary Effects of Industrial Accidents (in 2013), the Paris Agreement on Climate Change (in 2017) and the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (in 2017), and signed the Protocol on Pollutant Release and Transfer Registers to the Convention on Access to Information, Public Participation in Decision-Making

and Access to Justice in Environmental Matters (in 2013). This demonstrates the political importance that the Government attributes to being an engaged participant in international cooperation in the environmental domain. The aspiration to EU membership is the main driver for improving and completing the strategic and legal environmental framework in the country.

The development agenda in Bosnia and Herzegovina is, and continues to be, complex. Consensus-building and decision-making involves the State Government, the two entities (the Federation of Bosnia and Herzegovina and Republika Srpska) and Brčko District. Bosnia and Herzegovina has not yet put in place an overall efficient coordination formula among all the actors to ensure robust and continuous progress

in meeting the obligations deriving from environmental international agreements.

In May 2017, the Environmental Approximation Strategy was adopted by the Council of Ministers. Environmental Approximation Programmes of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District have also been approved. There is no single document that outlines the general framework for international cooperation on environmental protection. National priorities for the environment will be drawn from the Environmental Approximation Strategy and Programmes, and it is likely that priority will be given to acceding to international environmental treaties to which the EU is a party, which treaties represent the integral part of the EU acquis and serve as additional tools or requirements for the country to achieve full legal harmonization with the EU acquis.

Bosnia and Herzegovina has registered progress towards several of the MDGs. However, SDGs are not significantly embedded in the policy documents of the country, entities and Brčko District.

Bosnia and Herzegovina has in place appropriate and efficient measures to ensure monitoring of international aid. However, there is no coordination mechanism with regard to financial assistance provided by the donor community in the environmental and sustainable development domains.

While Bosnia and Herzegovina continues to be supported by a number of bilateral and multilateral donors, the restrictions around the IPA II, caused by the absence of a countrywide environmental approximation strategy, prevent the country from fully benefiting from such important assistance.

The improvement of Bosnia and Herzegovina's performance vis-à-vis international and regional environmental agreements and the 2030 Agenda for Sustainable Development requires a coordinated and joint endeavour among different parts of the administration.

Conclusions and recommendations

Institutional mechanisms

Bosnia and Herzegovina does not have in place effective institutional mechanisms to oversee and coordinate the implementation of all international environmental agreements to which the country is a party. The case-by-case approach followed in Bosnia and Herzegovina, under which implementation arrangements were established for some agreements,

does not resolve the absence of these arrangements for the whole set of environmental agreements the country is committed to.

The absence of the appointment of focal points is a direct effect of coordination difficulties in Bosnia and Herzegovina regarding international cooperation in the field of the environment. There are a number of environmental agreements to which Bosnia and Herzegovina is a party that do not have a nominated focal point in Bosnia and Herzegovina.

There is no formal coordination mechanism established in Bosnia and Herzegovina for donor coordination in the field of the environment and sustainable development.

Recommendation 5.1:

The Ministry on Foreign Trade and Economic Relations of Bosnia and Herzegovina, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska and the Government of Brčko District should:

- (a) *Set up an institutional mechanism to ensure coordination among all administration levels with regard to implementation and enforcement of multilateral environmental agreements, which should also serve as a platform for donor coordination on environmental and sustainable development issues;*
- (b) *Ensure the appointment of national focal points for all multilateral environmental agreements.*

Accession to multilateral environmental agreements

Despite the progress achieved by Bosnia and Herzegovina in ratification or accession to global and regional MEAs, there are still a number of MEAs to which the country is not a party.

Recommendation 5.2:

The Council of Ministers of Bosnia and Herzegovina should proceed with the country's accession to the following multilateral environmental agreements:

- (a) *Agreement on the Conservation of African-Eurasian Migratory Waterbirds;*
- (b) *Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization;*
- (c) *Convention on the Law of the Non-navigational Uses of International Watercourses;*
- (d) *1995 Amendments, amendments concerning the four Protocols already endorsed, and the*

- Protocol on Integrated Coastal Zone Management to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean;*
- (e) *Protocol on Pollutant Release and Transfer Registers to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters;*
- (f) *GMO amendment to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters;*
- (g) *Convention on Mercury;*
- (h) *Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 amended version, Protocol on Persistent Organic Pollutants (POPs) and its 2009 amended version, and Protocol on Heavy Metals and its 2012 amended version, to the Convention on Long-range Transboundary Air Pollution.*

Public engagement in implementation of MEAs

There is a general absence of information provided by the Bosnia and Herzegovina environmental authorities to the public on the status of Bosnia and Herzegovina's participation in global, regional and bilateral agreements and on the implementation of those agreements, including the reports submitted. NGOs are not involved in the decision-making processes with regard to the country's participation in MEAs. Consequently, they are not involved in the implementation of MEAs.

Recommendation 5.3:

The Council of Ministers of Bosnia and Herzegovina should engage actively in the intersessional process to

develop recommendations on the Strategic Approach to International Chemicals Management and the sound management of chemicals and waste beyond 2020.

Recommendation 5.4:

The Ministry on Foreign Trade and Economic Relations of Bosnia and Herzegovina, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska and the Government of Brčko District should:

- (a) *Ensure access through their websites to the texts of global, regional and bilateral environmental agreements, including translations into the national languages;*
- (b) *Make the information on the status of participation of the country in global, regional and bilateral agreements and on the implementation of those agreements (in particular, national reports on implementation) available to the public through their website;*
- (c) *Enhance the involvement of NGOs in development of national reports on implementation of multilateral environmental agreements;*
- (d) *Further involve NGOs in international decision-making processes on environmental matters, including on accession to and implementation of multilateral environmental agreements, through organizing effective public consultations and integrating NGOs in coordination groups dealing with international matters and ensuring their effective participation in such groups.*

Chapter 6

CLIMATE CHANGE MITIGATION AND ADAPTATION

6.1 Environmental and economic impacts from climate change

Weather

Extreme climate events in Bosnia and Herzegovina have become more frequent. In the period 2003–2014, six of the 12 years (2003, 2007, 2008, 2011, 2012, and 2013) were either very dry or extremely dry. In 2001, 2002, 2009, 2010 and 2014, there were large to disastrous floods. Extreme climate events were especially pronounced during the last eight years (in 2009, 2010 and 2014 major floods were recorded; in 2011, 2012 and 2013 there were severe droughts and waves of high/tropical temperatures; early 2012 saw a wave of extreme cold and there were windstorms in mid-2012). April and May 2014 saw record rain (over 420 mm) in the northern part of the country, which caused disastrous floods in the catchment area of the Vrbas and Bosna Rivers, as well as in the area of Semberija. These extreme climate and weather episodes have caused substantial material and financial deficits, as well as casualties.

Temperature

According to the analysis of meteorological data from the period 1961–2014, a continuous rise in mean annual temperature is maintained (table 6.1). In the analysis of multi-year series of data (1961–2014) by years, a positive linear trend was observed in mean

annual temperature, which is especially pronounced since 1982. In the same time series, trends in annual temperatures on all analysed stations are statistically significant, while the changes are more pronounced in the continental part of the country.

The increase in annual air temperature ranges from 0.4 to 1.0°C, while the increase in temperature during the growing season (April–September) reaches 1.0°C. However, increases in air temperature over the last 14 years are even more pronounced. The increase in temperature, in addition to increases in GHG emissions, is caused by a more pronounced effect of the urban heat island.

In all analysed meteorological stations, the biggest difference between the reference period 1961–1990 and the other two analysed periods, 1981–2010 and 2000–2014, is mainly pronounced in the summer period. Differences between the reference period 1961–1990 and the period 1981–2010 range from 1.9°C in Sarajevo to 0.8°C in Tuzla. The differences between the reference period 1961–1990 and the period 2000–2014 are higher than in the period 1981–2010, ranging from 2.7°C in Sarajevo to 1.5°C in Bjelašnica. Positive deviations are evident for the spring and fall seasons, as well as for the growing period in all meteorological stations. On an annual basis, the differences between these periods are positive – in all meteorological stations, there is an evident increase in temperatures.

Table 6.1: Changes in air temperature in Bosnia and Herzegovina, 1961–2014, °C

	Doboj	Banja Luka	Bijeljina	Sokolac	Trebinje	Mostar	Bjelašnica	Tuzla	Sarajevo	Zenica
max 2001–2014	12.73	13.07	13.10	8.82	15.52	16.17	2.46	12.03	11.70	12.58
min 2001–2014	10.40	10.71	11.13	6.55	13.90	14.58	0.63	9.65	9.14	10.25
mean 2001–2014	11.77	12.12	12.39	7.75	14.95	15.67	1.78	11.15	10.62	11.45
max 1961–2014	12.73	13.07	13.10	8.82	15.52	16.21	2.46	12.03	11.70	12.58
min 1961–2014	9.60	9.72	9.88	5.03	13.00	13.63	0.47	8.24	8.68	9.31
mean 1961–2014	11.02	11.12	11.44	6.88	14.33	14.97	1.41	10.32	9.95	10.57
max 1981–2010	12.45	12.82	13.10	8.39	15.52	16.21	2.28	11.98	11.27	11.87
min 1981–2010	10.07	10.18	9.95	5.34	13.38	14.08	0.47	8.24	8.92	9.51
mean 1981–2010	11.15	11.41	11.65	7.10	14.37	15.17	1.51	10.37	10.06	10.73
max 1961–1990	11.45	11.66	12.30	7.51	15.15	15.59	2.14	10.83	10.42	11.10
min 1961–1990	9.60	9.72	9.88	5.03	13.00	13.63	0.48	9.06	8.68	9.31
mean 1961–1990	10.63	10.58	10.93	6.38	14.03	14.58	1.23	10.02	9.55	10.15

Source: Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, July 2016.

The increase in mean annual temperatures ranged from +0.02 in Bjelašnica and in Sarajevo to +0.03 in Livno, mainly due to the increase in the maximum temperatures, with the trend of +0.07 in Livno to +0.03 on Bjelašnica.

Precipitation

In the period 1961–2014, most of the territory of Bosnia and Herzegovina was characterized by a slight increase in the amount of rainfall annually (table 6.2). Linear trends for the multi-year period 1961–2014 indicate stagnation or a slight increase in the amount of rainfall on the entire territory of Bosnia and Herzegovina. Changes in the amount of rainfall are more pronounced by seasons than annually.

The rainfall trend by seasons is different. In the central part it is negative during spring and summer (and most pronounced in the area of Herzegovina – up to 20 per cent), while during autumn increased rainfall was observed, especially in the northwestern and central parts. Although significant variability in

precipitation has not been recorded, the pluviometric regime, i.e. the annual distribution, has been greatly disrupted. Due to the increased intensity of rainfall and its greater variability, as well as the increased share of heavy rains in the total amount of rainfall, there is increased risk of flooding, especially in the north-eastern part of the country, where the most disastrous floods in history were recorded during May 2014. The mean value of annual precipitation for both the Sava River Basin and the Adriatic Sea Basin has not changed significantly in the period 1961–2014 (table 6.3).

However, the value range (distribution) is higher for both basins. In the period 1991–2014, annual precipitation in the Sava River Basin was 44 mm higher than in the period 1961–1990. However, the range has increased (769 mm compared with 407 mm) and the minimum value is lower at 100 mm, whereas the maximum value is higher at 262 mm. Accordingly, the value of variance is significantly higher in the period 1991–2014.

Table 6.2: Variability in precipitation in Bosnia and Herzegovina, 1961–2014, mm

	Banja Luka	Bjelašnica	Bijeljina	Doboj	Zenica	Mostar	Sarajevo	Sokolac	Tuzla	Trebinje
max 2001–2014	1 561	1 996	1 090	1 494	1 201	2 491	1 187	1 274	1 353	2 734
min 2001–2014	589	972	466	496	519	873	692	622	566	1 054
mean 2001–2014	1 054	1 397	781	1 009	848	1 527	984	946	963	1 776
max 1961–2014	1 561	1 996	1 090	1 494	1 201	2 491	1 249	1 274	1 353	2 741
min 1961–2014	589	693	466	497	519	841	625	562	566	1 054
mean 1961–2014	1 042	1 204	760	922	810	1 499	945	850	906	1 731
max 1981–2010	1 396	1 996	1 090	1 427	1 051	2 491	1 249	1 274	1 325	2 741
min 1981–2010	702	952	481	627	543	841	625	562	569	1 101
mean 1981–2010	1 039	1 314	792	934	811	1 401	937	859	911	1 678
max 1961–1990	1 281	1 518	892	1 154	1 010	1 987	1 170	1 048	1 233	2 398
min 1961–1990	685	693	492	657	543	841	625	562	600	1 311
mean 1961–1990	1 029	1 114	738	871	782	1 522	932	802	894	1 751

Source: Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, July 2016.

Table 6.3: Statistical parameters of the series of annual precipitation in Bosnia and Herzegovina, 1948–2014, 1961–1990, 1991–2010 and 1991–2014

	Annual precipitation in Sava River Basin				Annual precipitation in Adriatic Sea Basin			
	(mm)				(mm)			
	1948–2014	1961–1990	1991–2010	1991–2014	1948–2014	1961–1990	1991–2010	1991–2014
Mean value	1 009.30	990.40	1 040.90	1 034.30	1 481.60	1 523.80	1 456.50	1 469.10
Median	1 004.80	989.30	1 033.30	1 020.10	1 502.40	1 584.00	1 412.40	1 412.40
Standard deviation	137.77	104.38	144.08	172.62	324.26	282.71	371.10	398.40
Variance	18 979.80	10 896.20	20 759.10	29 795.20	10 514.50	79 927.20	137 749.80	158 692.10
Kurtosis	1.23	- 0.21	0.02	0.56	0.50	0.45	1.84	0.54
Skewness	0.36	- 0.57	0.20	0.13	0.21	- 0.75	1.14	0.80
Range – scope	768.94	406.56	582.66	768.94	1 650.20	1 146.70	1.59	1 618.20
Minimum	653.86	754.00	768.46	653.86	840.50	841.00	897.00	872.50
Maximum	1 422.80	1 161.00	1 351.12	1 422.80	2 490.70	1 987.00	2 491.00	2 491.00

Source: Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, July 2016.

Wind

The Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions under the UNFCCC does not analyse wind speed trends and seasonality. There are no statistics on the number of days per year with wind speeds in excess of 15 m/s in the period 1961–2014.

Water resources

The Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions under the UNFCCC does not analyse the impact from climate change on the quantity and quality of water resources in the country. However, the report states that water resources is one of the sectors most affected by climate change and points out a need to monitor and observe changes in water resources due to the impact of climate change.

Land and soil

The Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions under the UNFCCC does not analyse the impact from climate change on land and soil resources in the country. According to the report, due to climate change, in the future the country could face accelerated processes of land erosion mainly through increased land erosion, changes in land use, increased intensity of rainfall and prolonged dry periods. The report proposes reforestation practices as an adaptation measure to decrease erosion processes.

There are no official data on the country level on the areas affected by erosion, and no erosion monitoring system is in place.

Forest and other natural vegetation

In Bosnia and Herzegovina, there are no permanent measuring stations to monitor and track changes in and reactions of the forest ecosystems to climate change. Consequently, there are no data and no analysis on the current impact from climate change on forests.

Biodiversity and ecosystems

High mountain landscapes, mountain landscapes and relict-refugial landscapes in Bosnia and Herzegovina are highly sensitive ecosystems to climate change. The ecosystems situated in karst landscapes are also vulnerable to climate change and, at the same time, they are also strongly affected by other anthropogenic

pressures. Among these, the wetlands of karst fields are particularly sensitive.

During 2013, intensive drying of individual trees of spruce, fir, white and black pine and juniper was observed, and the cause was considered to be climate change and other anthropogenic impacts.

Human health

Neither direct nor indirect climate change effects on human health are continuously monitored in the country. Although some reports systematically cover climate change issues, there is still no established system for monitoring the incidence of certain diseases in a particular region that could be linked to changes in some climate parameters and subsequent natural disasters. Data gathered from the institutions of Bosnia and Herzegovina have not been used for development of a clear response methodology for crisis situations caused by climate change, including the preventive measures that must be implemented in order to avoid the occurrence of crisis situations, or mitigating measures for consequences caused by climate change (e.g. reduced food yield due to drought or flooding or a shortage of safe drinking water). Bosnia and Herzegovina does not have a clear model of information flow between different sectors, competences frequently overlap, and it is not clear who is responsible to whom, who takes data from whom and by which methodology or how data are delivered.

Economic impacts from climate change

There are no studies or assessments available of the existing economic impact from anthropogenic climate change on economic sectors in Bosnia and Herzegovina.

6.2 GHG emissions from economic sectors

Annex III presents the overview of total emissions and emissions by sector for the period 2002–2013.

Total emissions of CO₂-eq. was growing from 16,170.12 Gg in 2002 to 28,086.27 Gg in 2011. They then dropped to 21,816.43 Gg CO₂-eq. in 2012 and 24,027.84 Gg CO₂-eq. in 2013.

In the period 2002–2013, the energy sector was the greatest contributor to CO₂ emissions, accounting for 51–60 per cent, followed by the agriculture sector (11–16 per cent), transport (9–13 per cent), the industrial sector (3–10 per cent) and the waste sector (4–6 per cent).

Energy

The energy production sector is the main source of CO₂ emissions. It currently contributes around 70 per cent of total CO₂ emissions. This sector covers all activities encompassing the consumption of fossil fuels (fuel combustion and non-energy fuel consumption) and fugitive emissions from fuel. Fugitive emissions occur during production, transport, processing, storage and distribution of fossil fuels. The energy sector is the main source of anthropogenic emission of GHGs.

Two the most carbon-intensive energy subsectors are energy conversion (TPPs, heating plants, transport) and industrial fuel combustion. Most of the CO₂ emissions in energy conversion are from fuel combustion in TPPs, and the changing pattern in coal consumption affects the changes in total emissions. Furthermore, changing of fuel in industry facilities (mainly coal and natural gas) contributes to these changing emission values.

The share of the energy industry in total emissions varies from 61 to 70 per cent across the years. Emission quantities from 1990 have not been reached yet. The highest emission from energy industries was in 2011 when it amounted to 72 per cent of emissions from the base year 1990.

Emissions from transport are increasing steadily by year. The share of emissions from transport in energy sector emissions rose from almost 10 per cent in 1990 to 30 per cent in 2005, then dropped again in 2013 to 23 per cent. These fluctuations may be explained by the changes in energy production (coal consumption) patterns.

Fugitive emissions from solid fuel are mostly generated from coal mines, primarily from underground exploitation. The huge difference between 1990 emissions and emissions in the period 2002–2013 is explained by decreased exploitation from underground coal mines.

Industrial processes

Emissions from industrial processes show an increasing trend across the years, due to developing and increasing industrial activities. However, minor changes occurred in production in certain industries, which caused some inconsistencies in the trend, but this can be logically explained by decreased production capacities, which are not following the development curves. Even though activities, and consequently emissions, have an increasing trend, emissions from 1990 have not been reached yet.

Emissions from cement production vary across the years, due to changing production of cement. The highest emissions were recorded in 2008, when production in the cement plant Kakanj increased to 770,000 tons, which was the highest production in the history of that factory.

CO₂ emissions from iron and steel production started to grow rapidly in 2008 due to the start-up of integrated steel production in blast oxygen furnace (BOF) production, compared with the previous electric arc furnace (EAF) production, and non-existence of integrated production until 2008. Higher emissions are the result of both increased production and the different emission factors (0.08 for EAF vs 1.46 for BOF) applied.

Agriculture

Agriculture (enteric fermentation and manure management) is one of the main sources of methane emissions in Bosnia and Herzegovina.

Emissions of N₂O from agriculture soils (as the main source of N₂O emissions) changes slightly across the years, varying from 4–6 Gg. Total N₂O emissions from this category were 4.31 Gg in 2012 and 4.55 Gg in 2013.

Land use change and forestry

Forests represent a significant CO₂ sink. The final annual CO₂ sink by forest ecosystems for the baseline year 1990 is 7,423.53 Gg CO₂, and for the year 2013 is 6,141 Gg CO₂.

6.3 Adaptation to climate change by economic sectors

Bosnia and Herzegovina considers the following sectors as most affected by climate change: agriculture, water resources, human health, forestry and biodiversity, and sensitive ecosystems, including the coastal area.

Energy

The risks associated with climate change have not yet been systematically considered in strategies and management plans for hydropower development.

The hydropower sector has not yet adapted its infrastructure to both low river flows and increased peak river flows. The expected summer precipitation decreases could lead to a fall in the production of hydroelectric power. This reduction can be compensated for through the generation of thermal

energy or by importing power, although neither is economically viable or environmentally friendly. More frequent, intense rain events will lead to intensive run-off and increased peak river flows, when power production may not be possible due to potential (or actual) damage to infrastructure.

Industry

There is no evidence that Bosnia and Herzegovina has already implemented or is currently implementing policies and measures on adaptation of the industrial sector to the current and foreseeable impact of climate change. Moreover, the 2013 Climate Change Adaptation and Low-Emission Development Strategy does not envisage any adaptation measures for industry.

Agriculture

There is no evidence that Bosnia and Herzegovina has already implemented or is currently implementing policies and measures on adaptation of the agricultural sector of the country to the current and foreseeable impact of climate change.

Adaptation approaches will need to focus on improved water management and irrigation, new farming systems appropriate for hotter and more arid environments, and varietal improvements of local crops to maximize agricultural production under more arid conditions. Improvements of water storage infrastructure are also needed, along with mechanisms to better manage water supply and distribution in irrigation networks.

Forestry, biodiversity and protected areas

Adaptation approaches in the forestry sector will require improved information for forest management to support changes in species planted, and management interventions to prevent fire and diseases spreading. Adaptation measures to protect biodiversity could include expanding the network of protected areas and improving management of existing protected areas.

Transport

There is no evidence that Bosnia and Herzegovina has already implemented or is currently implementing policies and measures on adaptation of the transport sector and infrastructure of the country to the current and foreseeable impact of climate change. Moreover, the 2013 Climate Change Adaptation and Low-Emission Development Strategy does not envisage any adaptation measures for the transport sector.

Tourism

Climate change adaptation approaches in the tourism sector require revisiting winter tourism and snow-making capabilities. Tourism marketing strategies may need to focus on more summer ecotourism, and tourism infrastructure needs to be examined in relation to future climate change.

Human health

At present, there is no comprehensive system for the monitoring of epidemics and disease prevalence correlated with climate parameters in Bosnia and Herzegovina.

The increased temperature is likely to result in a higher number of cases of cardiovascular and cerebrovascular illness. Higher temperatures will also contribute to the spread of vector-borne diseases, thus increasing the incidence and extent of infectious diseases. Increased humidity will increase the number of respiratory ailments. The heatwaves will affect risk and mortality, for the elderly population in particular.

Effective adaptation will require better information on the potential extent of the problems, and then targeted investment in air conditioning and water purification plants.

6.4 GHG emissions mitigation scenarios

The GHG inventory in the Third Communication covers the period 2002–2009, and 2012 and 2013. The database was formed using the Non-Annex I Inventory Software (NAAIS) developed by the UNFCCC Secretariat for parties not included in Annex I to the Convention. The report also covers the revision of the First Biennial Update Report on Climate Change for 2010 and 2011.

Bosnia and Herzegovina developed scenarios modelling possible pathways of GHG emissions until 2040. Scenarios were developed for the following sectors: electricity generation, district heating, buildings, transport, waste management, agriculture and forestry. The financial effects of the scenarios were also analysed. However, this analysis does not assess measures that would lead to these results.

The modelling process considered three development scenarios:

- S1 – a baseline scenario ("business as usual");
- S2 – a scenario that assumed partial implementation of mitigation actions;

- S3 – an advanced scenario that assumed the implementation of a comprehensive set of mitigation actions.

Electricity sector

The S1 and S2 scenarios assume that CO₂ emissions from the Bosnia and Herzegovina energy sector will increase in the period 2010–2040, with the increase exceeding 100 per cent in the S2 scenario. Under the S3 scenario, however, emissions in 2040 will be similar to those in 2010. In addition, financial analysis for the S3 scenario indicates a benefit that is 16 per cent higher than in the S1 scenario.

Scenario S1 includes phasing out the operation of existing coal-fired TPPs (efficiency degree about 30 per cent) due to the end of their lifetime. Of 1,765 MW in the existing coal-fired TPPs, 900 MW will remain in operation in 2030 and 300 MW by 2050. Construction of new TPPs is foreseen with the new degree of efficiency of about 40 per cent. The total capacity of new TPPs will amount to 1,000 MW in 2030 and 1,200 MW by 2040. In 2050, the capacity of new power plants will also be reduced because some of them will be shut down due to the end of their service life. Although, in this scenario, electricity generation from coal-fired TPPs is growing, CO₂ emissions are not growing because most of the electricity will be generated from new, more efficient power plants.

Total production is on the rise, from 17,451 GWh in 2013 to 23,368 GWh in 2015 (34 per cent). At the same time, CO₂ emissions will drop from 10.67 million tons in 2013 to 6.50 million tons in 2050 (39 per cent).

Construction of power plants using other RES is also expected. By 2050, a total of 40 MW is foreseen for biomass cogeneration plants, 300 MW in wind turbines, 40 MW in solar power plants and 250 MW in small HPPs.

The S2 scenario envisages a faster phasing out of the existing TPPs from operation due to the introduction of certain mechanisms (open market, eliminating subsidies for electricity from fossil fuels, etc.). In such circumstances, owners of the existing TPPs will be incentivized to speed up construction of new coal-fired power plants as the fossil fuel subsidies are removed, and, moreover, to consider more intensive construction of new power plants using RES.

By 2030, about two-thirds of the existing coal-fired TPPs will be shut down and a total of 600 MW will

remain in operation. By 2040, this capacity will be reduced to 300 MW, and in 2050 to zero. In the new coal-fired power plants, about 600 MW will be built by 2030 and they will operate with that capacity until the end of the observed period.

Total electricity generation is projected to grow from 17,451 GWh in 2013 to 23,995 GWh in 2050 (37.5 per cent). At the same time, CO₂ emissions will decrease from 10.67 million tons in 2013 to 3.93 million tons in 2050 (63 per cent).

This scenario is characterized by intensive use of RES compared with scenario S1. By 2030, the country plans to have 30 MW in biomass cogeneration plants, 200 MW in wind turbines, 20 MW in solar power plants and 150 MW in small HPPs, and for these capacities to increase to 100 MW, 800 MW, 60 MW and 300 MW respectively by 2050. Due to the increasing decentralization of electricity generation, an increase in generation is foreseen in the industrial cogeneration plants.

Scenario S3 implies intensive use of the potentials of RES and energy efficiency for Bosnia and Herzegovina to join the European emission trading system for GHGs (EU-ETS) and to create a competitive regional electricity market. Bosnia and Herzegovina's entry into the EU-ETS also includes payment of emission permits for GHGs for the power sector, which reduces the competitiveness of fossil-fuel power plants, particularly coal-fired plants. A gradual phasing out of the operations of the existing power plants is foreseen as early as 2030, and construction of new power plants with a total capacity of 600 MW. The active capacity of power plants at the end of the observed period is expected to amount to 300 MW.

Scenario S3 is characterized by the most intensive use of RES, when compared with scenarios S1 and S2. By 2030, the country plans to have 60 MW in operation in the biomass cogeneration plants, 200 MW in wind turbines, 40 MW in solar power plants and 150 MW in small HPPs, and for these capacities to increase to 200 MW, 1200 MW, 160 MW and 600 MW respectively by 2050. Since the industrial power plants mainly use fossil fuels, the plan is to reduce their production.

Under scenario S3, total electricity generation will grow from 17,451 GWh in 2013 to 24,590 GWh in 2050 (41 per cent). CO₂ emissions will decrease from 10.67 million tons in 2010 to 1.55 million tons in 2050 (85 per cent).

District heating sector

According to scenario S1, only new buildings with lower energy consumption will be connected to the district heating system. The share of district heating in total energy consumption will not change from the current level, and neither will the efficiency of production and distribution of thermal energy.

The S2 scenario assumes that new consumers will be gradually connected to the district heating system so that in 2050 the percentage of households covered by the district heating system will be approximately twice the current level. Due to application of the current legislation, energy consumption will decline; in 2050, it will therefore amount to slightly below 50 per cent of the consumption in 2010. This scenario also envisages a slight increase in efficiency in generation and distribution of thermal energy.

The S3 scenario envisages more intensive coverage of district heating systems so that in 2050 the percentage of households covered by the district heating system will be approximately three times the current level. Specific consumption of thermal energy will decrease. Due to implementation of more stringent legislation, in 2050 the average specific consumption of thermal energy will amount to approximately 25 per cent of the consumption of thermal energy in 2010. Higher percentages of RES will be introduced in the district heating systems, particularly biomass and geothermal energy. This scenario envisages the construction of several smaller heating plants that will use municipal waste for energy, then the intensive introduction of cogeneration in district heating systems, as well as increased efficiency in production and distribution of thermal energy.

Transport

The S1 scenario is based on the present trends in development of the transport sector. It assumes road and rail transport will retain their shares by 2050. An increase in the number of road vehicles is expected, by an average annual rate of about 5.8 per cent, with the average age of the vehicle fleet increasing from 12 to 15 years, without the implementation of measures of approval and with a decrease in the share of diesel vehicles (in passenger kms) by 3 per cent by 2050 and petrol vehicles by 5 per cent, and the introduction of electric cars bringing their share to 10 per cent by 2050. It is also assumed that by 2050 the share of passenger vehicles (in passenger kms) will decline by 10 per cent while the share of buses will rise by 10 per cent. The present scenario assumes that the energy intensity of passenger vehicles will decline

by 0.2 per cent per year and GHG emissions produced by motor vehicles will grow proportionally with the increase in consumption of energy from fossil fuels. In relation to the age of the vehicle fleet in Bosnia and Herzegovina, the average CO₂ emissions from road vehicles is around 185 g of CO₂/km (at an average consumption of 6.5 litres/100 km for diesel and about 7.0 litres/100 km for petrol vehicles for the period 1998–2008). A reduction in the overall volume (ton/km) of freight transport is assumed by 2050, although rail transport will increase by about 4 per cent. This scenario is also based on the currently applicable local legislation and trends in other subsectors of transport in Bosnia and Herzegovina.

The S2 scenario assumes the introduction of additional technical measures to improve the efficiency of motor vehicles and decrease fuel consumption. This scenario implies an average reduction in the energy intensity of all types of vehicles by 0.5 per cent, a decrease in the share of diesel and petrol vehicles (in passenger kms) along with an equivalent increase in the share of electric vehicles (25 per cent) by 2050, as well as a decrease in the share of passenger vehicles (per passenger km) along with an equivalent increase in that of bus transport (approximately 13 per cent) by 2050. Another assumption is an increase in the share of electric locomotives and an equivalent decrease in diesel locomotives (10 per cent) by 2050. Improvements in both the quality of fuel and the road infrastructure are expected to impact on vehicle efficiency. In the area of freight transport, a reduction in tons/km is assumed along with an equivalent increase in rail (about 12 per cent) by 2050. An important element of scenario S2 is the reduction in the average age of road vehicles to 12 years by 2025. The main objective of this scenario is to reduce the emission coefficient from 185g of CO₂/km in the base year to 150 g of CO₂/km in 2025, with a further reduction to 130g of CO₂/km by 2040. In addition, the introduction, implementation and enforcement of EU directives in the field of transport by 2025 are also assumed.

The S3 scenario assumes a sharp reduction in emissions in the transport sector by the implementation of EU directives in Bosnia and Herzegovina by 2025, as a consequence of: better fuel quality; more efficient motor vehicles; better tyres; the exclusion of vehicles without catalytic converters; introduction of new regulations on the importation of road vehicles; introduction of the EURO-6 standard; compliance with EU Regulation 443/2009 on the limitation of CO₂ emissions from new passenger cars to 95g CO₂/km by 2021; construction of more efficient road infrastructure and vehicle flows;

introduction of measures for urban/city traffic that reduce emissions; the impact of the ETS Directive on air traffic; and a significant increase in railway transport by 50 per cent by 2025 and stabilization by 2040. Assumptions in this scenario include reducing energy intensity per passenger km for all types of vehicle by 1 per cent per year, reducing the share of road passenger kms and increasing the share of rail passenger kms by 15 per cent by 2050, and increasing the share of electric vehicles by 35 per cent, resulting in a reduction of diesel and petrol vehicles in road traffic, as well as a decrease of 14 per cent in the share of passenger cars in passenger kms and a significant increase in bus passenger kms. In the area of freight transport, a reduction in tons/km is assumed, along with an equivalent increase in rail (17 per cent).

An overview of projections of total CO₂ emissions from the transport sector for the period 2010–2050 under these three scenarios is provided in table 6.4.

According to scenario S1, an increase in CO₂ emissions to 6,627 Gg CO₂-eq. is foreseen by 2050, with an average annual growth in emissions of about 1.5 per cent in the period 2010–2050. This scenario follows the historical trend of increasing CO₂ emissions in the transport sector. According to scenario S1, CO₂ emissions in 2050 will be almost double those of 2010.

The S2 and S3 scenarios also result in continued average growth in CO₂ emissions, respectively by about 0.6 per cent and 0.3 per cent annually in the period 2010–2050. Scenario S2 results in a 64 per cent increase in CO₂ emissions, and scenario S3 a 27 per cent increase, compared with 2010.

Agriculture

According to scenario S1, no major changes are expected in terms of the development of the agricultural sector and sectoral policies. In addition, the share of agriculture in the overall economy remains at the same or a similar level. Under these circumstances, the industrial sector is not developing and therefore pressure on agriculture will increase in terms of ensuring the living conditions of the population. The focus will be on increasing yield per unit area by introducing large amounts of mineral fertilizers and manure, and in some cases natural meadows and pastures will be ploughed for the production of fodder for livestock. Organic agriculture will have symbolic importance.

Increased growth of livestock production is foreseen. The emphasis is on the concept of concentrated farm production with a large number of farming units. Similarly, increased use of land for non-agricultural purposes is expected, particularly from the point of view of permanent losses in construction of infrastructure, settlements, exploitation of raw materials and such. The technologies used in agriculture and technical and technological measures will not follow world trends in this area. Conservation and land development measures will be lacking, and soil moisture conservation measures and no-tillage farming will be applied at a low level. Degraded land areas will be scarcely recultivated. Agricultural practices will remain at the current level and the EU Nitrates Directive (Council Directive 91/676/EEC) will not be applied. Conventional agriculture standards will be partially applied. Furthermore, the development of agriculture, rural areas, incentive programmes and legislation will not be harmonized in the country. Incentive measures remain at the current or lower levels, the issue of climate change is not part of sectoral policies and strategies and there is no strategy to combat drought.

Scenario S2 assumes positive changes and progress in the agricultural sector. The share of agriculture in the overall economy of Bosnia and Herzegovina, use of agricultural land and trends in production of agricultural products increase, while an increase in average yields still remains modest. Organic farming takes a significant share in overall agricultural production. Advanced technical and technological measures are used. A modest number of farmers apply the code of good agricultural practice. The Nitrates Directive is partially applied. The number of livestock is slightly on the rise and productivity has increased. Degraded land area has decreased slightly. Development of agriculture, rural areas and villages is harmonized. Programmes of measures and incentives are partially harmonized, funds have increased slightly and are targeted towards officially registered farmers, in order to protect the environment and apply the best agricultural practices, among other things. The principles of landscape design of rural areas are taken into account in conceptualizing the construction of infrastructure, agricultural development and other secondary activities. Climate change constitutes an integral part of sectoral policies, strategies and incentive programmes. The 2013 Climate Change Adaptation and Low-Emission Development Strategy becomes the backbone of activities, while there is increased awareness of climate change and the strategy to combat drought is being implemented.

Table 6.4: Projected total CO₂ emissions in the transport sector for the period 2010–2050, Gg CO₂-eq.

Scenario	2010	2015	2020	2025	2030	2035	2040	2045	2050
S1	3 371	3 669	3 994	4 347	4 730	5 147	5 600	6 093	6 627
S2	3 371	3 669	3 807	4 048	4 306	4 581	4 876	5 191	5 528
S3	3 371	3 669	3 569	3 676	3 789	3 907	4 032	4 163	4 301

Source: Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, July 2016.

The starting point of scenario S3 is the fact that Bosnia and Herzegovina is a full member of the EU. Upon joining the EU, the agricultural policy of Bosnia and Herzegovina is developed in accordance with the EU common agricultural policy and the available resources are used to boost the development of the sector, which makes development of the agricultural and environment sector sustainable.

Degraded land areas are successively being renewed through rehabilitation and remedial measures. The farms are modernized, high technical and technological measures and standards are used, as are codes of good agricultural practice. There is highly raised awareness of climate change. Monitoring of the environmental conditions and changes in the area is developed, and thus there is transparent reporting to both the domestic and international public.

According to the S1 scenario, total annual GHG emissions in the agricultural sector will rise from 3,609 Gg CO₂-eq. in 2015 to 8,170 Gg CO₂-eq. in 2050 (an increase of 126 per cent).

According to the S2 scenario, total annual GHG emissions will be 4,359 Gg CO₂-eq. in 2050 (an increase of 20 per cent on 2015).

According to the S3 scenario, total annual GHG emissions will be 2,562 Gg CO₂-eq. in 2050 (a decrease of 30 per cent on 2015).

Forestry sector

During the development of the First and Second National Communications there were no significant changes in the forestry sector in terms of recognizing the existence of climate change. According to the Third National Communication, developments in the forestry sector do not place any importance on climate change in terms of the significance of the existing forests in Bosnia and Herzegovina.

The S1 scenario is based on the trend of increasingly intense deforestation. This scenario has a negative trend of sequestration capacity, as a consequence of forest fund losses at an annual average rate of -1 per cent. After 2025, all forests are managed in

accordance with the recommendations of the certifying institutions, and logging scope is brought down to the level of 2010. There is no excessive or illegal logging, and no decrease of forest areas. The volume of reforestation and success is the same as activities to date.

The S2 scenario envisages the application of certain stimulus measures for preserving existing forest cover and of certain silviculture methods to increase the carbon sequestration in tree biomass in existing forest areas. For example, the reforestation of bare lands would increase the total annual biomass increment. The enhancement of fire protection measures aims at preventing and reducing the number of forest fires. The S2 scenario would result in a slight increase in the sink capacities of forest cover in Bosnia and Herzegovina. The extent of logging will be back to the level of 2010. About 2,500 ha will be forested per year with 100 per cent success in planting and development of newly established forests.

The S3 scenario is based on the assumption that Bosnia and Herzegovina will become a member of the EU by 2025 and will thus be obliged to comply with all obligations and directives related to the forestry sector. This primarily refers to full certification of programmes for the overall forest fund in Bosnia and Herzegovina, aiming to improve sustainable forest management. One of the special measures that the S3 scenario assumes is the continued reforestation of degraded forest cover and afforestation of woodland barrens, with the aim of combating the negative trend in forest area reduction by increasing the area under forest cover in future.

The scenario envisages demining of forest areas (at present, 10 per cent of forest areas are still mined). The extent of logging will stay at the level of 2010, with no increase in intensity. About 2,500 ha will be forested per year with complete success over the entire surface. Over the next 20 years, every year 100 ha of new plantations are established in the form of energy plantations with fast-growing species. Activities and investments in fire protection will be introduced. These activities contribute to an estimated 1,000 ha less burned each year.

According to the S1 scenario, sequestering capacities will decline by 2025 and remain almost stagnant thereafter. By 2050, sinks would be reduced to 6,119.19 Gg CO₂.

Under the S2 scenario, the projected value of the sink capacity would increase to 6,693.25 Gg CO₂ in 2050, an increase of 3.4 per cent over 2010.

According to the S3 scenario, the size of the sink would have increased by around 400 Gg CO₂ in 2050, an increase of 6.15 per cent.

Waste sector

The S1 scenario assumes 65–70 per cent of total generated waste is collected and disposed of at regulated landfills and illegal dumping sites. After 2030, regional landfills are foreseen, as well as waste disposal on legal dumping sites. Starting from 2012, an annual increase in recycling of 0.5 per cent is envisaged from the current level of 0.5 per cent. This takes into account an increase in the amount of generated waste, as well as an increase in the level of coverage by collection services. No other waste management measures are foreseen apart from recycling.

The S2 scenario envisages construction of several regional sanitary landfills with systems for the collection and burning of biogas across Bosnia and Herzegovina by 2025. Collection of the entire amount of generated waste and an increase in recycling are foreseen. Scenario S2 takes into account an increase of generated waste as in the baseline scenario, but it predicts an increase in recycling and treatment using other methods, such as biological treatment or incineration. An annual increase in recycling of 2 per cent by 2018 is foreseen, and then 1 per cent by 2030 and 0.5 per cent by 2050. Other waste treatment methods are foreseen, such as biological treatment or incineration of 0.5 per cent of all waste in the period 2015–2020 and, as of 2020, an annual increase of 0.5 per cent to the level of 16 per cent by 2050. Disposal of residual waste only on regional landfills is foreseen by 2025. In 2030, about 70 per cent of the waste will be disposed of on the landfills, and 50 per cent in 2050.

The S3 scenario envisages an increased level of recycling at source and on the landfills, as well as the change of billing services based on the amount of waste produced. It does not take into account construction of incinerators for incineration of mixed utility waste (i.e. treatment after recycling). The S3 scenario takes into account increases as in the baseline scenario, but it predicts an increase in

recycling (44 per cent by 2050), as well as wider application of other methods, such as biological treatment or incineration (up to 36.5 per cent by 2050). It also assumes the disposal of residual waste only on regional landfills by 2020.

According to the S1 scenario, total GHG emissions will continue to grow and almost triple by 2050. Total emissions according to the S2 scenario will grow by 2025, then remain stable by 2030 and start to slowly decrease by 2050. Total emissions according to the S3 scenario will grow by 2020 and then more than halve by 2050.

6.5 Climate change mitigation and adaptation provisions in legislation

There are no separate laws on climate change at the state level or in the entities and Brčko District. Climate change provisions are not well reflected in the environmental and sectoral legislation of the entities and Brčko District (chapter 1).

Federation of Bosnia and Herzegovina

In 2013, the Federation of Bosnia and Herzegovina adopted the Law on the Use of Renewable Energy Sources and Efficient Cogeneration, which transposed in the legislation of the Federation of Bosnia and Herzegovina provisions of Directive 2009/28/EC on the promotion of the use of energy from renewable sources and Directive 2004/08/EC on the promotion of cogeneration.

The 2017 Law on Energy Efficiency transposed the provisions of Directive 2006/32/EC on energy end-use efficiency and energy services, Directive 2010/30/EC on the indication by labelling of energy-related products, and Directive 2010/31/EC on the energy performance of buildings (together with the Law on Spatial Planning and Land Use of the Federation of Bosnia and Herzegovina).

The adoption of the legislation in the Federation did not give the expected results because it was not implemented from the entity to the cantonal levels. Currently, activities are ongoing to amend the by-laws in order to reduce maximum energy consumption in buildings, and even better coordination with the cantons can be expected.

Republika Srpska

In 2017, in accordance with the 2011 Air Protection Strategy, Republika Srpska amended the 2011 Law on Air Protection by harmonizing it with the EU acquis in the areas of GHG inventory and reporting (chapter 1).

The Law on Spatial Planning and Construction transposed in the legislation of Republika Srpska the requirements of Directive 2010/31/EC on the energy performance of buildings. The Law envisages the adoption of by-laws to define the maximum energy consumption in buildings and the process of its certification within nine months from the adoption of the Law; this deadline expired long ago (February 2014). New by-laws were published in April 2015 and their compulsory application began in January 2016.

The Law on Energy Efficiency transposed in the legislation of Republika Srpska the requirements of Directive 2006/32/EC on energy end-use efficiency and energy services, and Directive 2010/30/EC on the indication by labelling of energy-related products.

The 2013 Law on the Use of Renewable Energy Sources and Efficient Cogeneration transposed in the legislation of Republika Srpska the requirements of Directive 2009/28/EC on the promotion of the use of energy from renewable sources, and Directive 2004/08/EC on the promotion of cogeneration.

The 2011 Law on the Fund and Financing of Environmental Protection of Republika Srpska (OG RS, No. 117/11 and 63/14) introduced the allocation of funds to support the implementation of energy efficiency projects and renamed the former Environmental Fund the Environmental Protection and Energy Efficiency Fund of Republika Srpska.

6.6 Policies, programmes and strategies and related action plans on climate change mitigation and adaptation

Climate Change Adaptation and Low-Emission Development Strategy

The Climate Change Adaptation and Low-Emission Development Strategy was adopted by the Council of Ministers of Bosnia and Herzegovina in October 2013. It was based on the climate and mitigation scenarios developed under the Second National Communication. The Strategy has two main objectives: increase resilience to climate change, and reach a peak and stop annual growth values of GHG emissions by 2025. The Strategy clearly defines the results and activities, as well as the funds necessary for their implementation.

The approach outlined in this document encompasses two closely linked components: an Adaptation Strategy and a Low-Emission Development Strategy. The Strategy considers mitigation as essential to minimizing impacts from climate change and

ensuring that they remain manageable. This approach is correct from the global prospective. However, even were Bosnia and Herzegovina to reduce its GHGs emissions to close to zero, the country will still be exposed to impact from climate change. Bearing in mind its limited resources for both mitigation and adaptation measures, the country needs to think twice when establishing priorities.

Adaptation is required to ensure that Bosnia and Herzegovina reduces the risk to and vulnerability of society and the economy to climate change, and maximizes the opportunities attendant on climate change. The adaptation component of the Strategy is focused on seven priority sectors.

The low-emission development component of the Strategy aims at creating a low-carbon and resource-efficient economy through increasing levels of energy efficiency, greater renewable energy use, and improved energy and transport infrastructure and services.

Environmental Approximation Strategy

The 2017 Environmental Approximation Strategy addresses air quality and climate change as one of eight subsectors of the EU environmental acquis. Specific institutional requirements for various aspects of implementation of the respective EU legislation and climate-change-related international treaties are identified in the document. All these requirements are grouped into three categories:

- GHG monitoring and reporting;
- EU Emission Trading Scheme;
- Carbon capture and storage.

Action Programme to Combat Land Degradation and Mitigate the Effects of Drought

The 2017 Action Programme to Combat Land Degradation and Mitigate the Effects of Drought in Bosnia and Herzegovina considers desertification as a form of land degradation resulting from various factors, including climate change. It states that, due to high temperatures and the risk of summer period drought, agriculture in Herzegovina and in the north of the country displays the greatest vulnerability to climate variability. It also lists several measures that can support the adaptation of agriculture to climate variability and climate change:

- Improvements in the irrigation systems, including drip irrigation;

- Inclusion of agriculture in water management programmes (including construction of canals and reservoirs);
- Changes in land cultivation methods with focus on different forms of conservational tillage;
- Introduction of crop rotation;
- Changes in dates of sowing and harvesting;
- Mixing less productive drought-resistant crops with highly productive types that are sensitive to drought;
- Growing crops for green manuring;
- Mulching;
- Developing drought-resistant varieties;
- Improvements in hail protection;
- Agroclimatic regionalization;
- Development of monitoring and early warning systems;
- Raising awareness and training of farmers;
- Increasing capacity of farmers for livestock management during hot periods.

Measures that could assist in reducing the agricultural sector's vulnerability to climate change include increasing soil capacity to absorb and accumulate water, developing soil organic matter and supporting the forms of agricultural production contributing to this – first, organic farming.

Forestry Development Strategy of Republika Srpska 2012–2020

Some segments of the Forestry Development Strategy of Republika Srpska 2012–2020 indicate the importance of climate change. In the context of the multifunctionality of forests, one of 10 planned criteria is the role of forests in mitigating climate change and their importance in storage of SO₂. Among 11 defined strategic objectives, the strategic objective Ecosystem-based forest management, environmental protection, conservation of nature and biodiversity through defined measures is largely devoted to climate change.

Programme for Conservation of Forest Genetic Resources of Republika Srpska 2013–2025

The 2013 Programme for Conservation of Forest Genetic Resources of Republika Srpska 2013–2025 defines the importance of climate change in terms of conservation of genetic resources (biodiversity) in forest ecosystems, where the partial measures also include evaluation (scenario-making) of the impact of climate change on forest genetic resources, as well as clearer (more specific) definition of the importance of preserving genetic resources in terms of adaptation of forest ecosystems to projected climate change.

Study on Forest and Climate Change

The 2011 Study on Forest and Climate Change was produced in the Federation of Bosnia and Herzegovina. This document provides an overview of the potential for reforestation, which is an important measure for mitigation of and adaptation to climate change.

Strategy and Action Plan for the Protection of Biodiversity in Bosnia and Herzegovina for the period 2015–2020

The 2017 Strategy and Action Plan for Protection of Biodiversity in Bosnia and Herzegovina for the period 2015–2020 was developed in line with the CBD's Strategic Plan for 2011–2020 and the Aichi Targets, in particular Aichi Target 10: Sensitive Ecosystems Affected by Anthropogenic Pressures and Climate Change, and Aichi Target 15: Restored Ecosystems and Increased Resilience. Aichi Target 10 seeks to minimize the multiple anthropogenic impacts on ecosystems that are particularly vulnerable to climate change. Such ecosystems in Bosnia and Herzegovina have been developed within alpine, mountainous, relict-refugial and karst landscapes. Aichi Target 15 requires strengthening the resilience and recovery of at least 15 per cent of degraded ecosystems, in order to mitigate the effects of climate change.

6.7 Sustainable Development Goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis relevant targets is described in box 6.1.

6.8 Institutions dealing with climate change mitigation and adaptation

State level

The Council of Ministers has adopted the Decision on Establishment of an Authorized Body for the Implementation of the CDM of the Kyoto Protocol of UNFCCC in Bosnia and Herzegovina. In accordance with the Decision, the Designated National Authority (DNA) has been established and necessary documentation for the smooth operation of this body was prepared. The DNA commenced work at the beginning of 2012. There are no legally prescribed procedures for the Bosnia and Herzegovina GHG inventory and no institutions are mandated to carry out the GHG inventory at the state level, or the Federation of Bosnia and Herzegovina or Brčko District levels.



Box 6.1: Targets 1.5, 11.B, 13.1, 13.2 and 13.3 of the 2030 Agenda for Sustainable Development

Goal 1: End poverty in all its forms everywhere

Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

The 2013 Climate Change Adaptation and Low-Emission Development Strategy recognizes the serious implications of the exposure and sensitivity of agriculture to climate change for the poor and those in vulnerable situations, as it negatively impacts on households and household budgets. The Strategy strives to increase resilience to climate variability and climate change.

Bosnia and Herzegovina should develop and implement specific measures to target the resilience of the poor and those in vulnerable situations in order to reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.B: By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels

The 2013 Climate Change Adaptation and Low-Emission Development Strategy recognizes the need to incorporate climate change into risk assessment and risk reduction planning processes, with particular emphasis on floods and forest fires.

Bosnia and Herzegovina should successfully implement the Strategy in order to ensure that government at all levels is able to understand and effectively integrate climate change vulnerability and risk reduction approaches into policies and programmes.

Goal 13: Take urgent action to combat climate change and its impacts

Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

One of the two main goals of the 2013 Climate Change Adaptation and Low-Emission Development Strategy is to increase resilience to climate variability and climate change, and in so doing secure development gains.

During the implementation of the Strategy, Bosnia and Herzegovina should take actions to strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in both entities and Brčko District.

Target 13.2: Integrate climate change measures into national policies, strategies and planning

Climate change measures are integrated in the 2013 Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and Herzegovina, the 2017 Environmental Approximation Strategy of Bosnia and Herzegovina (supplemented by Environmental Approximation Programmes of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District), the 2017 Action Programme to Combat Land Degradation and Mitigate the Effects of Drought in Bosnia and Herzegovina, the Forestry Development Strategy of Republika Srpska 2012–2020, the Programme for Conservation of Forest Genetic Resources of Republika Srpska 2013–2025 and the Strategy and Action Plan for Protection of Biodiversity in Bosnia and Herzegovina for the period 2015–2020.

Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

The 2013 Climate Change Adaptation and Low-Emission Development Strategy envisages a broad, public-focused, awareness-raising campaign, including printed and multimedia materials suitably adapted for different target groups.

Bosnia and Herzegovina should organize a series of media events, television programmes, workshops and other awareness-raising events in order to improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

Photo 6: Solar energy use in rural areas

Designated National Authority for Nationally Appropriate Mitigation Actions (NAMAs)

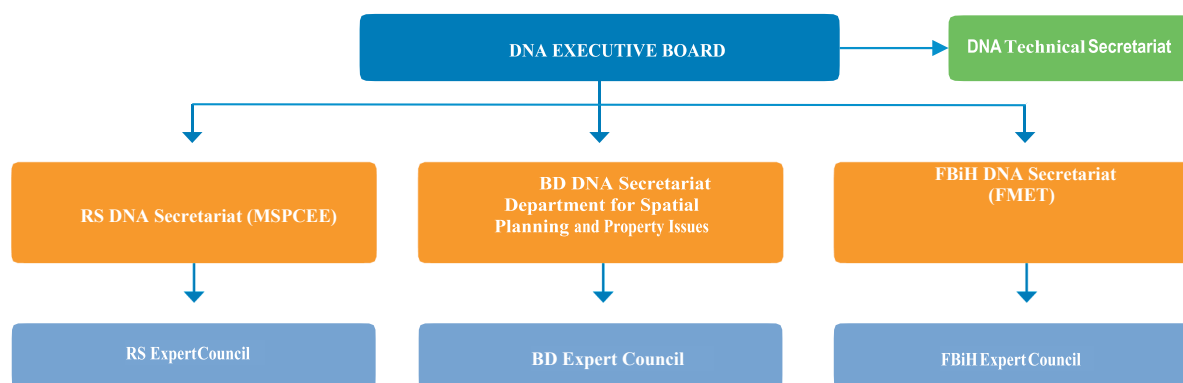
In Bosnia and Herzegovina, a mechanism has been established for approving and sending NAMA projects to the UNFCCC Registry. At its 113th meeting, held on 27 November 2014, the Council of Ministers of Bosnia and Herzegovina adopted the Decision on Amendments to the Decision establishing the Designated National Authority (DNA) for the implementation of Clean Development Mechanism (CDM) Projects, which, in addition to the existing activities of the DNA, has added development, receipt and approval/rejection of NAMAs. In line with the amended Decision, and as provided in the First Biennial Update Report, the NAMA DNA's structure is composed of the Executive Board, the DNA Secretariats and the Expert Councils, each with different but closely related functions, as shown in figure 6.1.

The Executive Board of the NAMA DNA is comprised of appointed representatives from the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, and the Department of Spatial Planning and Property Issues of Brčko District. The Technical Secretariat of the NAMA DNA is part of the

Executive Board, within the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, and supports the work of the Executive Board.

The NAMA DNA Secretariats are formed at the entity and Brčko District levels. They define and implement their respective NAMA policies, receive NAMA project proposals to be implemented in the territories of the entities and Brčko District in accordance with their jurisdiction, evaluate and adopt NAMA project documentation, submit NAMA project proposals to the Expert Council and seek expert assessment of project documents, and approve or reject NAMA projects.

The Expert Councils of the DNA Secretariats in the entities and Brčko District consist of one expert representative for the area that is the subject of the NAMA project from each relevant ministry responsible for environmental affairs, energy, industry, mining, agriculture, forestry and water management, economic relations and regional cooperation, transport and finance. The areas with the greatest potential for climate change mitigation are defined, along with the identified NAMAs, in the Climate Change Adaptation and Low-Emission Development Strategy, which also represents the first comprehensive NAMA plan for Bosnia and Herzegovina.

Figure 6.1: NAMA Designated National Authority structure

Source: First Biennial Update Report of Bosnia and Herzegovina, 2014.

Federation of Bosnia and Herzegovina

The Ministry of Environment and Tourism releases the Report on Air Pollution Emission Inventories for the territory of the Federation in January of each year for the two preceding years. Cantons release the Report on Air Pollution Emissions Inventories in April of each year (including dissemination from natural resources) for the two preceding years.

Republika Srpska

The Hydrometeorological Service of Republika Srpska is responsible for preparing reports on air pollution emission inventories for the territory of Republika Srpska. According to the 2011 Law on Air Protection, the Service is responsible for carrying out the GHG inventory, including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), fluorocarbons (HCFs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆).

Brčko District

The Department of Spatial Planning and Property Issues deals with climate change issues at the District level.

6.9 Measures on climate change mitigation and adaptation

There is no evidence that Bosnia and Herzegovina has already implemented or is currently implementing economic and fiscal measures on climate change mitigation or adaptation to the current and foreseeable impact of climate change.

Information measures

According to the Third National Communication, activities conducted so far in the field of education

and awareness-raising about climate change were quite modest. There is also a need for greater involvement of civil society and enhanced advocacy. This requires active communication to raise the profile of climate change issues.

The focus of the 2013 Climate Change Adaptation and Low-Emission Development Strategy is to support organizations and communities across Bosnia and Herzegovina to respond to the impacts of climate change, rather than merely raising their awareness of climate change and its impacts. The Strategy envisages a broad, public-focused awareness-raising campaign, including printed and multimedia materials suitably adapted for different target groups. A series of media events, television programmes, workshops and other relevant awareness-raising events will be organized.

6.10 Participation in international agreements and processes

United Nations Framework Convention on Climate Change

Bosnia and Herzegovina ratified the UNFCCC in 2000 and the Kyoto Protocol in 2007. The country ratified the Paris Agreement on 16 March 2017 (it entered into force for Bosnia and Herzegovina on 15 April 2017).

In 2010, the country submitted its Initial National Communication under the UNFCCC. It includes the inventory of GHG emissions for the base year of 1990. In 2013, the Second National Communication under the UNFCCC was submitted. The inventory of GHG emissions covers the 10-year period 1991–2001. The First Biannual Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the UNFCCC was submitted in 2014. It covers the years 2010 and 2011.

The Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions were published in Bosnian in July 2016 and submitted in English to the UNFCCC Secretariat in June 2017. The GHG inventory in the Third National Communication covers the period 2002–2009, and 2012 and 2013. The report containing the Third National Communication and the Second Biennial Update Report also covers the revision of the First Biennial Update Report for 2010 and 2011.

Nationally determined contributions (NDCs)

As a party to the Paris Agreement, Bosnia and Herzegovina prepared and communicated nationally determined contributions (NDCs) that it intends to achieve.

According to the developed scenarios, the peak of total emissions occurs in 2030; according to the baseline scenario (BAU), in 2030, the level of emissions is expected to be 20 per cent higher than in 1990. Emissions reduction that Bosnia and Herzegovina might achieve unconditionally, compared with the BAU scenario, is 2 per cent by 2030, which would mean 18 per cent higher emissions than in the base year 1990.

It is only possible to achieve significant emissions reduction with international support, which would result in emissions reduction of 3 per cent compared with 1990, or a possible reduction of 23 per cent compared with the BAU scenario.

Clean Development Mechanism

Nationally Appropriate Mitigation Actions

The NAMA Registry has one NAMA from Bosnia and Herzegovina seeking support for implementation: Sustainable and energy-efficient building of the Faculty of Architecture, Civil Engineering and Geodesy of the University of Banja Luka.

The main objective of the project is to reduce GHG emissions from the building sector and at the same time set a prototypical example for solving the problem of spatial and technological capacity for teaching and scientific research by designing and construction of an environmentally friendly and energy-efficient building for the Faculty.

The goal is to establish a sustainable instrument for energy management of the building, which will result in a reduction of CO₂ emission of over 50 per cent in relation to the CO₂ emission of buildings of educational purpose with the typical spatial configuration and materialization of that in Banja Luka.

The estimated full cost of implementation is €11,946,550. The first phase of the construction works is already finished, with the total cost of €2,926,549.68 provided by the University of Banja Luka and Government of Republika Srpska. Estimated emission reduction is 228 tons CO₂/year.

Although 2016 was expected to be the first year of implementation, the NAMA is still seeking support for implementation.

Other processes

In Bosnia and Herzegovina, 12 cities are signatories to the Covenant of Mayors and they have the adopted sustainable energy action plans (SEAPs), which created preconditions to achieve the "20–20–20 targets"⁷ through their implementation.

6.11 Assessment, conclusions and recommendations

Assessment

As a party to the UNFCCC and the Kyoto Protocol, Bosnia and Herzegovina participates in international activities and processes under this framework. In 2017, the country ratified the Paris Agreement.

Bosnia and Herzegovina fulfils its reporting obligations. The country has already submitted three national communications under the UNFCCC and two biennial update reports.

Bosnia and Herzegovina is progressing in developing its legal, policy and institutional framework on this topic. In particular, in 2013 the country adopted the Climate Change Adaptation and Low-Emission Development Strategy. The country established a mechanism for approving and sending NAMA projects to the UNFCCC Registry.

However, Bosnia and Herzegovina is still far from properly coping with the multiple challenges emanating from different natural and anthropogenic

⁷ Three objectives for climate and energy policy, to be reached by 2020: reducing GHG emissions by at least 20 per cent compared with 1990 levels; increasing the share

of renewable energy in final energy consumption to 20 per cent; and moving towards a 20 per cent increase in energy efficiency.

phenomena, which are and will be aggravated by anthropogenic climate change.

Conclusions and recommendations

Impact of anthropogenic climate change

Bosnia and Herzegovina lacks data and studies on the current impact of climate change on different components of nature, including water resources, land and soil cover, forest and other natural vegetation, biodiversity and ecosystems. The monetary impact of current anthropogenic climate change on economic sectors in the country is not available.

Recommendation 6.1:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should integrate and apply the results of studies of the current impact of anthropogenic climate change on components of the environment, social and economic situation and health sector in policy formulation and implementation.

Adaptation to climate change

Bosnia and Herzegovina is a small actor in the global environment due to its low total and per capita GHG emissions. At the same time, the country is vulnerable to the impact of different natural and anthropogenic

phenomena and hazards, such as floods, precipitation patterns, heat and cold waves, forest fires, landslides and erosion. All of these can be aggravated by anthropogenic climate change.

Taking into consideration its limited resources for both mitigation and adaptation measures, the country needs to clearly identify priorities.

Recommendation 6.2:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should:

- (a) *Develop and implement policies and measures that can bring the best results in terms of making the country more resilient, not only to the impact of climate change but also to other natural and anthropogenic hazards;*
- (b) *Ensure that human settlements are included in the considerations about climate change adaptation and therefore included in future studies and strategies to be implemented in the country;*
- (c) *When feasible, foresee district heating for new and existing neighbourhoods and buildings;*
- (d) *Ensure that climate change adaptation and mitigation measures are included in spatial and urban planning.*

PART III: MEDIA AND POLLUTION MANAGEMENT

Chapter 7

AIR PROTECTION

7.1 Trends in air emission levels

Bosnia and Herzegovina does not submit emissions data to the European Monitoring and Evaluation Programme (EMEP) of the Convention on Long-Range Transboundary Air Pollution (CLRTAP). Therefore, EMEP estimates and calculates air emissions in the country (table 7.1).

The Third National Communication under the UNFCCC also reports on emissions data for the country. These data are based on measurements, calculations and estimates by accredited institutes. There is therefore less uncertainty in these emissions data than in the EMEP data.

Annual emissions data for SO₂, NO_x, NMVOC and CO (as indirect GHGs) are based on inventories from the Federation of Bosnia and Herzegovina and Republika Srpska (table 7.2). These data differ considerably from the data that are estimated by EMEP. In general, emissions data for SO₂, NO_x and CO from the Third National Communication are higher than those from EMEP by approximately a

factor of 2, while data for NMVOC are generally 30–50 per cent lower. The Third National Communication does not report on NH₃, PM_{2.5} and PM₁₀. A distribution of the air emissions per sector was given for the GHGs and for SO_x, NO_x, NMVOC and CO (table 7.3).

NH₃

The emission of NH₃ as given in table 7.1 is mainly from the agricultural sector. Industrial emissions (leather and explosives industry) and emissions from other sectors are relatively low and hardly contribute to the total emission.

Heavy metals

Heavy metals are emitted in the iron and steel industry, the metallurgical industry, coal-fired power plants, galvanic companies and other industries. Aggregated emissions data for heavy metals on the national level of Bosnia and Herzegovina are not published. Emissions of Pb, Cd and Hg are based on expert estimates and are used in EMEP modelling (table 7.4).

Table 7.1: Emission trends for Bosnia and Herzegovina, 2005–2014, 2020, Gg/y

	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2020*
SO _x	192	225	225	224	224	224	224	221	219	217	214	427
NO _x	35	33	33	33	33	33	32	32	32	32	31	52
NH ₃	17	18	18	19	19	19	19	19	19	20	20	17
NMVOC	52	45	44	42	41	40	39	38	37	36	35	42
CO	181	111	104	96	89	82	75	72	70	68	66	
PM _{2.5}	16	20	19	18	17	16	15	15	15	15	14	19
PM ₁₀	31	37	35	33	31	29	27	27	27	26	26	45

Source: EMEP Centre on Emission Inventories and Projections, 2016.

Notes: Data are calculated/estimated by MSC-W and submitted to EMEP. * prognosis for 2020.

Table 7.2: Emission trends, 2005–2013, Gg/y

	2005	2006	2007	2008	2009	2010	2011	2012	2013
SO ₂	300	405	390	405	415	440	435	455	412
NO _x	50	52	55	62	70	76	82	65	72
NMVOC	24	23	22	23	23	23	24	24	24
CO	137	135	132	138	129	128	129	138	140

Source: Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, July 2016.

Table 7.3: Emissions per sector, 2013, Gg/y

Sector	SO _x	NO _x	NM VOC	CO
Total	412	72	23	140
Energy power plants and combustion installations	378	37	1	3
Manufacturing industry (heat and power)	10	3	0	1
Other industrial sectors (heat and power)	19	2	1	14
Fugitive emissions	2	0	1	0
Transport	0	30	19	101
Industry process emissions	3	1	1	22
Agriculture	0	0	0	0
Other	0	0	0	0

Source: Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, July 2016.

Table 7.4: Emissions of Pb, Cd and Hg, 2012–2014, Mg/y

	2012	2013	2014
Pb	23.6	17.5	36.0
Cd	1.6	1.5	1.5
Hg	1.8	1.8	1.8

Source: EMEP Centre on Emission Inventories and Projections, 2016.

In the Federation of Bosnia and Herzegovina, an annual inventory of emissions of some heavy metals by industry is drawn up and published each year in the Report on Emissions of Polluting Substances to the Air on the Territory of the Federation of Bosnia and Herzegovina. The 2015 Report gives values for total industrial emissions of nine heavy metals (Pb, Cd, Hg, Cr, Zn, Ni, As, Mn and Cu) in the period 2013–2015.

Persistent organic pollutants

The main sources of unintentionally produced POP emissions to air in Bosnia and Herzegovina are heat and power generation (PCDD/Fs and PAHs), ferrous and non-ferrous metal production (PCDD/Fs and PAH), metallurgical processes (PCDD/Fs and PAH) and uncontrolled (waste) incineration (PCDD/Fs and PAH).

In the 2015 National Implementation Plan (NIP) for the Stockholm Convention in Bosnia and Herzegovina, the PCDD/F Inventory Group estimated the total emission of PCDD/Fs to the air on 93.5 g TEQ/y in 2012.⁸ Heat and power generation causes almost 70 per cent of this emission and ferrous and non-ferrous metal production 30 per cent. The emission of polycyclic aromatic hydrocarbons (PAH) is estimated at 4,800 kg/year in 2012.

In the extensive list of POP substances (PCBs, HCBs, DDT and lindane) mentioned in the NIP, there are no other POPs identified that have significant air emissions.

EMEP estimated data (table 7.5) and the data established in the NIP differ but are of the same magnitude.

Table 7.5: POPs emissions, 2013–2015

	2012	2013	2014
PCDD/Fs (g TEQ)	44.2	42.4	40.5
B(a)P/PAH (kg)	2 700	2 500	2 300

Source: EMEP Centre on Emission Inventories and Projections, 2016.

No obsolete pesticides are stored in stockpiles and specialized landfills as far as the POPs Pesticides Inventory Group has established; eventual disposal was dealt with in an uncontrolled manner.

Greenhouse gases

According to the Third National Communication, the total GHG emissions in Bosnia and Herzegovina (in Gg CO₂-eq.) are 80–90 per cent of the level of GHG emissions recorded in the baseline year 1990. The largest source of CO₂ emissions by far is the energy sector (75 per cent of the total of all combustion emissions) (table 7.6). The Third National Communication includes GHG emissions of the transport sector in the sector Energy/Combustion. For 2014, CO₂ emission for the transport sector is 3,000 Gg CO₂-eq./y.

Ozone-depleting substances

In 2009, zero consumption of CFCs was reached and 250 ODP tons of CFCs have been phased out.

⁸ TEQ = toxic equivalents

Table 7.6: GHG emissions per sector, 2009–2013, Gg CO₂-eq.

Category	2009	2010	2011	2012	2013
Total without LULUCF	23 784	25 723	28 086	21 816	24 028
Total including LULUCF	15 784	20 037	22 183	14 270	17 887
Energy sector					
Combustion	17 287	19 276	21 115	15 267	17 518
Fugitive emissions	738	711	763	657	741
Industrial processes	1 721	1 907	2 277	2 179	2 040
Agriculture	2 759	2 880	2 916	2 466	2 555
LULUCF (sinks)	- 8 000	- 5 686	- 5 903	- 7 546	- 6 141
Waste	1 280	974	1 018	1 248	1 175

Source: Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, July 2016.

Table 7.7: HCFC consumption trend, 2011–2015, tons OPD

	2011	2012	2013	2014	2015	Baseline 2010
Total	10.80	11.19	8.43	4.58	2.11	8.17

Source: UNEP, Project Proposal Bosnia and Herzegovina, April 2016.

7.2 Urban and rural air quality

Performance and gaps in air monitoring networks

In Bosnia and Herzegovina, a network of stations for air quality monitoring is operated on the entity level, on the cantonal level, by public health institutes and by companies.

In the Federation of Bosnia and Herzegovina, the Hydrometeorological Institute is responsible for the verification of air quality data and reporting. The Institute operates five monitoring stations, while 11 monitoring stations are operated by cantonal public health institutes in Sarajevo and Mostar, the Environmental Protection Directorate of Tuzla Canton and three by Općina Zenica. One automatic monitoring station in Sarajevo (Ilidza, Sarajevo Canton) is mobile. In 2016, a new monitoring station operated by the Hydrometeorological Institute was opened in Gorazde, funded by UNEP. Most of these stations are automatic and supply online data to the Institute. The measured components are SO₂, NO_x, CO, O₃, BTX (benzene, toluene, xylene), PM₁₀ and PM_{2.5}. Not every component is monitored in all stations. Some stations also monitor black smoke. In Republika Srpska, the Hydrometeorological Institute is responsible for establishment and management of air quality monitoring and reporting.

The Hydrometeorological Institute operates two automatic station in Banja Luka while the Institute of Protection, Ecology and Informatics operates 10 stations in Banja Luka and other municipalities. In

2016, a new automatic monitoring station operated by the Hydrometeorological Service was opened in Prijedor, funded by UNEP. The measured components are SO₂, NO_x, CO, O₃, PM₁₀, PM_{2.5}, heavy metals, PAH and BTX in Banja Luka and in the other stations – not all substances everywhere. In Brod, H₂S, SO₂, NO_x, CO, O₃, PM₁₀, PM_{2.5} and BTX are monitored. The stations can be distinguished in the Urban Traffic, Urban Background, Rural Background, Suburban Background and Urban-Industrial categories. Monitoring is established on two levels: the monitoring network managed by the Hydrometeorological Institute and local networks managed by municipalities.

Brčko District operates three automatic monitoring stations measuring SO₂, NO_x, CO, particles (TSP) and black smoke.

Six automatic monitoring stations are operated by companies, measuring SO₂, NO_x, CO and particles (TSP). The results are sent to the monitoring system.

The air monitoring system has been improved since 2010 but is not sufficient for a well-functioning countrywide air monitoring regime. The network covers mainly urban areas and rural air quality is hardly measured. In general, measurements are performed according to EU standards.

The website <http://www.hidrometeo.ba> provides online data for a number of monitoring stations and substances throughout Bosnia and Herzegovina. The website <http://monitoringzrakatk.info> provides data for stations in Tuzla Canton.

Reports on air quality

The Hydrometeorological Institute of the Federation of Bosnia and Herzegovina (box 7.1) and the Hydrometeorological Institute of Republika Srpska (box 7.2) both publish annually a report on the air quality in the entity. In these reports, developments in the network of monitoring stations are described and the results of the measurements are published. The measured values are reviewed against the EU Air Quality Standards as published by the European Commission.

In the Federation of Bosnia and Herzegovina, the Regulation on the Method of Monitoring Air Quality and Defining Types of Pollutants, Limit Values and Other Air Quality Standards (OG FBiH, No. 1/12) sets air limit values and air quality standards. Deadlines for reaching the EU Air Quality Standards are established as follows: 2016 for CO, Pb and benzene, and 2021 for SO₂, NO₂, PM₁₀, and PM_{2.5}. The 2016 targets for CO were met. For benzene the air quality standards are exceeded in the vicinity of coke plants.

Republika Srpska has the Rulebook on air quality limit values (OG RS, No. 124/12). Republika Srpska plans to align air quality standards for all air pollutants with the EU standards by 2021.

The air quality standards in Brčko District show minor differences from the EU standards.

Pollutant release and transfer registers

Pollutant release and transfer registers (PRTRs) have been installed in entity ministries and the Hydrometeorological Institute of Republika Srpska. A comprehensive monitoring system and associated database (not linked with PRTR) has not yet been in operation. The implementation of the E-PRTR Regulation ((EC) No. 166/2006) is hampered by the lack of sufficiently trained personnel within the governments and operators.

7.3 Pressures

Agriculture

The agricultural sector is the largest national source of the emissions of NH₃ – accounting for 98 per cent – with industry accounting for 2 per cent. Animal husbandry and mineral fertilizers are the main contributors to agricultural ammonia emission. The emission of ammonia is calculated by applying

emission factors considering the different ways of breeding and manure storage, treatment and application (table 7.8). Calculated emissions (EMEP) are in the range 17–20 Gg/year.

Energy sector

Electricity

In Bosnia and Herzegovina, around 35 per cent of the electric power is produced by hydropower while the remaining 65 per cent is generated in six brown coal/lignite-fired TPPs. The share of wind, solar and biofuels in electricity production is less than 0.5 per cent. Bosnia and Herzegovina is a net exporter of electricity. The six TPPs in Bosnia and Herzegovina have a total capacity of 2,081 MW and, because of the requirements of the Energy Community Treaty between the EU and Balkan and Eastern European States, are subject to Directive 2010/75/EU on industrial emissions (IPPC Directive).

One aim of the IPPC Directive is to reduce emissions of SO₂, NO_x and dust from the large combustion plants. To fulfil the demands of the Directive, the operators of the six TPPs have three options: compliance with the ELVs of the Directive (Annex V of the Directive), implementation of a national emission reduction plan (NERP) or limited lifetime derogation of the ELVs. No operators in Bosnia and Herzegovina have chosen the option of compliance with the ELVs. Two have chosen a limited lifetime derogation, which means closure of the plant within a short term. The remaining operators have selected the NERP option. A draft of the NERP was submitted to the Energy Treaty Community Secretariat in 2015. The draft has been adopted by the State Council of Ministers of Bosnia and Herzegovina but is still to be finalized and implemented. There is not yet a final NERP. The ultimate objective of the NERP is to reduce emissions from the large combustion plants included in the Plan by 1 January 2028, to 14.24 Gg SO₂/year (from 273 Gg/year in 2014), to 7.75 Gg NO_x/year (from 20.5 Gg/year in 2014) and to 0.780 Gg dust/year (from 6.615 Gg/year in 2014).

This means total emission reduction percentages for the TPPs in Bosnia and Herzegovina of 95 per cent for SO₂, 65 per cent for NO_x and 85 per cent for dust.

The total SO₂ emission in Bosnia and Herzegovina (that is now larger than the total German SO₂ emission) would be reduced by 75 per cent.

Box 7.1: Air quality in the Federation of Bosnia and Herzegovina in 2015

SO₂ data show many exceedances of one-hour and daily EU Air Quality Standards for SO₂ (resp. 350 µg/m³ and 125 µg/m³) in monitoring stations in the Zenica area, the Tuzla area, Lukavac and Kakanj, and a few in Sarajevo stations. The number of permitted exceedances for one-hour mean values is 24/year. In 2015, exceedances at the stations in Zenica, Tuzla, Lukavac and Kakanj vary from 45 to 625. The number of permitted exceedances for 24-hour mean values is three per year. In 2015, exceedances at the stations in Zenica, Tuzla, Lukavac and Kakanj varies from 10 to 100.

High maximum one-hour mean values above 1,000 µg/m³ are measured in all these stations, with Zenica-Radakovo and Lukavac Centre the worst with a highest one-hour mean concentration of 1,353 µg/m³ and 1,790 µg/m³ respectively. The EU Air Quality Standard for one-hour averaging period is 350 µg/m³.

For NO_x, the EU Air Quality Standard for maximum one-hour mean values is exceeded at stations in Sarajevo and Tuzla, but for fewer than 10 hours in that year, when 18/year is permitted. At one station in Zenica (Brist) and one in Sarajevo (Otoka), the mean annual EU Air Quality Standards for NO_x are exceeded, in Sarajevo slightly but in Zenica by a factor of 2.

In Jajce, Sarajevo and Kakanj, the number of exceedances of the EU Air Quality Standard for O₃ is higher than permitted (25/year). The number of exceedances is highest in Jajce and Kakanj.

In 2015, the EU Air Quality Standards for the 24-hour mean values for PM₁₀/PM_{2.5} and the yearly mean values are exceeded at stations in Zenica, Sarajevo and Kakanj. In Tuzla and Lukavac, the WHO Air Quality Guidelines for the 24-hour mean values and the annual mean values of PM_{2.5} are exceeded. The exceedance of the annual mean value for PM_{2.5} at the Bosanski Kulturnij Center (BKC) station in Tuzla is high, by a factor of 20, and in Lukavac by a factor of 10. In Zenica and Sarajevo, the exceedance of the annual mean value of PM₁₀ is by a factor of 2.

The number of permitted exceedances of the EU Air Quality Standard for the 24-hour mean value for PM₁₀/PM_{2.5} is 35; in Zenica, Sarajevo, and Kakanj this number varies from 38 to 214. No data are available for Lukavac and Tuzla.

There were no exceedances of the EU Air Quality Standard for CO in 2015.

Source: Air Quality Report for the Federation of Bosnia and Herzegovina for 2015, Federal Hydrometeorological Institute, 2016.

Box 7.2: Air quality in Republika Srpska in 2015

SO₂ data show more exceedances of the one-hour mean values of the EU Air Quality Standards in Brod and Ugljevik than is permitted and more exceedances of the 24-hour mean value in Ugljevik and Gatsjko than is permitted. Maximum 1-hour values are high in Brod (829.6 µg/m³) and Ugljevik (1,125.5 µg/m³). Annual mean values are also high in Gatsjko and Ugljevik.

There were no exceedances of EU Air Quality Standards for NO_x in 2015.

There were no exceedances of EU Air Quality Standards for O₃, with the highest one-hour value recorded in Brod.

The annual mean value for PM₁₀ in Brod is 30 per cent higher than the EU Air Quality Standard. In the centre of Banja Luka, the concentration is just below this standard. The number of permitted exceedances of the EU standard for the 24-hour mean value of PM₁₀ is exceeded in Brod (factor of 4), in Gatsjko (factor of 1.7) and in Banja Luka Centre (factor of 1.9).

Maximum one-hour mean values for PM₁₀ are high in Brod, Ugljevik and Gatsjko (355–607 µg/m³).

There were no exceedances of EU Air Quality Standards for CO, PM_{2.5} and benzene.

Source: Air Report for Republika Srpska for 2015, Federal Hydrometeorological Institute, 2016.

Table 7.8: Greenhouse gas emissions from the agricultural sector, 2009–2013, Gg CO₂-eq./year

	2009	2010	2011	2012	2013
Total	2 759	2 880	2 916	2 566	2 555
Enteric fermentation	855	841	822	808	814
Manure management	338	344	333	323	331
Agricultural soils	1 566	1 695	1 761	1 335	1 411

Source: Third National Communication and Second Biennial Update Report on Greenhouse Gas Emissions of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, July 2016.

At this moment, solutions to finance this NERP are under investigation. At one plant (Ugljevik), which is responsible for 45 per cent of the SO₂ emissions of the TPPs, concrete plans have been made and contracts are signed for the building of a desulphurization installation.

New lignite/brown coal-fired power plants have been projected, e.g. in Tuzla, Banovici and Ugljevik, but it is questionable to realize new projects without proper abatement measures for air pollution and energy efficiency targets that are based on best available techniques (BAT) as established in the EU BREF for large combustion plants. Investing in new coal-fired TPPs in the future is ultimately in doubt, as more realistic pricing of CO₂ emissions seems inevitable when the EU-ETS will be reinforced and the EU is moving closer to decarbonization. Future annual CO₂ payments are to be properly accounted for when planning new coal plants.

Gas and oil

Bosnia and Herzegovina has no domestic sources of natural gas. A distribution network is only present in Sarajevo, Visoko, Zenica and Zvornik. Due to the high price of natural gas, many households in urban areas that used gas for heating are now again using coal, which has a bad impact on urban air quality.

Imported crude oil is processed at the refinery in Brod. According to the Energy Community Treaty Secretariat, Directive 1999/32/EC⁹ on reduction of sulphur content in certain liquid fuels is incorrectly transposed in the legislation by Bosnia and Herzegovina at the state and entity levels.

The high emissions of the refinery (SO₂, dust, VOC and H₂S, odour) have led to protest in cities along the Croatian side of the frontier river. A possible solution for the bad environmental situation could be the replacement of crude oil for the refinery's power plant by natural gas. Owners of the refinery are involved in the realization of this proposal.

Industry

The environmental permits for industrial establishments are issued at entity and cantonal levels in the Federation of Bosnia and Herzegovina or at entity level in Republika Srpska and include ELVs for the main air polluting substances. ELVs are in many cases based on EU standards (as described in the BREFs). The validity of the permits is five years. Since 2011, companies have to pay charges for the

emission of SO₂, NO_x and dust. When emissions are not measured at the stacks, and are not or cannot be calculated, companies pay fixed amounts.

Compliance with the ELVs that are included in the permits is often low as the necessary abatement equipment is not installed or does not function properly. This may lead to problems if, after five years, a new permit is needed and there is no progress made in emissions reduction. Sometimes it even leads to operations not having a valid permit. The steel works in Zenica operated without a single permit during a great part of 2015 and still operates without a permit for parts of the establishment.

A company can be fined or can be prosecuted in serious situations. The fines are not comparable with the investment amounts that are needed to install abatement equipment. In different cities (Zenica, Tuzla, Sarajevo), lawsuits by environmental NGOs have been filed in recent years against companies and the local administration in Zenica, and against environmental permits for new TPPs issued by the authorities of the Federation of Bosnia and Herzegovina.

SO₂, NO_x and dust (coarse, PM₁₀, PM_{2.5}) emissions from the iron and steel industry in Bosnia and Herzegovina are high as abatement techniques as described in the EU BREFs are insufficiently installed. Measurements of PAHs are not reported; heavy metal emissions are calculated. At the iron and steel plant, a new filling machine has recently been installed at the coke plant and a hybrid filter on one of the sinter lines – an electrostatic filter combined with fabric filter. The other sinter lines will be equipped in the near future. This equipment also carries the possibility of built-in (necessary) desulphurization techniques. These measures would allow the reduction of emissions into air.

The aluminium smelter in Mostar was rebuilt and operates with a recently modernized anode plant and 256 electrolytic cells. The use of fuel oil in parts of the anode plant and cast house is replaced by natural gas, which reduced SO₂ and dust emissions. No inventory of the emissions data of the plant for 2014 and 2015 have been submitted to the Hydrometeorological Institute of the Federation of Bosnia and Herzegovina. Due to high electricity prices and low aluminium prices, the smelter has operated at reduced capacity in the last few years.

The coke plant in Lukavac did not submit emissions data for either 2014 or 2015. This coke plant, the

⁹ Directive 2005/33/EC amended Directive 1999/32/EC.

related chemical plants that produce benzene, coal tar, maleic acid anhydride, calcium ammonium nitrate and ammonium sulphate, and the power plant that uses coke gas as fuel, cause heavy air pollution in Lukavac and the region, especially in winter. However, there is no data on the extent to which the different factories each contribute to this. Lukavac Centre recorded the highest measured maximum one-hour SO₂ emission concentration in the country in 2015 and also had high PM₁₀ concentrations.

In recent years, after demonstrations by citizens, the soda plant in Lukavac has invested in advanced production technologies and air pollution abatement techniques, which have improved the air quality in the town, especially the PM₁₀ levels and occasional dust deposition. In 2014, a first monitoring station was installed.

The paper industry (SO₂, NO_x, PAH, dust) and the cement industry (NO_x, dust) are also relatively big air polluters.

Transport

The transport sector causes 40 per cent of the NO_x, 80 per cent of the NMVOC and an estimated 10 per cent of the emission of particulate matter (PM_{2.5}). According to the EMEP report, the transport sector is the second largest contributing sector to NO_x emissions in the country (power plants and industry lead with a joint contribution of 55 per cent). Because of the growing fleet of automobiles, additional measures are required to ensure that emissions of NO_x and PM_{2.5} in 2020 are decreasing, to ensure that urban air quality improves, especially during the winter. At the moment, the average age of the private car fleet is 17 years and more than 75 per cent of the cars use diesel as fuel. More than 50 per cent of the vehicles achieve below Euro-3 standards. In December 2016, Sarajevo Municipality ordered alternating driving days for cars with even and odd numbered licence plates and made public transportation free of charge until the air quality situation had improved. There are intelligent transportation systems used by major cities.

Other measures that are under study are the prohibition of the import of cars that achieve below Euro-4 emission standards and prohibition of diesel-fuelled cars in city centres during emergencies. The necessary legislation for these measures is yet to be adopted. Cars driving on LPG/CNG as a fuel and electrically driven cars are rare in Bosnia and Herzegovina.

In the 2016 National Renewable Energy Action Plan, the contribution of the use of bioethanol and biodiesel

in 2020 is expected to be 20 times higher than in 2015, which would decrease the sectoral contribution to GHG emissions.

Housing

In Bosnia and Herzegovina, the heating of buildings and services consumes more than 50 per cent of the primary energy consumption. The age of the buildings – 80 per cent of the housing stock is older than 30 years – and the generally inadequate energy efficiency generate a large potential for energy saving measures. About 70 per cent of the houses are individually heated by furnaces that use fuel wood, lignite or coal as fuel. The other 30 per cent of the houses are centrally heated, 12 per cent of which are connected to a district heating system. Most of the heat for district heating is delivered by TPPs or by the boilers of industrial establishments. In the past, in cities such as Sarajevo and Tuzla, more natural gas was used for residential heating, but, due to its high price, most people in the cities have returned to the use of firewood or coal. In winter, with periods of unfavourable meteorological conditions, the many emissions points at low altitude intensify the bad air quality and considerably increase local peak concentration levels of SO₂ and dust.

Improvement of energy efficiency in the residential sector can have a great influence on air quality. In the near future, big investments in the maintenance and renovation of central and district heating systems are necessary; this provides an opportunity to modernize installations to achieve better energy efficiency standards for household devices and reconstruction and isolation of buildings and private houses.

7.4 Legal, policy and institutional framework

Legal framework

Environmental air protection is under the responsibility of the entities and Brčko District. The laws in the different entities are not identical, but similar. In general, legislative alignment with the EU acquis on air quality and air protection is still developing and faces obstacles due to the complex political and administrative structure, and lack of staff and funding. Bosnia and Herzegovina is working to implement the requirements of the IPPC Directive in the entity-level laws on environmental protection. The provisions of EU Directive 1999/32/EC on reduction of sulphur content in certain liquid fuels have not yet been transposed, legislation on VOC emissions has not yet been adopted, and neither have air quality plans for areas where pollutant levels exceed limit values.

Federation of Bosnia and Herzegovina

The 2003 Law on Air Protection in the Federation of Bosnia and Herzegovina was amended in 2010 (OG FBiH, No. 4/10).

Subordinate legislation concerning air protection can be found in different rulebooks and decrees (annex IV). The regulation of emission ceilings and emission registries is not fully executed. There is no specific law on environmental inspections at the level of entities and cantons. The GHG inventory report is not in line with EU monitoring, reporting and verification.

At the cantonal level, there is subordinate legislation in cantonal laws on environmental protection (or nature protection) concerning different decisions and ordinances with regard to air protection. The existing legislation is not yet harmonized vertically between the Federation of Bosnia and Herzegovina and the cantonal level. Only the cantons Tuzla, Central Bosnia and Sarajevo have cantonal laws on air protection or air quality.

Republika Srpska

The 2002 Law on Air Protection remains the main law related to air protection. Subordinate legislation concerning air protection can be found in decrees and rulebooks. Regulation of emission ceilings and emission registries is not fully executed. There is no specific law on environmental inspections. The GHG inventory report is not in line with EU monitoring, reporting and verification.

Brčko District

The 2004 Law on Air Protection was followed by laws on amendments and supplements to it.

Policy framework

State level

The 2015 National Emission Reduction Plan (NERP) for Large Combustion Plants envisages the reduction of emissions of SO₂, NO_x and dust from large combustion plants by 95 per cent, 65 per cent and 85 per cent respectively, to gain (overall) levels in the IPPC Directive by 2027. However, its budget is assessed at more than €300 million; a solution for financing has still to be found.

The 2016 Framework Transport Strategy of Bosnia and Herzegovina has various targets: improvement of infrastructure and transport networks, technological

upgrading of the transport systems and reduction of vehicle age and emissions to the air. The Trans-European Transport Network might be extended to the Western Balkans in the future. Reduction of emissions through measures to stimulate the import of newer or more environmentally friendly vehicles and modal shift enhancement are described.

National Renewable Energy Action Plan

In 2012, the Ministerial Council of Bosnia and Herzegovina adopted the Decision on the implementation of Directive 2009/28/EU on the promotion of the use of energy from renewable sources. The targets for Bosnia and Herzegovina are a 40 per cent share of RES in the final consumption of electricity and a 10 per cent share of RES in transport before 2020. These targets influence air emissions in the electricity sector. Policy measures include less consumption of fossil fuels and higher energy efficiency in the industry, transport and residential sectors.

As energy statistics, especially regarding the use of biomass, are still under development, the National Renewable Energy Action Plan (NREAP) will require regular updating and harmonization with the latest known indicators. The parties to the Energy Community Treaty between the EU and eight South-Eastern and Eastern European countries agreed to establish a common market for electric power and gas that functions according to the energy market and environmental standards of the EU. Implementation of relevant EU directives, such as Directives 2010/75/EU (IPPC Directive) and 2009/28/EU on the promotion of the use of energy from renewable sources, are obligatory.

The NREAP is based on previously adopted entity action plans for the use of RES. Construction of additional small, medium and large HPPs (up to 694 MW), wind farms (up to 330 MW in 2020), cogeneration biomass power plants (35 MW) and, eventually, small-scale solar plants can contribute to the decrease in emission of air polluting substances.

In 2009, the share of RES in the Gross Final Energy Consumption in Bosnia and Herzegovina was 34 per cent.

The NREAP gives an overview of the measures to be taken in Bosnia and Herzegovina and of the timescale and the difficulties in realizing it. Hydro and wind energy are the biggest sources of RES in electricity production.

Photo 7 : Kakanj cement plant

There is not yet a state-level incentives programme and incentive schemes for biofuels that meet the criteria in Article 21(2) of Directive 2009/28/EU for the use of RES in transport.

As the residential sector is the largest individual energy consuming segment, improving its energy efficiency will decrease SO₂, dust and PAH emissions. In the NREAP, a number of necessary measures for this and the other sectors (industry, transport, services) are identified. The NREAP subsumes the action plans of the entities. The NREAP was adopted by the Government of Bosnia and Herzegovina in March 2016. It is foreseen that in 2020 a 43 per cent share of RES will be reached (i.e. exceeding the 40 per cent target).

National Implementation Plan

The 2015 National Implementation Plan for the Stockholm Convention was developed in accordance with the Guidance for developing a national implementation plan for the Stockholm Convention. In Bosnia and Herzegovina, legislation on chemicals is adopted mainly at the level of the entities and Brčko District. The NIP describes management of POPs according to the regulations at the level of Bosnia and Herzegovina, the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District for

each of the chemicals on the Stockholm Convention list. POP pesticides have never been produced in Bosnia and Herzegovina, according to preliminary inventories, and there are no stockpiles. Packaging disposal of some pesticides was done in an uncontrolled manner because there were no specific waste disposal methods in Bosnia and Herzegovina.

PCBs are still in use in Bosnia and Herzegovina in closed systems in power equipment and one transformer has PCBs still in stock. Some equipment was damaged during the civil war and there are potentially contaminated locations within brown coal mines and an electricity distribution station. Inventories of POPs and unintentionally produced chemicals (PCDD/Fs, HCB, PCB, PeCBz) have been made by six inventory groups. There are no air quality measurements regarding POPs and there are no regulations that prescribe monitoring POPs in general. However, some research projects have been carried out since 2000 by institutes.

Eleven priorities for POPs management have been determined and 19 strategies and action plans have been formulated to improve the management of chemicals and wastes related to POPs. The organizational framework and the measures and activities for the implementation of the NIP are comprehensively described in the report.

Management Plan on the Phase-out of Hydrochlorofluorocarbons

The Management Plan on the Phase-out of Hydrochlorofluorocarbons (HCFCs) for the period 2012–2020 is under way and the implementation plan for the third tranche has been drawn up. In 2013, Bosnia and Herzegovina was not in compliance with the Montreal Protocol control target; however, for 2016, HCFC consumption in Bosnia and Herzegovina was below the Montreal Protocol control targets.

Draft policy documents

A national energy efficiency action plan is expected to be developed in 2017. It is based on the entities' energy efficiency action plans and the 2012 National Energy Efficiency Action Plan of Bosnia and Herzegovina, which was adopted in Republika Srpska but not in the Federation of Bosnia and Herzegovina. Overall, the indicative aim is an energy efficiency improvement of 9 per cent in 2018 compared with the baseline year 2010.

Federation of Bosnia and Herzegovina

The Federation of Bosnia and Herzegovina adopted the Environmental Protection Strategy for the period 2008–2018, together with an Action Plan. The Air Protection Strategy is one part of this Environmental Protection Strategy. The Action Plan includes short-, medium- and long-term projects and activities with the necessary sources of financing at the Federation of Bosnia and Herzegovina and cantonal levels. Harmonization with the EU *acquis* is one of the key elements in the Air Protection Strategy.

A project concerning the rules on monitoring emissions of atmospheric pollutants, about the quality of monitoring and the necessary accreditation of laboratories, was carried out. There are no national, regional or local plans or programmes specifically addressing improvements in air quality. According to the existing legal framework on air protection, a canton adopts an air quality protection action plan in areas where levels of one or several pollutants exceed ELVs. If two or more cantons are involved, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina coordinates the activities.

Environmental action plans cantons

The cantonal environmental action plans are development plans for a five-year period that

contribute to the improvement of the environmental situation in the canton, based on assessment of the environmental conditions, determined environmental issues and priorities and defined action. Five cantons currently have plans or are preparing them.

Republika Srpska

The 2011 Air Protection Strategy defines the reduction targets, objectives and actions on air quality in Republika Srpska. The Air Protection Strategy is the main document used as the basis for development of air quality plans by the local self-government unit authorities.

EU standards defined by Directives 2008/50/EC and 2004/107/EC relating to SO₂, NO_x, PM, lead, benzene, O₃, arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air shall be adopted. In order to achieve these targets, reductions in emissions are necessary, especially from the power plants and the metals and chemical industries.

The Action Plan for the Implementation of the Sector Development Strategies 2009–2013 establishes a system for sustainable development of industry and the introduction of and support for the application of BAT. According to the EU BREF documents, BAT is a useful tool in reaching air emission reductions and air quality targets.

The 2012 Energy Development Strategy until 2030 describes energy efficiency measures and measures to promote clean energy by modern energy technologies without air pollution.

In local communities, air protection is implemented by adoption of local environmental action plans (LEAPs) or sustainable energy action plans (SEAPs). Air quality plans are adopted by local self-government unit authorities with the approval of the Ministry of Spatial Planning, Civil Engineering and Ecology.

Brčko District

In Brčko District, the Sustainable Energy Action Plan (2015) has been adopted. Until now there have been no programmes or strategies for reducing emissions of atmospheric pollutants. The 2016 Environmental Protection Strategy of Brčko District for the period 2016–2026 describes the legal system (Law on Air Protection and by-laws (rulebooks)), emissions into the air (qualitative), causes of air pollution, the state of air quality, objectives and measures for air protection, and international conventions and measures.

Institutional framework

Environmental management in Bosnia and Herzegovina is complex as four administrative levels are involved: state, entity, canton and municipality.

State level

On the state level, the Ministry of Foreign Trade and Economic Relations has some competences in environmental protection (chapter 1). As there is no state law on environmental protection or air protection, air protection management is executed at the entity level.

Federation of Bosnia and Herzegovina

The Ministry of Environment and Tourism has jurisdiction over air protection. It has 48 related staff positions in the Division of Environment and the Division of Environmental Permits, of which four are for air protection.

The Hydrometeorological Institute is responsible for the air quality monitoring system and reporting, together with authorized persons in the cantons. Three employees work on environmental issues.

The Administration for Inspection Affairs has 15 inspectors on urban water management and environmental inspections. At the cantonal level, implementation and enforcement of regulations and policies on air protection are performed by the different cantonal ministries. The organizational scheme differs canton by canton.

Republika Srpska

In Republika Srpska, air management and protection is under the jurisdiction of the Ministry of Spatial

Planning, Civil Engineering and Ecology. The Ministry is responsible for the implementation of regulations on the control of air quality, coordinates activities of the air monitoring network and collaborates with other administrative bodies such as the Hydrometeorological Service, authorities responsible for the protection of human health and local authority units. The Division of Environment of the Ministry works on the integral protection of the environment and natural resources, such as on research, planning, management, projects and drafting laws and by-laws. There are two senior associates for air protection. The Hydrometeorological Institute manages the air quality monitoring system, together with authorized legal persons in local governments, and is responsible for air quality monitoring, the GHG inventory, the PRTR and air quality inventory and reporting.

In the Administration for Inspection Affairs, an independent administration for inspection activities, one of the 13 services is the Urban Planning, Construction and Environmental Inspection Service. There are four inspectors for the environment at the entity level and a number of inspectors in municipalities (84 in total for urban planning, construction and the environment).

Brčko District

The Department of Spatial Planning and Property Issues is responsible for air protection. In the Inspectorate organized within the Office of the Mayor, there is one inspector for environmental protection.

Sustainable Development Goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis Targets 3.9 and 11.6 is described in box 7.3.

**Box 7.3: Targets 3.9 and 11.6 of the 2030 Agenda for Sustainable Development****Goal 3: Ensure healthy lives and promote well-being for all at all ages**

Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution

For Bosnia and Herzegovina, the annual mortality rate (per 100,000 people) attributed to household and ambient air pollution is estimated by the World Health Organization at 223.6 in 2012 (World Health Statistics, 2016), which is one of the highest mortality rates by air pollution in the world. Air pollution by particulate matter (PM) is the most dangerous factor, but other components (NO₂, SO₂, PAH, O₃) also contribute. By reducing air pollution levels, Bosnia and Herzegovina can reduce the burden of disease from stroke, heart disease, lung cancer and chronic and acute respiratory diseases such as asthma.

In Bosnia and Herzegovina, the WHO Air Quality Guidelines, as well as the less-stringent EU Air Quality Standards, are often largely exceeded in some urban areas. To reduce the mortality rate to the mean European level, substantial measures to reduce air emissions from industry, traffic, households and services are necessary. For large combustion plants, a (draft) national emission reduction plan was set up with clear targets for the reduction of emissions of SO₂, NO_x and dust. As a preparation for future ratifications of protocols under the CLRTAP, emission reduction plans for other sectors should be made.

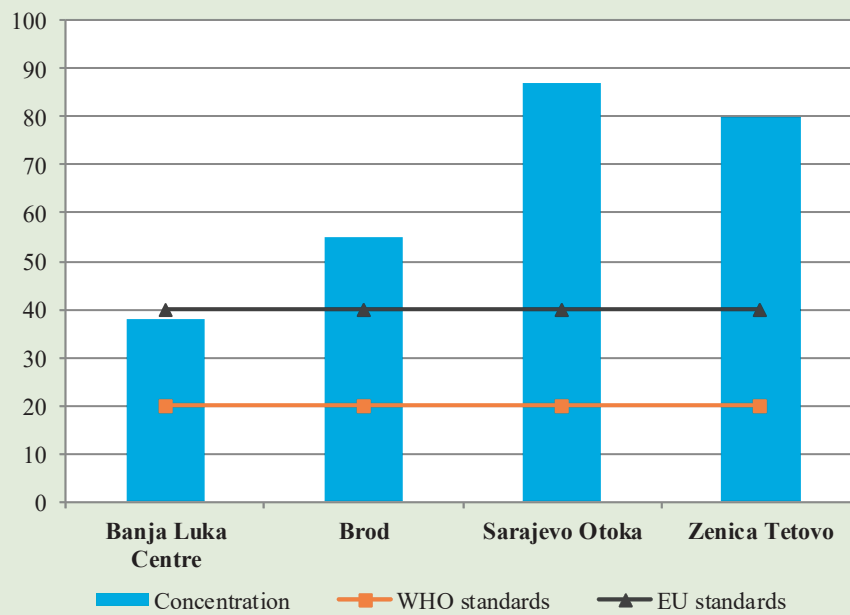
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

Indicator 11.6.2: Annual mean levels of fine particulate matter (e.g. PM_{2.5} and PM₁₀) in cities (population weighted)

The WHO Air Quality Guideline for the annual mean concentration of PM₁₀ is exceeded in many cities in Bosnia and Herzegovina, as is the EU Air Quality Standard. Results from a few stations are shown in figure.7.1.

Figure 7.1: Annual mean concentration of PM₁₀, 2015, µg/m³

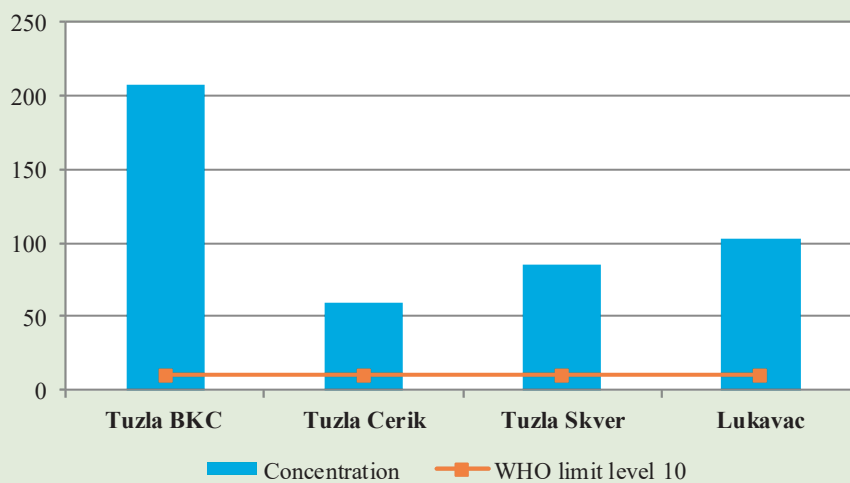


Source: Air Quality Report for the Federation of Bosnia and Herzegovina for 2015. Air Report for Republika Srpska for 2015, 2016.

Note: WHO Air Quality Guideline: 20 µg/m³; EU Air Quality Standard: 40 µg/m³

Exceedances of the WHO Air Quality Guideline for PM_{2.5} in Tuzla and Lukavac are shown in figure 7.2.

Figure 7.2: Annual mean concentration of PM_{2.5}, 2015, µg/m³



Source: Air Quality Report for the Federation of Bosnia and Herzegovina for 2015.

Note: WHO Air Quality Guideline: 10 µg/m³. There is no EU Air Quality Standard for PM_{2.5}.

Regulatory, economic, fiscal and information measures

Air quality data for nine monitoring stations in Bosnia and Herzegovina can be obtained online (<http://www.hidrometeo.ba>). The hourly concentrations of SO₂, NO₂, O₃, PM₁₀ and meteorological conditions are shown. The website <http://www.monitoringzrakat.k.info> gives air quality data from a number of stations in Tuzla Canton, measuring hourly values of CO and PM_{2.5} instead of PM₁₀. The Hydrometeorological Institute of the Federation of Bosnia and Herzegovina and the Hydrometeorological Service of Republika Srpska publish annually a report on air quality in the respective entity. In addition, detailed inventory reports on emissions of air polluting substances from point sources (industry) are published in the Federation of Bosnia and Herzegovina every year. The Hydrometeorological Service of Republika Srpska is authorized for the GHG inventory for Republika Srpska and publishes a GHG emissions inventory report annually.

The Indicator Reporting Information System software, a tool developed by UNEP for data collection and indicator creation for national focal points reporting to international conventions in the environmental field, has been demonstrated as a possible instrument in Bosnia and Herzegovina by the UNDP Country Office in Bosnia and Herzegovina.

Federation of Bosnia and Herzegovina

Environmental permits are issued by both the Ministry of Environment and Tourism and at the cantonal level. Integrated permitting is still in the development phase. Permits are issued for a period of five years. ELVs are prescribed in the permits, based on the Regulation on Limit Values of Air Emissions from Combustion Plants, and are sometimes (for new installations) based on BAT described in EU BREF documents. The ELVs of the EU Large Combustion Plants Directive (2001/80/EC – no longer in force) are transposed in the legislation of the Federation of Bosnia and Herzegovina. ELVs in the IPPC Directive (2010/75/EU) for new plants have not yet been transposed in the legislation of the Federation.

In the EU, according to the IPPC Directive, the BAT-associated ELVs (BAT-AELs) are binding and derogating them is not easy. Public participation in the permitting process, as in the EIA process, is hampered by the frequent ignoring of comments and regular breaches of the legal conditions concerning public comment, by the competent authorities.

Inspectors of the Ministry of Environment and Tourism and cantons control permit conditions. The financial sanctions they impose for exceeding ELVs or non-compliance with permit conditions are not high (mostly €500–€5,000) and are not sufficient to motivate operators to comply with the prescriptions. As the number of inspectors is relatively quite low (e.g. there are five for the Federation of Bosnia and Herzegovina), stakeholders advise that enforcement of environmental permits is inadequate.

Companies in the Federation of Bosnia and Herzegovina pay an air pollution tax that is derived from the emission data for SO₂, NO₂ and dust recorded in the annual emission reports that they submit to the ministry that issued the environmental permit (the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina or the canton). Sometimes companies pay fixed prices if there is no emission report for certain years.

The air pollutant fees are €19/ton for SO₂, €18/ton for NO_x and €85/ton for PM₁₀. A problem is that diffuse emissions are not measured or calculated and reported, but only emissions from the stacks. The measurements are carried out by accredited laboratories. The tax revenue is earmarked for the Environmental Protection Fund. The Federation of Bosnia and Herzegovina and Republika Srpska each has an Environmental Protection Fund (chapter 1).

Republika Srpska

Environmental permits are issued by the Ministry of Spatial Planning, Civil Engineering and Ecology and (for small plants) local self-government units. Integrated permitting is a new development, and permits are issued for five years. The emissions levels in the permits are based on the Decree on Emission Limit Values of Polluting Substances into the Air. There are Rulebooks on limit values of emissions from biomass combustion plants and on the emission of vaporizing organic compounds. The ELVs for large combustion plants are based on the EU Large Combustion Plants Directive; the ELVs in the IPPC Directive (Annex V) are not yet transposed.

Brčko District

Environmental permits are issued by the Department for Spatial Planning and Property Rights Matters (Office for Spatial Planning, Urban Planning and Environmental Protection) of the Brčko District Government. Regulations and standards applied in the District are found in the Rulebook on air quality monitoring under the Law on Air Protection.

Environmental inspection activities are carried out by the Inspectorate of Brčko District. In Brčko District no specific economic instruments are used. Environmental tax as such does not exist.

7.5 Participation in air-related international agreements and processes

United Nations Framework Convention on Climate Change and Kyoto Protocol

Bosnia and Herzegovina ratified the UNFCCC in 2010 and the Kyoto Protocol in 2008 as a non-Annex I party to the Convention (chapter 6).

Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol

Bosnia and Herzegovina has been a party to the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer since 1993 and has ratified all amendments (in 2003 and 2011). The HCFC Phase-out Management Plan is on track and Bosnia and Herzegovina is currently in compliance with its obligations.

Stockholm Convention on Persistent Organic Pollutants

The Stockholm Convention on Persistent Organic Pollutants was ratified by Bosnia and Herzegovina in 2010. The National Implementation Plan (NIP) was published in 2015. The Ministry of Foreign Trade and Economic Relations is the national coordination centre (National Focal Point) for information exchange and the public authority in charge of fulfilment of the obligations of Bosnia and Herzegovina under the Stockholm Convention.

Energy Community Treaty

This Treaty is an international organization established between the EU and nine South-Eastern European countries with the aim to create a pan-European energy market by extending the EU energy acquis to the territories of the nine countries. The EU acquis includes legislation on energy, the environment (e.g. air protection) and competition. The Treaty was signed and ratified by Bosnia and Herzegovina and came into force in 2006. The Treaty contains a timetable for important elements of the EU acquis. For air protection the reduction of the sulphur content of certain liquid fuels (31 December 2011), completion of the NREAP (30 June 2013), transposition of the Renewables Directive (1 January 2014), implementation of Directive 2012/27/EU on energy

efficiency (15 October 2017) and limitation of emissions of certain pollutants into the air from large combustion plants are important aspects of this.

The main institutions established by the Treaty are the Ministerial Council, Permanent High Level Group, Energy Community Regulatory Board, Forum and Secretariat. The last annual implementation report of the Energy Community Secretariat (September 2016) states that Bosnia and Herzegovina has reached a modest level of transposition of the Energy Community environmental acquis. Incorrect transposition and implementation of Directive 1999/32/EC on reduction of sulphur content in certain liquid fuels is currently subject to an infringement procedure. Assessment of the draft NERP is currently ongoing. The ELVs of the IPPR Directive for new combustion plants have not yet been transposed in the two entities.

Convention on Long-Range Transboundary Air Pollution

Bosnia and Herzegovina has been a party to the Convention on Long-Range Transboundary Air Pollution (CLRTAP) and the EMEP Protocol for Monitoring and Evaluation since 1993. Although the country ratified the EMEP Protocol, it has never reported to EMEP so in the ECE/EMEP emission database there are no submitted data of Bosnia and Herzegovina but only estimated data. Bosnia and Herzegovina has not appointed a national focal point to the Convention to date and did not sign or ratify any other protocols under the Convention.

Three revised protocols to the Convention are now considered key to the overall aim of the Convention: the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), the Protocol on Persistent Organic Pollutants and the Protocol on Heavy Metals.

The revised Gothenburg Protocol has introduced flexibility measures to facilitate the accession of new parties. It provides ELVs for stationary and mobile sources in the annexes and requires implementation of BAT (for NH₃ control measures in the agricultural sector). Looking at the annexes of the Gothenburg Protocol, the conclusion is that Bosnia and Herzegovina is currently only partially complying with the ELVs in these documents (which are less stringent than the EU BAT-ELVs in the BREF documents).

The focus of the Heavy Metals Protocol is the limitation of emissions of lead, cadmium and mercury.

By reducing emissions of particulate matter, most heavy metal emissions will be also reduced.

Protocol on Pollutant Release and Transfer Registers

Bosnia and Herzegovina signed the Protocol on Pollutant Release and Transfer Registers in 2003 but did not ratify it.

The legislation (Rulebook on registers of plants and pollution) was adopted in the Federation of Bosnia and Herzegovina in 2007 and the PRTR database was established in 2011. The Hydrometeorological Institute verifies the information on air emissions.

Data are not yet forwarded to the state level and not yet made public. Around 70 per cent of the relevant facilities enter the data electronically or by mail. Data are collected for 91 pollutants according to Directive 2010/75/EU. The PRTR is directly accessible by ministries, inspectorates and reference centres. There are still gaps in the system. There is no public access to the information.

In Republika Srpska, the PRTR is regulated by the Law on Environmental Protection and the Rulebook for Pollution Release and Transfer Register (OG RS, No. 92/07). The Hydrometeorological Service has been the authorized institution for the establishment and maintenance of the PRTR Register since 2016. There has been insufficient response from operators to date, due to a lack of knowledge, capacity and resources. The Government is working on improvement and the PRTR is expected to be publicly available on the website www.rhmzrs.com.

At the state level, there is no standardized system of data transmission and reporting of data and statistics related to the environment in accordance with the relevant EU PRTR legislation. There is no national environmental information system. The Agency for Statistics collects data on the state of the environment through the implementation of the annual programme of statistical surveys.

7.6 Assessment, conclusions and recommendations

Assessment

Industrial air emissions, combined with the air emissions from the growing number of vehicles and from domestic heating using firewood and lignite, create severe air pollution in industrial and urban areas, which causes serious nuisance and health problems. During less favourable meteorological

conditions, which often occur during winter, high concentrations of substances such as SO₂ and particulate matter are reached in some urban areas that are situated in valleys, such as Tuzla, Zenica and Sarajevo. Transboundary air pollution also occurs with the high emissions of SO₂ from TPPs and the oil refinery at the Bosnian/Croatian border. Advanced abatement techniques are not installed that would attain better and healthier air quality on a sustainable basis and achieve the EU acquis for ambient air quality in the future.

Measures to prevent air emissions from industry such as those described in the EU BREF documents are sometimes included in environmental permits in Bosnia and Herzegovina, but in many cases they are not (yet) implemented by installed abatement techniques. In the last few years, some measures have been planned and some abatement techniques have been, or soon will be, installed in companies in both entities (e.g. ACM Zenica and TPP Ugljevik), but the search for the necessary investments that would reduce air emissions, create better air quality and public health and maintain the competitiveness of industry, is a great challenge. Pressure to reach these targets is strengthened by growing public awareness of and protest about the lack of access to information and public participation in permit procedures to prevent bad air quality.

Due to the high industrial emissions, combined with traffic exhaust and, during the winter months, domestic heating with coal and wood, high concentrations of air-polluting substances are measured that often exceed the WHO Air Quality Guidelines and the less-stringent EU Air Quality Standards, especially when stagnant meteorological conditions occur during colder periods. The conditions that give rise to air pollution are worsened as some cities are situated in valleys, which prevents dispersion of polluting substances because of air inversion on cold days with little wind.

In rural areas, air pollution is mostly below dangerous levels, with the exception of areas in the vicinity of cities such as Zenica, Tuzla, Kakanj, Lukavac, Ugljevik and Brod. The high levels of air pollution in and around cities in Bosnia and Herzegovina lead to serious health complaints, such as cardiovascular, respiratory and lung diseases. According to the WHO, the per capita mortality rate in Bosnia and Herzegovina attributed to household and ambient air pollution is 223.6 per 100,000, which is one of the highest mortality rates by air pollution in the world. Concrete measures in all sectors (industry, traffic and domestic heating) are not being taken to improve this situation.

Conclusions and recommendations

Pollution Release and Transfer Register

As part of the EU acquis, the country would have to comply with the E-PRTR standards.

At the state level and at Brčko District level, there is no PRTR.

In the Federation of Bosnia and Herzegovina, the legislation was adopted in 2007 and the PRTR database was established in 2011. About 70 per cent of the relevant facilities submit data electronically or by mail. Data are collected for 91 pollutants according to Directive 2010/75/EU. The PRTR is accessible by governmental institutions and reference centres, but the information is not publicly accessible. Data are not yet shared with the state level.

In Republika Srpska, the legislation is in place to support the implementation of the PRTR. However, due to the lack of knowledge, capacity and resources, response from the operators remains insufficient. The Government is working on improvement and the PRTR is expected to be publicly available on the website www.rhmzrs.com.

Recommendation 7.1:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should further improve the legal framework, make necessary institutional arrangements, develop technical capacity and allocate and train the staff required for an effective pollutant release and transfer register system at the state level.

Recommendation 7.2:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should ensure that:

- (a) *The respective PRTR systems are harmonized and data are reported according to the international obligations;*
- (b) *The reporting mechanisms are in place and in force.*

Legislation on industrial emissions

As a candidate for EU membership, Bosnia and Herzegovina agrees to harmonize its legal framework on environmental issues with the EU legal framework. Directive 2010/75/EU on industrial emissions lays

down rules on integrated prevention and control of air and water pollution, energy efficiency and waste control arising from industrial activities. An EU-funded project is being carried out in Bosnia and Herzegovina to help implement the IPPC Directive, but no laws have yet been enacted that transpose the Directive.

Recommendation 7.3:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should amend the legislation to fully transpose Directive 2010/75/EU on industrial emissions and ensure that the legislation at the entities and District levels is harmonized.

Transport and air pollution

In Sarajevo and other cities, the growth in the number of private cars is one of the main causes of air pollution (NO_x, PM₁₀, NMVOC and SO₂). In December 2016, the air quality in Sarajevo was so bad that a cantonal emergency committee took the measure to ban half the city's cars from the roads on alternate days, allowing only cars with licence plates ending with an odd number one day and those ending with an even number the next day, for as long as the bad air quality episode lasted. Other measures followed, such as prohibiting older cars and heavy trucks on several routes. The critical situation in Sarajevo and other cities, such as Tuzla and Zenica, lasts for several months each winter when temperatures are low and there are air inversions in the valleys that hamper air circulation.

Private cars in the country are generally between 15 and 18 years old, which means that they do not comply with modern emission standards. Import of cars is already restricted for vehicles with lower emission standards than Euro-3. Although most cities are not steep or have a great altitude differential, and a few have cycleways, only a few people use bicycles. There is no campaign to promote a shift to cleaner heavy-duty diesel vehicles and low-emission fuels and cars. It is not easy to use bicycles for shorter distances due to the lack of a safe cycling infrastructure or the common use of bicycles.

Recommendation 7.4:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should:

- (a) *Introduce economic incentives to facilitate the renewal of the country's ageing vehicle fleet*

with a view to improving the situation regarding motor vehicle emissions;

- (b) Support municipalities to abate air pollution from transport by improving their public transport system, in particular by promoting the use of clean and energy-efficient transport modes;
- (c) Promote active (non-motorized) mobility in cities and assess the possible benefits of such a transformation.

Domestic heating and air pollution

Domestic heating is the other big source of air pollution in cities during winter. The lack of insulation of buildings leads to low energy-efficiency performance and bad air quality in the cities, in particular during winter. The use of firewood, coal and other heat sources in individual stoves and furnaces with low emission thresholds and the use of fuel with a high sulphur content in district heating systems contribute significantly to bad air quality and the exceeding of EU Air Quality Standards for dust, SO₂ and PAH in winter.

Recommendation 7.5:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should:

- (a) Implement the measures for energy efficiency in residential and commercial buildings that are and will be proposed in the Second and Third National Energy Efficiency Action Plans in order to realize the envisaged 9 per cent improvement in energy efficiency in 2018 compared with the base year 2010;
- (b) Promote the use of low carbon technology (heat pumps, renewables) and cleaner fuels such as natural gas instead of liquid and solid fuels by individual households;
- (c) Seek financial support from international institutions to support these measures.

European Monitoring and Evaluation Programme

Bosnia and Herzegovina does not comply with its reporting obligations under the EMEP Protocol and does not submit emission data.

Recommendation 7.6:

The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, should improve the monitoring and reporting system to the European Monitoring and Evaluation Programme of the Convention on Long-Range Transboundary Air Pollution.

Protocols to the Convention on Long-Range Transboundary Air Pollution

Bosnia and Herzegovina has been party to the Convention on Long-Range Transboundary Air Pollution and its Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) since 1993. To date, Bosnia and Herzegovina does not have a national focal point to this Convention and did not sign or ratify any other protocols under the Convention. The lack of human resources and the country's complex organization makes it difficult to maintain the required contact points. The Convention is increasingly focusing on providing expertise and guidance to the Eastern European, Caucasian and Central Asian countries to help them ratify and implement the key protocols and reduce air pollution. Some of the Protocols of the Convention that have recently been revised and include stringent emission targets coupled with provisions for flexibility, to facilitate countries' accession to the EU, are the Gothenburg Protocol (to Abate Acidification, Eutrophication and Ground-level Ozone), the POPs Protocol and the Heavy Metals Protocol. For Bosnia and Herzegovina, these developments create opportunities to obtain guidance from the Convention on replacement of older technologies and to develop policies to implement new regulations.

Recommendation 7.7:

The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina should invest in acquiring twinning and other projects with EU countries and other parties and institutions to obtain the guidance and expertise that is necessary to ratify and implement the Protocols to the Convention on Long-Range Transboundary Air Pollution, as an important step in the direction of achieving the EU acquis on air protection.

Chapter 8

WATER MANAGEMENT

8.1 Water resources

General aspects

Bosnia and Herzegovina has two main watersheds. One covers the larger part of the territory and embraces the right bank of the basin of the Sava River, which is a tributary of the Danube River and flows into the Black Sea. The other river basin encompasses the coastal catchment that drains into the Mediterranean, in the Adriatic Sea. This hydrological pattern, in respect of the country overall, the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, is presented in Table 8.1.

Water resources represent an ecological and economic asset in Bosnia and Herzegovina. Mean annual precipitation is very significant, around 1,250 l/m². Total resources are estimated at 38 billion m³, of which 36 billion m³ are internal and only 2 billion m³ are external (excluding upstream Sava River). Total renewable freshwater is considered to be 9,781 m³/year per capita (FAO Aquastat, 2015). These values point to a medium to high level of water availability, based on international water stress benchmarking (Falkenmark indicator). However, there is uneven distribution across Bosnia and Herzegovina's territory and noticeable seasonal amplitudes, sometimes with extreme hydrological phenomena. In addition, there is considerable annual rainfall variability: during dry-summer periods, some Bosnia and Herzegovina regions may undergo water abstraction limitations. Furthermore, there are signals that the country is experiencing a trend towards declining summer precipitation values and rising

temperatures (0–2°C).

Surface waters

Rivers

In total, inland run-off is around 1,155 m³/s with 722 m³/s being discharged into the Black Sea (Danube River Basin) and 433 m³/s into the Adriatic Sea. Rivers are characterized by high gradients and a relatively high water run-off, 22 l/s/km².

The territories of the Federation of Bosnia and Herzegovina and Republika Srpska share most of the draining basins. In general, Republika Srpska is the downstream and the Federation of Bosnia and Herzegovina the upstream region due to the country's orography. Ultimately, a stream source and mouths may be in one entity and a part of the middle course in the other one, as occurs with the Una and Drina Rivers. Nearly half of the average annual flow that drains towards the Sava River has such an internal transboundary characteristic. In the Adriatic Sea river basin, internal transboundary waters between the two entities are less significant.

Besides the challenging issue of internal transboundary waters, there is also a meaningful international context. Rivers are the natural characteristics that define nearly half of Bosnia and Herzegovina's borders, extending 751 km in length. The Sava River receives the surface waters drained by the catchment area of Bosnia and Herzegovina on its right bank and is the natural northern border with Croatia.

Table 8.1: Sava River Basin and Adriatic Sea Basin: area and main sub-river basins

	Total area (km ²)	Sava River Basin (percentage of territory and main sub-river basins)	Adriatic Sea river basin (percentage of territory and main sub-river basins)
Bosnia and Herzegovina	51 212	74	26
Federation of Bosnia and Herzegovina	26 086	66 Una (with Glina and Korana Rivers), Vrbas, Bosna, Drina, and immediate Sava	34 Neretva, Trebišnjica, Krka and Cetina
Republika Srpska	24 640	81 Una, Vrbas, Bosna, Drina and immediate Sava	19 Neretva and Trebisnjica
Brčko District	486	100 Brka, Trnja and immediate Sava	- -

The Sava River is the main international river that crosses Bosnia and Herzegovina and is the main tributary by discharge into the Danube River, the confluence being in Belgrade (Serbia). The Tara and Piva Rivers both flow from Montenegro, forming the Drina River, the main Sava River tributary. The Drina River forms the demarcation between Bosnia and Herzegovina and Serbia to a large extent and Montenegro to a lesser extent. Besides these rivers, others also have a transboundary feature in the Sava River watershed, e.g. the Una River at the western border with Croatia.

International transboundary water management is also a major theme in the Adriatic watershed, where Bosnia and Herzegovina is the upstream country vis-à-vis Croatia. The Neretva River has the most significant transboundary river basin in the Adriatic Sea watershed. The Neretva River flows from Republika Srpska down to the Federation of Bosnia and Herzegovina and towards Croatia, where the costal delta is listed under the Ramsar Convention. In addition, the Mediterranean basin is the core of international concerns due to both the ecological vulnerability of its large endorheic basin and its multinational borderline. Within such a framework, the current environmental pressures in the Adriatic zone are significant and complex (e.g. tourism demands, wastewater discharges and biodiversity threats).

Lakes and artificial reservoirs

There are several natural perennial lakes of various types and hydrological characteristics in Bosnia and Herzegovina. River lakes, formed in riverbed extensions or resulting from natural barriers, are found in the Pliva, Una and Trebizat Rivers. Such lakes are not very significant from a hydrological perspective but they provide valuable ecosystem services and scenic value. Mountain lakes are mostly of glacial origin and are found in the Dinarides with a volume range between 0.01 and 3.5 billion m³. Moreover, *seasonal* lakes may act as retention basins in some karst fields during rainy periods or after snow melt. The most important of these are located in the Adriatic Sea river basin but there are a few in the Sava River Basin (e.g. Podrašnica, Lušci, Palanka). Intermittent lakes are important passive flood control structures, increasing the time of rainfall concentration in small watersheds.

There are about 30 artificial reservoirs in Bosnia and Herzegovina, primarily in the Neretva and Trebisnjica River Basin and in the Drina River. Most are designed for hydropower uses and all have an impact on flood control, drinking water supply and irrigation. The total

volume of reservoirs is about 3.9 billion m³. About 90 per cent of them are located in the Adriatic Sea watershed and the remainder in the Black Sea watershed.

Groundwater

Aquifers are distributed across different geographical areas of Bosnia and Herzegovina. Most of the territory (89 per cent) is contained in the Dinaric system (internal and external Dinarides), a structure of the alpine mountain chain that has a northwest–southeast alignment parallel to the Adriatic Sea. In the central part of the country (internal Dinarides), groundwater accumulates in limestone massifs and emerges as lime wells in the river basins of the Una, Sava, Bosna, Drina and Neretva Rivers. In the south, in the Adriatic Sea catchment, the geology is primarily karst (external Dinarides) and groundwater is mostly found in wells of the Cetina, Neretva and Trebisnjica River Basins. Karst aquifers are very fragile in terms of pollution impacts. Their vulnerability depends on several features within the strong hydrology–hydrogeology interplay, with shallow soils and scarce vegetation. Indeed, karst structure fosters water infiltration through the rock fissures, favouring a direct connection between the surface and water table. This geocharacteristic may prompt pollution contamination, since a likely contaminant may reach the water table easily.

The tectonic graben of the Sava River is considered to be the northern edge of the Dinarides system. The Dinarides fringe is located some 20–30 km south of the Sava River and groundwater reserves are within alluvial connected sediments at a depth of about 50 m.

8.2 Water quality

Surface waters

River basin projects were carried out during recent years and directly contributed the current knowledge about the quality of Bosnia and Herzegovina freshwaters. Information on ecological quality based on monitoring and risk assessment procedures following the EU Water Framework Directive (WFD) shows that good water status was not achieved in large parts of Bosnia and Herzegovina; indeed, more than half of these water bodies present a status lower than good. The main problems are organic matter concentration and microbiological levels due to untreated municipal loads. Nutrients are also a problem. However, annual average values vary from river to river and from year to year without a clear trend and without a cause–effect relationship from agriculture or urban pressures.

Photo 8: Vrelo Bune, the source of the Buna river

The shutdown of some heavy industries since the 1980s led to lower pollution loads in Bosnia and Herzegovina but concerns about water contamination by industrial products still remain. Indeed, research studies identified polycyclic aromatic compounds in several samples from riverbeds. Contaminants were present in sediments at levels that breach the international criteria (e.g. PCBs, chlorinated hydrocarbon pesticides). Other priority substances such as surfactants and metals were also sampled, but their concentration was lower than permissible levels. Nevertheless, the concern about emerging pollutants, including endocrine disruptors, is shared by all industrialized countries in Europe. Increasing monitoring efforts and expansion of the scope of analysis is envisaged in order to provide more information.

In general, lake water quality is satisfactory, although some water bodies may occasionally show eutrophication symptoms (e.g. Buško Blato). Other lentic freshwaters have a natural low transparency, not caused by algal blooms (e.g. Blidinje Lak).

Groundwater

Most groundwater bodies in Bosnia and Herzegovina are of good chemical status. However, some are considered of poor chemical status or at possible risk of failure to achieve such good status. For instance, in Republika Srpska, 13 groundwater bodies (62 per

cent) are in the category of "non-pressure", while four groundwater bodies (19 per cent) are classified as "under potential pressure" and another four (19 per cent) as "conditionally under pressure". Most anthropic pressures are caused by urban zones without sewerage and wastewater treatment plants (WWTPs) or uncontrolled leachates from solid waste sites without proper treatment. It is evident that groundwater vulnerability is boosted by the prevalence of Bosnia and Herzegovina's karst geology.

Nitrate contamination issues require additional comment. If aquifers are being put at risk by nitrate pollution, agricultural areas should be designated as "vulnerable zones" by environmental authorities in EU territory (Directive 91/676/EEC). Draft proposals on the Directive transposition are being prepared by national authorities, using an interdisciplinary approach among water and agriculture departments. However, there is no comprehensive monitoring programme to assess the baseline and impacts derived from current fertilizer and manure application.

Drinking water quality

Water resources in Bosnia and Herzegovina are sufficient to fulfil drinking water demands, but microbiological hazards are a health concern. For that reason, most local utilities are known to define an immediate intake protection zone around groundwater

sources, aiming at preventing direct contamination. Good practices recommend the implementation of a second sanitary perimeter, not just an immediate one. However, this second zone is not designated or regulated in Bosnia and Herzegovina, either for ground or surface waters. In this framework, it is worthwhile to recall the lessons learned by some EU countries, where such dual zoning drove a network restructuring. Indeed, because the implementation of a far-reaching protection zone increases social costs (several activities are forbidden or restricted), small water intakes for public supply may be abandoned in order to reduce such social impacts. A side effect of having fewer water sources is the reduction of monitoring costs – a driver that cannot be neglected.

Chlorination is the standard disinfection method in Bosnia and Herzegovina. However, 21 per cent of drinking water samples failed microbiological tests according to the Danube Water Programme report released in 2015. In these cases, a safe residual chlorine concentration was not achieved and microbiological contamination along the water network built up and surpassed permissible post-treatment guidelines.

Automatic flow-proportional systems are present only in larger Bosnia and Herzegovina towns. Iron and manganese presence is detected in some areas and may require additional treatment for removal, but this question does not seem to be a relevant health problem. The same applies to water turbidity, which also hinders disinfection effectiveness but may be solved by preoxidation.

Water supply quality is supervised by both entities and Brčko District through their Institutes of Public Health, but the performance of drinking water programmes is not fully addressed. The number of tested samples is insufficient, laboratories are not accredited and most are only equipped for standard chemical and microbiological analyses. Consequently, some priority substances and emergent contaminants

are not controlled as defined by the EU Drinking Water Directive (98/83/EC).

8.3 Water supply and demand

While both surface water and groundwater may be used as drinking water sources, the former is the dominant one in Bosnia and Herzegovina. According to the Agency for Statistics of Bosnia and Herzegovina, water consumption was 328 million m³ in 2013, of which about 273 million m³ were abstracted from groundwater (83 per cent) and 55 million m³ from surface waters (17 per cent).

The effective average residential water consumption is 168 l/day per capita. There is 88 per cent access to piped water supply in Bosnia and Herzegovina, and slightly more than 90 per cent of the urban population is so served. Table 8.2 presents the percentage of the population connected to a public water supply system in Bosnia and Herzegovina.

Water supply systems managed by municipal utilities cover 58 per cent of the population of Bosnia and Herzegovina. Information is not always consistent, as some other sources point to higher coverage, 65 per cent, and about 45 per cent in Brčko District. In 2011, 57.5 per cent of the population was already connected to a public water service. Based on such official figures, no tangible upgrade has been achieved since 2011.

Approximately 82 per cent of the water abstraction in Bosnia and Herzegovina is for domestic use, 16 per cent is for industry and the remainder for agriculture and other applications (World Bank, 2015). These figures are not the traditional pattern in EU countries and reveal the underdevelopment of industry and irrigated agriculture in Bosnia and Herzegovina. Total water demand from industrial activities in Bosnia and Herzegovina reached 81 million m³ in 2014 (Agency for Statistics of Bosnia and Herzegovina, 2015).

Table 8.2: Population connected to water supply system in the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, percentage

	Federation of Bosnia and Herzegovina	Republika Srpska	Brčko District	Bosnia and Herzegovina
Access to public water supply connection	60	57	37	58
of which:				
Systems according to EU Drinking Water Directive	36	34	25	35
Systems with occasional water quality deviations from the standards prescribed by EU Drinking Water Directive	24	23	12	23

In the industrial sector, mining and quarrying represented 19 per cent and manufacturing 81 per cent of water use, and abstraction from proprietary systems was dominant. Abstraction from both riverbeds and reservoirs accounted for 38 per cent and groundwater 11 per cent. Water supplied by public systems accounted for only 8 per cent, while 5 per cent was from other sources.

In the industrial sector, processing accounted for 68 per cent of water use and cooling 23 per cent. The remaining 9 per cent was either for sanitary uses or other purposes. The total amount of water used in the industrial sector remains very similar to consumption recorded in 2011.

The legal status of service providers varies from state-owned enterprises (municipal, town, cantonal) to a stakeholder enterprise, which is what operates in Republika Srpska. Bosnia and Herzegovina has a diverse portfolio of public water companies at municipal, city or cantonal levels (142 in 2014). The remaining part of the water supply system is self-organized through local households, using small springs or wells. Very little is known about the informal service providers, which are normally beyond policy and regulatory reach and thus pose particular challenges for the sector due to their small size and limited technical and financial capacity.

The investment deficit revealed by the sloppy progress in water service statistics has direct effects on operational conditions and water supply infrastructure, which was mostly constructed some decades ago and is extremely liable to cracking. An immediate indicator of the existing problem is the extremely high level of water losses. Leaks are quite persistent in Bosnia and Herzegovina, in general over 50 per cent and reaching 70 per cent or more in exceptional cases. Indeed, these records accord with an average water abstraction of 256 l/day per capita, if water and population data from 2013 are considered (disregarding industrial consumption). Other known risks derived from outdated infrastructure in Bosnia and Herzegovina are related to the asbestos materials used in some sewer systems until the 1990s, which demand specific attention in rehabilitation works.

8.4. Water resources monitoring networks

Currently, surface water quantity monitoring is performed by 134 hydrological stations in Bosnia and Herzegovina, most of which (around 90 per cent) are automatic, which seems reasonable. Furthermore, the Sava River Watershed Agency has an online water monitoring service with forecasting and early warnings, with online data acquisition and numerical

simulation. This facility is crucial in the activation of emergency plans in flood risk areas. In Brčko District, the Institute for Waters performs water flow monitoring, measurement of physico-chemical parameters (including heavy metals), and microbiology and saprobiology observations. Monitoring is regularly carried out in the Tinje, Brka and Sava Rivers.

8.5 Management of water use

The main environmental pressures on surface waters derive from urban and rural agglomerations, industrial facilities, livestock and poultry farms and fish farms. Diffuse sources of pollution in Bosnia and Herzegovina result from uncontrolled animal manure, the leaching of silage and solid waste dumping sites, and fertilizer surplus. In the industrial sector, the mining and quarrying sector represented 23 per cent of discharged water and the manufacturing sector 77 per cent. Of total discharged industrial wastewater, 67 per cent was treated, 23 per cent was not polluted and 10 per cent was considered to be non-contaminated (Agency for Statistics of Bosnia and Herzegovina, 2015).

Sewerage and wastewater treatment plants

The protection of aquatic ecosystems in Bosnia and Herzegovina has been a major environmental concern for several decades. Therefore, the improvement of domestic wastewater treatment has been sought in order to reduce organic loads and nutrient (nitrogen and phosphorus) discharges into receiving freshwaters. Several past investment programmes highlighted this concern, aligned with EU Directive 91/271/EEC on urban wastewater treatment. In 2015, as little as 4 per cent of wastewater in Bosnia and Herzegovina was connected to a WWTP. There are no reliable statistics for the current year, but on the basis of Sarajevo's WWTP being in full operation with proper sewerage connections, it is considered that about 20 per cent of Bosnia and Herzegovina's population is served by wastewater treatment. The ongoing construction of some additional WWTPs (e.g. in Mostar) may see this coverage rise to about 30 per cent in the near future. Despite this progress, sanitation infrastructure in Bosnia and Herzegovina lags behind international references. In the EU, for instance, combined water and sewerage system services cover approximately 75 per cent of population.

The pattern is not much different in the component entities of Bosnia and Herzegovina. In the Federation of Bosnia and Herzegovina, 33 per cent of the population is covered by a sewerage system, but only about 3 per cent was connected to a WWTP in 2015

(excluding Sarajevo WWTP). In Republika Srpska, 36 per cent of the population is covered by a sewerage system but less than 5 per cent of population was connected to a WWTP. Brčko District has no urban wastewater treatment facility at all. Tables 8.3 and Table 8.4 present a snapshot of current sewerage and wastewater treatment facilities in the entities of Bosnia and Herzegovina. Additional systems are being planned in Bosnia and Herzegovina, some of which are already in the tender pipeline. Among these are the Brčko District WWTP and similar facilities in Zenica, Prozor-Rama, Tomislavgrad, Kupres, Siroki Brijeg, Tešanj and Usora, Lukavac, Bosanski Petrovac, Velika Kladuša, Orasje, Cazin (Federation of Bosnia and Herzegovina), Gorazde (Federation of Bosnia and Herzegovina and Republika Srpska), Teslic, and Prijedor (Republika Srpska).

Previous data clearly shows that the Bosnia and Herzegovina authorities are working to increase urban wastewater treatment performance. The construction of such facilities requires a strong financial allocation, which is being secured through significant multilateral funding support. Nevertheless, more steps are needed to achieve effectiveness. Sewage drainage systems are not achieved at the same time as WWTP construction. In fact, the major problem hindering water resources protection goals turns out to be the insufficient budget for rehabilitation and/or extension of sewerage networks, including house connections to sewer lines, as shown in tables 8.3 and 8.4. In many cases, wastewater treatment facilities are underloaded, since sewerage systems have not yet been built. In addition, proper biosolids processing and final disposal are not foreseen in all WWTPs.

Table 8.3: Wastewater treatment plants in the Federation of Bosnia and Herzegovina

	Population equivalent capacity	Observations (performance level, sludge facilities, sewerage connections)
Sarajevo	400 000	Secondary treatment performance with sludge processing by anaerobic digestion; recent rehabilitation works, but underloaded due to insufficient sewerage system connection
Srebrenik	12 000	Secondary treatment performance but rehabilitation works are necessary
Trnovo	5 000/2 500	Secondary treatment performance; rehabilitation of sewerage system in Trnovo is required
Zepce	10 000/5 000	Secondary treatment performance; sewerage system connection is insufficient
Odzak	10 000	Secondary treatment performance
Neum	5 000	Primary treatment, effluent discharged into the Adriatic Sea; requires integration with Croatia sewerage system
Citluk, Medugorje	14 000	Tertiary treatment performance
Grude	2 500	Secondary treatment performance
Ljubuski	6 000	Secondary treatment performance
Konjic	5 000	Tertiary treatment performance; current idle capacity of 10,000 PE but sewerage system should be connected
Zivinice	25 000	Tertiary treatment performance; current idle capacity of 15,000 PE but sewerage system should be connected
Gradacac	30 000/20 000	Secondary treatment performance, but requiring additional sewerage connections (5,000 PE)
Mostar*	100 000/70 000	Tertiary treatment performance and sludge processing using anaerobic digestion under completion; requires sewerage network connection
Bihac	550 00/35 000	Tertiary treatment performance under completion; requires sewerage network connection

Note: * joint management with Republika Srpska; PE = population equivalent

Table 8.4: Wastewater treatment plants in Republika Srpska

	Population equivalent capacity	Observations (performance level, sludge facilities, sewage connections)
Bijeljina	40 000/25 000	Secondary treatment performance
Trebinje	20 000	Secondary treatment performance
Mostar*	100 000/70 000	Tertiary treatment performance and sludge processing using anaerobic digestion; requiring sewerage network connection
Bileća	5 000	Tertiary treatment performance, but rehabilitation works are required

Note: * joint management with the Federation of Bosnia and Herzegovina

Hydropower

Bosnia and Herzegovina produces about 45 per cent of its total electricity consumption from hydropower, attaining a net maximum electrical capacity of 2,120 MW in 2013. Hydropower schemes in Bosnia and Herzegovina do not have all the provisions regarding ecosystems protection that are determined in modern water concessions (e.g. hydropeaking mitigation, fish passages, fish stocking, ecosystem monitoring). In fact, the water–energy–ecosystem nexus is of the utmost importance in decision-making; it means that not just one factor is to be considered. Several cases in Bosnia and Herzegovina reinforce the importance of integrated water resources management and consideration of this nexus for both current operations and future planning. For instance, Jablanica artificial reservoir in the Neretva River was recently drained almost completely to meet a temporary peak demand of energy, leading to negative environmental and social impacts.

Landfills

Environmental impacts from water resources use induced by landfill operation depend on the performance of leachate treatment facilities. Indeed, leachates have a high organic content, as well as inorganic compounds and heavy metals that require proper collection and removal, either by biological or physico-chemical treatment prior to discharge in natural waters. In many urban zones of Bosnia and Herzegovina, there are no modern municipal solid waste treatment facilities with leachate treatment, which is causing impacts on ecosystems, the landscape and health. There are about 250 registered illegal dumpsites in Republika Srpska and 340 in the Federation of Bosnia and Herzegovina. However, allegedly, only about 10 to 15 per cent of these hazards have been closed in recent years. An example of a landfill with environmental risks is that at Banja Luka, where the groundwater is contaminated by seepage through the soil despite its low permeability. There are other impacts related to the absence of solid processing facilities. One example is that 20,000 tons from the annual generation of waste in the Drina River Basin (89,000 tons) are believed to reach the watercourse.

8.6 River basin management

River basin planning

The territory of Bosnia and Herzegovina has been the geographical scope for several river basin studies (the Bosnia River in 2014, Drin River in 2016, Una River in 2013 and Sava River in 2013, and the Danube River

Basin Management Plan in 2015). Consequently, there is already reasonable knowledge about water issues, which is an important asset for decision-making purposes. Recently, management plans for the Sava River and Adriatic Sea Basins were prepared by the water agencies in accordance with WFD guidelines and are in the final phase of public discussion, preceding legal publication.

Erosion and floods

Deforestation, new roads and other infrastructures, construction and new insights into the impacts of climate change jeopardize future basin management and water quality in Bosnia and Herzegovina. The erosion problem is at its worst from autumn to spring, due to climatic conditions, confirming the well-known role of vegetation in run-off reduction and soil erosion control. Bosnia and Herzegovina is prone to torrential rain regimes, due to river basin characteristics and run-off modules as large as 1–1.5 m³/s/km². The ratio between extreme flows and mean annual flows may be very high (more than 15-fold). This sensitivity to climate change was evident in 2014 after extreme rains and major floods, which are estimated to have caused damage and losses equivalent to almost 15 percent of Bosnia and Herzegovina's annual GDP. Torrential rains unearthed undetected landmines and resuspended chemical residues deposited at the bottom of the rivers. The most affected zones were Samac, Odzak, Orasje, Doboje, Bijeljina, Brčko and Maglaj, and about 2000 landslides were reported.

Water scarcity and droughts

Droughts are becoming a major issue in the country's water policy, following recent phenomena in 2015. The annual rainfall regime shows a decreasing trend, while mean annual air temperature shows the opposite signs. In addition, river flows are very asymmetric through the hydrological year. The minimum monthly flow is 15 per cent of the annual average in the Sava River Basin. In the Adriatic Sea Basin, a similar asymmetric flow regime is observed. Little attention is given to the fact that water scarcity dilemmas are a trigger for social conflict between users/regions with different allocation aims (e.g. drinking water, agriculture, industry and hydropower). Agriculture is the sector that suffers the greatest impact if a severe drought occurs in Bosnia and Herzegovina, but there is no emergency or contingency plan for such an event.

Ecological flows

Environmental flows in the Federation of Bosnia and Herzegovina are prescribed in the Law on Environmental Flows (OG FBiH, No. 3/14). Article 11

provides the methodology based on natural hydrological flow data prescribing mean minimal, mean average and mean decade discharges over a minimum period of 10 days. In Republika Srpska, ecological flow is determined according to the Law on Water as the mean monthly flow that occurs with 95 per cent of probability. No monitoring data was available. Thus, the main concern is implementation of the Law and enforcement when legal provisions are not applied.

8.7 Legal, policy and institutional framework

Legal framework

In terms of water resources management, all administrative bodies of Bosnia and Herzegovina adopted a specific Law on Water with related by-laws. The main legal framework on water resources and water services is based on the Law on Water in the Federation of Bosnia and Herzegovina, Law on Water in Republika Srpska and Law on Water Protection (OG BD, No. 24/04, 1/05, 19/07) in Brčko District. The general legal framework has been improved in recent years due to implementation of the EU pre-accession process and the *acquis communautaire* is fostering the build-up of a unified water policy among the administrative units of Bosnia and Herzegovina. The EU WFD (2000/60/EC) and Urban Wastewater Treatment Directive (91/271/EEC) are among those with the highest impact since they both have a lasting effect on pollution control and water quality preservation, but both demand significant funds for their proper application.

Policy framework

River basin management plans (RBMPs) covering Bosnia and Herzegovina's territory are of the utmost importance in promoting a vision of integrated water resources management. RBMPs are currently being finalized, following the approach and methodology prescribed by the WFD. Two RBMPs, for the Sava River and the Adriatic Sea watersheds, were prepared by the Federation of Bosnia and Herzegovina. Republika Srpska also prepared RBMPs for these two watersheds. Official publication of these RBMPs is expected soon. Their integration in a comprehensive national water strategy is strongly advisable since the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District share the same river basins and aquifers. Upon adoption of the RBMPs in the Federation of Bosnia and Herzegovina and Republika Srpska, the competent authorities at the state level of Bosnia and Herzegovina will prepare a common "Roof report on RBMPs" for the country. An Action Plan for Flood Protection and River Management 2014–2017

was adopted by the Bosnia and Herzegovina Council of Ministers in January 2015.

In terms of sanitation, all agglomerations in Republika Srpska with a population equivalent (PE) greater than 5,000 should be covered by a sewerage system and WWTP by 2020, according to the Strategy for Integrated Water Management for the period 2015–2024. In the Federation of Bosnia and Herzegovina, 90 per cent of agglomerations with a greater than 15,000 PE should be covered by 2022. Under its Water Management Strategy, the goal for agglomerations between 10,000 and 15,000 PE is 75 per cent coverage and for agglomerations between 2,000 and 10,000 PE, 70 per cent coverage. With these goals, Bosnia and Herzegovina is aiming to achieve a sewerage system connection rate of 78 per cent and 73 per cent connection to WWTPs by 2035.

Institutional framework

State level

The Ministry of Foreign Trade and Economic Relations is the competent state-level ministry responsible for policy and coordination in the areas of agriculture, energy, environmental protection, development and natural resources and tourism management in Bosnia and Herzegovina. The Ministry of Foreign Trade and Economic Relations coordinates cooperation *vis-à-vis* international institutions in water management affairs and is in charge of the process of ratification of international agreements. Although foreign policy falls under state competence, the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District are entitled to establish direct links with neighbouring countries. Upon approval granted by the Parliamentary Assembly of Bosnia and Herzegovina, they can establish agreements with other countries and international organizations, enabling subsequent cooperation. At the state level, other institutions also play important roles on water issues – the Food Safety Agency of Bosnia and Herzegovina and its Department of Drinking Water (regarding health risks and educational programmes). The Ministry of Security is responsible for international coordination and cooperation on natural hazards prevention and civil protection in the event of floods. The Inter-Entity Coordination Body for the Environment promotes dialogue and integration on water issues, although its effectiveness is far from the level intended.

Water resources management in the territory of Bosnia and Herzegovina is fully assigned to the administrations of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District.

There are specific authorities in each that deal with water and spatial planning.

Federation of Bosnia and Herzegovina

Competences on water strategy and implementation of water-related legislation in the Federation of Bosnia and Herzegovina are assigned to the Ministry of Agriculture, Water Management and Forestry. The Ministry of Environment and Tourism is responsible for supervising and monitoring activities related to local public services, including drinking water and wastewater collection and treatment. However, in practice, most activities on water management are carried out by the Sava River Watershed Agency (based in Sarajevo) and the Adriatic Sea Watershed Agency (based in Mostar). The Water Agencies are responsible for water planning and licensing processes. They grant and control water extraction and discharge rights, collect the corresponding fees and invest them in sector-related projects. They are also responsible for the flood protection policy. Both Agencies have regional offices (in Zenica, Jajce, Bihać, Livno and Konjic) and water analysis laboratories. River basin district advisory councils lack administrative and financial support and relevant feedback mechanisms, so they are not relevant in decision-making processes.

The cantons are responsible for administrative supervision of communal affairs and of water management at the local level. The cantonal ministries are responsible for tariff supervision. The budget of river basin organizations is based on water tariffs, and they manage 40 per cent of the revenue. The Environmental Protection Fund of the Federation of Bosnia and Herzegovina receives 15 per cent of water charges and 45 per cent is distributed to the cantons in their capacity as water services providers. International benchmarking suggests the use of cost-recovery mechanisms to fund sanitation services, instead of using water resources taxes (which should be used only in the water resources sector). The civil protection administration of the Federation of Bosnia and Herzegovina is organized as an independent body. The Water Management Inspection is dedicated to eight cantonal administrations, while there are two cantonal ministries with their own inspection services. The Hydrometeorological Institute focuses on meteorological and hydrological activities. The Institute of Public Health is responsible for monitoring drinking water quality.

Republika Srpska

The Ministry of Agriculture, Forestry and Water Management and its Division of Water Management

is responsible for all water management matters in Republika Srpska. At the entity level, the water agency "Vode Srpske" (Waters of Srpska) holds water resources planning responsibilities, including licensing, protection and rehabilitation measures, monitoring and public information. "Vode Srpske" is a public institution established in 2013 from the merger of two previous water agencies, one for the Sava River Basin and the other for the Adriatic Sea Basin, based in Trebinje and Bijeljina. "Vode Srpske" has two departments, one for each river basin in Republika Srpska.

The Ministry of Spatial Development, Civil Engineering and Ecology is responsible for supervising and monitoring activities related to drinking water and wastewater collection and treatment. In addition, other institutions perform a role in water resources management in Republika Srpska. The Hydrometeorological Institute is in charge of water quantity monitoring, hydrological stations network surveillance and flood protection. The Ministry of Health and Social Welfare has jurisdiction within the public health domain, namely for human consumption, food processing and recreational uses of water. The Institute of Public Health carries out sampling and analysis of drinking water. Within the Administration for Inspection Activities, a water inspection body supervises enforcement of laws and regulations regarding construction of new facilities or reconstruction of existing ones, water protection against pollution, control of surface water and groundwater and legal supervision over public companies. Tariff oversight remains under the umbrella of the municipalities in Republika Srpska. The civil protection administration, which deals with flood risks, falls under the Ministry of the Interior.

Brčko District

The Department of Agriculture, Forestry and Water Management of Brčko District is responsible for water-related activities, but the local utility is the main operational authority for all natural resources, including water. The Public Safety Division of Brčko District performs administrative, expert and other tasks in the field of protection and rescue, namely on flood prevention issues, reporting to the Government of Brčko District,

Water service providers

There is no regulatory body/agency for water services at the state or entity level, even though Bosnia and Herzegovina has more than 100 service providers with an average utility size of 15,641 inhabitants per utility.

Forty-two per cent of these are self- or informal providers, 14 per cent are regional providers and 44 per cent are municipal utilities (which are mostly in the Federation of Bosnia and Herzegovina).

Water and communal affairs activities are organized differently in the Federation of Bosnia and Herzegovina and Republika Srpska.

In the Federation of Bosnia and Herzegovina, water supply and wastewater collection and treatment is assigned to the cantonal level. The cantons' duties encompass drinking water and sanitation services financed by the cantonal budgets. Income is based on the water tax and is complemented by the municipalities' participation.

In Republika Srpska, water management companies are under the jurisdiction of local communities and self-government units.

In Brčko District, JP Komunalno Brčko is the public water utility. The company owns two water plants, one of which processes water from the Sava River and the other from groundwater wells. Presently, there is no WWTP and the sewerage system is discharging the untreated wastewater into the Sava River.

Water resources monitoring

Water resources monitoring is under the competence of three river basin authorities: the Sava River Watershed Agency and Adriatic Sea Watershed Agency of the Federation of Bosnia and Herzegovina and "Vode Srpske" in Republika Srpska. These water agencies exchange data with the Hydrometeorology Institute of the Federation of Bosnia and Herzegovina and Hydrometeorology Service of Republika Srpska, while the National Reference Centres for Water and Air Quality and National Focal Points for Bosnia and Herzegovina report to Eionet. In Brčko District, water monitoring coordination is assigned to the Forestry and Water Management Department.

The Agency for Statistics of Bosnia and Herzegovina, together with the entities' statistical offices, is responsible for data collection and information on water abstraction, consumption and use. Excluding Brčko District, the entities' statistical offices are responsible for data collection as one of the phases in the process of statistical data production.

Sustainable development goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis relevant targets is described in box 8.1.



Box 8.1: Targets 6.1, 6.2, 6.3, 6.4, 6.5 and 6.6 of the 2030 Agenda for Sustainable Development

Goal 6: Ensure availability and sustainable management of water and sanitation for all

Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all

Target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

These two targets are almost reached in Bosnia and Herzegovina. Most parts of the country (about 90 per cent) have access to a water source, including wells, springs and onsite solutions. The same goes for sanitation conditions; people generally have access to private toilets. It is necessary, however, to go beyond meeting those basic needs and to increase service standards. In this regard, the authorities of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District are undertaking significant efforts. Based on current planning instruments, by 2035, 90 per cent of the population should have access to safe drinking water served by public systems. For the remaining 10 per cent of the population, who live in rural areas, drinking water supply is delivered through individual water supply.

Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

A better sanitation service is signified by more than having a flush toilet; it requires WWTPs in order to protect water resources and aquatic ecosystems. If effective wastewater treatment is a proxy for water resources quality, the current situation in the country is far from acceptable. Most of secondary wastewater treatment facilities are not in full operation because wastewater drainage systems are not set up. By 2035, Bosnia and Herzegovina plans to have 73 per cent of the population served by wastewater treatment, with 95 per cent coverage in urban areas. These objectives will only be achieved through substantial funding, as the current figures are less than 20 per cent. Besides, because sewerage systems are very expensive, decentralized and low-energy treatment systems should also be considered as appropriate solutions in rural areas and small communities. However, the state-level Agency for Statistics of Bosnia and Herzegovina, the Office of Statistics of the Federation of Bosnia and Herzegovina and the Institute of Statistics of Republika Srpska do not provide any data on

decentralized forms of wastewater treatment, even those as simple as septic tanks.

Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

Water efficiency and drought risks are starting to be addressed in Bosnia and Herzegovina. The region is not really water scarce, but signs of water scarcity with droughts during the last decade encourage a mitigation approach.

Target 6.5: By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

International cooperation is already very consistent in the Sava River Basin and is fostered by several programmes, mainly through the International Commission for the Protection of the Danube River – an excellent example of knowledge and data sharing. This contrasts with the fragility of the current internal mechanisms of water co-management in Bosnia and Herzegovina, which hinders effective basin-wide integrated water resources management in the country.

Target 6.6: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

To be able to reach this target, Bosnia and Herzegovina should devote the environmental protection funds fed by water taxes revenues to aquatic ecosystems protection and rehabilitation. Even if some NGOs may play an important and meritorious role in Bosnia and Herzegovina, the river basin councils remain the appropriate governance forums for this target. Bolstering them should be a goal under the current mission of the water agencies of the Federation of Bosnia and Herzegovina and Republika Srpska.

8.8 Conclusions and recommendations

Water plan and institutional framework

Institutional organization in Bosnia and Herzegovina is decentralized in accordance with the constitution. From the water management perspective, bottom-up governance evolved from river basin level is not a problem if national targets are well defined and inter-entity coordination is effective. Thus, the main challenge is to reinforce integrated water resources management processes – planning, licensing, monitoring and community participation in decision-making – and to avoid discontinuities and fragmentation in river basin and aquifer management.

The same integrated perspective is required considering transboundary waters: international cooperation with riparian countries is of exceptional importance considering the Adriatic Sea and Sava River Basins regional framework. Because of these challenges and in order to tackle increasing responsibilities, a modern technical infrastructure and qualified human resources, as well as appropriate funding resources, are mandatory for river basin organizations. Currently, no national information system on water resources exists above the existing systems in the river basin agencies, to support monitoring of the Sustainable Development Goals. There is no integration of the information systems in the river basin agencies.

Recommendation 8.1:

The Ministry of Foreign Trade and Economic

Relations of Bosnia and Herzegovina, the Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Forestry and Water Management of Republika Srpska and the Government of Brčko District should:

- (a) *Develop a common water plan that will provide a straightforward, basin-wide vision for water and embrace a coherent and harmonized long-term water strategy for the whole country by merging information from the river basin management plans that are now reaching the final approval stage after preparation by the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District authorities, absorbing the programmes of measures related to water management;*
- (b) *Reach full coherence in legal procedures regarding water issues in the country, by endowing the Inter-Entity Coordination Body for the Environment with such a mission and boosting the role of river basin councils in decision-making processes at the river basin district level;*
- (c) *Reinforce the competences of the water agencies and make enduring efforts to increase their technological infrastructure, staff skills and financial self-sustainability;*
- (d) *Charge existing river basin organizations with sharing knowledge and information with each other, as well as with analogous institutions in riparian countries.*

Wastewater and sanitation

Bosnia and Herzegovina authorities are well aware of water quality issues and aquatic ecosystems protection, as well as human needs regarding water and sanitation services. The building of a modern and comprehensive legal system has been encouraged by the EU pre-accession process and multilateral financing is supporting important investments in urban wastewater treatment. Nonetheless, Bosnia and Herzegovina is far from European water and sanitation benchmarking. Additional investments in water and sanitation are still required – namely, in sewerage systems – but operational costs can not be disregarded when planning sanitation infrastructure, as they will pose a heavy burden on consumers. Operational costs are not considered when designing wastewater collection and treatment schemes. Low-energy-demand types of WWTPs are not established whenever feasible. Operation is supported by water resources taxes and not by tariffs levied on the basis of willingness to pay, and neither are subsidized services provided to the most vulnerable segments of the population.

Because wastewater treatment facilities are designed with a long time horizon (40 years, in general), if construction is not phased in, some idle capacity may occur over the course of a decade or more. Therefore, co-treatment of urban and agro-industrial/industrial wastewaters should be considered as an option to solve multiple pressures. Sludge processing is a major concern in biological wastewater treatment facilities, reaching 30–50 per cent of costs. In this case, biomethanization and/or composting are well-known options for sludge processing and biosolids could be used as slow fertilizer if land application is monitored properly.

Water utilities in Bosnia and Herzegovina are very heterogeneous in size, staff skills and economic sustainability. The aggregation of small utilities into larger ones has been the international drive in the water sector, with the aim of benefiting from economies of scale and increasing external and internal accountability. Technical and financial performance is not assessed in a timely manner. Accountability principles are necessary guidelines to promote good governance.

Recommendation 8.2:

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Forestry and Water Management of Republika Srpska and the Government of Brčko District, in cooperation with the Ministry of Foreign Trade and Economic Relations of

Bosnia and Herzegovina, should:

- (a) *Put a hold on current efforts regarding construction or rehabilitation of wastewater treatment plants, to reconsider appropriate technologies and operational costs;*
- (b) *Aim at coordinated construction or rehabilitation of sewerage systems;*
- (c) *Consider sludge biotreatment/valorization from the design phase;*
- (d) *Require that drinking water safety plans are developed by drinking water suppliers following WHO guidelines, increase monitoring reliability and quality control and disclose all results.*

Integrated and sustainable water resources management

Bosnia and Herzegovina is moving towards integrated and sustainable water resources management. Flood and drought intensity and frequency might increase due to climate change patterns; risk mitigation is effective only if carried out on a river basin scale, in both surface waters and groundwater. Among measures to be considered are expanding water reservoir construction, aiming to increase the security of supply for drinking water and food irrigation. Therefore, multipurpose schemes covering the water–food–energy nexus should be planned on a river basin scale and be supported by river basin management plans and sustainable development goals. Some parts of river basins may be designated as no-go areas, in order to keep them as pristine as possible.

Recommendation 8.3:

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Forestry and Water Management of Republika Srpska and the Government of Brčko District should implement water-sensitive land measures regarding drought and flood risks (e.g. aquifer protection from contamination, non-structural measures and "non-aedificandi" areas regarding flood mitigation), and early warning systems and contingency plans.

Recommendation 8.4:

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Forestry and Water Management of Republika Srpska and the Government of Brčko District, in cooperation with the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, should ensure that the respective water agencies:

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- (a) *Carry out strategic environmental assessment procedures regarding new water resources projects for agriculture and/or hydropower purposes;*
- (b) *Implement a monitoring programme on ecological flows and enforce them where they are not applied.*

Chapter 9

ADRIATIC SEA PROTECTION

9.1 Description of the Bosnia and Herzegovina part of the Adriatic Sea

Bosnia and Herzegovina is located on the eastern central coast of the Adriatic Sea. Bordered by Croatia and Montenegro at the coast, its coastal area is 24 km long, with a jagged coastline at Neum Bay and Klek Peninsula. Bosnia and Herzegovina has a population of about 3.5 million people, of which about 500,000 live in the Adriatic Sea discharge basin. The coastal region belongs to the Herzegovina-Neretva Canton, encompassing an area of 3,318 km² and nine municipalities. The main town in this canton is Mostar. Neum is the only coastal municipality. As regards delimitation of the territorial sea, a treaty on the maritime borders between Croatia and Bosnia and Herzegovina was signed in 1999, but it has not yet been ratified. Bosnia and Herzegovina's territorial sea is entirely surrounded by the internal waters of Croatia. The country itself indicates that its territorial sea includes Neum Bay and half of the Channel of Mali Ston and that it has a strong willingness to be part of the Adriatic Sea community.

Physical description

Geological setting

One of the three Adriatic Sea sub-basins, the central Adriatic is up to 50 km wide. It shows an average depth of 130–150 m but is also characterized by the presence of the Meso-Adriatic Trench, known by Italians as Pomo Pit and by Croatians as Jabuka Pit (in both languages the term means "apple"). It is a complex transverse depression, reaching a depth of 240–270 m and is one of the most productive areas for fish, known as an important spawning and nursery area for commercially valuable fish. This area lies in the deepest zones of the central Adriatic, between Italy and Croatia, the main countries that exploit it. It is influenced by the Mid Gyre that determines the circulation of the waters, contributing to the well-known dense waters together with the seasons and the entering waters from the Ionian Sea.

On the edge of this marine system, the coast of Bosnia and Herzegovina is part of the Croatian coastal system, which is one of the most indented in the Adriatic as well as in the Mediterranean, comprising about 1,250 islands, islets and scattered rocks.

Hydrology and hydrodynamics

The Adriatic Sea is a semi-enclosed sea forming a distinct sub-region within the Mediterranean Sea region. The Adriatic Sea waters are exchanged with those of the open seas of the Mediterranean only once every three or four years and the North Adriatic is the shallowest part of the entire Mediterranean Sea, with an average depth of around 50 m. It presents the water body with relatively slow water exchange mechanisms, making it particularly vulnerable to anthropogenic activities. The environmental conditions are predominantly caused by a specific system of exchange of waters with the Ionian Sea, the thresholds of Otranto and Palagruža separating the Adriatic Sea from the Ionian Sea and deeper South Adriatic from the shallower North Adriatic. Hence, there are three principal water masses in the Adriatic Sea: the Adriatic Surface Water, the Levantine Intermediate Water and the Adriatic Deep Water – every sub-basin has its own characteristic deep water.

However, this overall flow becomes much more complex and uneven when approaching the very indented eastern coast, in particular the coast of Bosnia and Herzegovina. The small coastal area of Bosnia and Herzegovina is particularly vulnerable because of a very weak renewal of waters within Neum Bay (no river run-off, small tides, North–South-dominant winds and freshwater surges).

About 38,719 km² (75.7 per cent) of the territory of Bosnia and Herzegovina belongs to the Black Sea catchment area, while 12,410 km² (24.3 per cent) belongs to the Adriatic Sea catchment area. The Mediterranean region of Bosnia and Herzegovina, which presents the Adriatic (Mediterranean) Sea Basin, is composed of Neretva, Trebišnjica and Cetina River Basins, and of the narrow coastal zone around Neum Municipality. Neretva and Trebišnjica River Basins have an area of 10,100 km² or 81.4 per cent of the total Adriatic Sea catchment area, while Cetina River Basin in Bosnia and Herzegovina has an area of 2,310 km² or 18.6 per cent of the total Adriatic Sea catchment area.

Abiotic and biotic characterization

Freshwater input from the mountain regions of the Eastern Adriatic coast substantially contribute to the

uniqueness or rarity of a variety of specific ecosystems. The Eastern Adriatic Sea, including its Bosnia and Herzegovina part, is a shallow transitive area with a great number of typical pelagic and benthic species adapted to the high salinity.

Owing to the unique current system and the exchange of water with the Ionian Sea, limited but permanent invasions of temperate species are recently more evident, even in the northernmost parts of the Adriatic Sea. The highly indented eastern coast of the Adriatic acts as a breeding ground and nursery to a large number of marine species.

River discharge and sedimentation processes

With the exception of the Neretva River, Croatian and Bosnian rivers, which in large part drain limestone terrain, discharge relatively little sediment into the Adriatic Sea. The central sections of the Adriatic Sea Basin, where the coast of Bosnia and Herzegovina is located, have relatively little discharge.

Biological description

Benthic communities

Soft bottoms

Central and Southern Adriatic soft bottoms, including the Bosnian Adriatic coastal areas, are less investigated and a unified framework of the benthic assemblages is still not available. In any case, the main habitats described in fishers' reports show the high heterogeneity of the area, with mixed bottoms with rocks, sand, mud, sand-mud, and ostrea beds.

Neum-Klek Bay and Mali Ston Bay seabed is generally muddy and is considered an almost intact area, with important and sensitive habitats, and the presence of 176 fish species and several invertebrate species. For the naturalness and the potential for life development of these areas, they are suggested as potential areas meeting the criteria for Ecologically and Biologically Significant Areas (EBSAs). There are also some land habitats recognized as sufficiently valuable to be included in the European Natura 2000 network.

Hard bottoms

Most of the eastern coasts are represented by rocky shores, as in the case of the Bosnian Adriatic. The prevailing lithologies are calcareous. Benthic assemblages starting from the shore are characterized

by photophilic algae, often including *Cystoseira* spp. belts, and sea urchin barrens. Near the rocky shores, especially in shallow bays, there are plenty of seagrass meadows, while deeper subtidal rocky cliffs have peculiar coralligenous habitats. The presence of calcareous substrates allows a wide distribution of the mussel date *Lithophaga lithophaga*, often illegally fished and commercially exploited, leading to extensive barrens.

Biocenosis

The classification of Adriatic benthic marine habitats follows the typologies proposed by the Regional Activity Centre for Specially Protected Areas (RAC/SPA) for the Mediterranean region. It shows that the wider biocenosis in the Adriatic Sea are the biocenosis characteristics of the circalittoral. Coastal and offshore muddy bottoms host sponges, soft corals, sea pens and ascidians, in addition to a rich infauna. Offshore bottoms are usually viewed as receiving compartment, dependent on primary production in the water column. Benthic compartment regulates mineralization, affecting pelagic production. Sea floor integrity is therefore crucial to the Adriatic Sea and the productivity of its coastal areas, as in the case of the Bosnia and Herzegovina coastal area.

Among the emblematic Mediterranean biocenosis figure the coralligenous biocenosis, which is particularly rich in the Adriatic Sea where it is widely distributed along its eastern side, including the Bosnia and Herzegovina coastal area.

Vertebrates

Sea turtles

From literature and interviews in the field, no sea turtles have been observed so far in the Bosnian part of the Adriatic.

Sea birds

The Bosnia and Herzegovina coastal area is part of what is called the "Adriatic Flyway", which is one of the main routes for millions of migratory birds crossing the Mediterranean, with birds making a resting stop along the eastern Adriatic. A number of bird species also spend winters in the area.

Sea mammals

From literature and interviews in the field, no sea mammals have been observed so far in the Bosnian part of the Adriatic.

9.2 Anthropogenic pressures

The increased attractiveness of and tourism development in the coastal area of Bosnia and Herzegovina make both land use and land-based pollution current and potentially important issues.

Multiple-sources issue

Though still limited, pollution in the Bosnia and Herzegovina part of the Adriatic Sea may come from multiple sources: intensive maritime transport resulting in oil spills, including large-scale pollution events and noise pollution, pollution from rivers as a result of excessive use of nitrates on agricultural land, insufficient wastewater treatment and non-sanitary landfills. Poor solid waste management results from a combination of scant investment in solid waste treatment infrastructure, a lack of awareness on the part of the public, weak enforcement and increasing urbanization of coastlines. This, in turn, results in a large number of illegal landfills, which include hazardous waste. In a confined area such as Neum Bay, future concern about pollution could also arise from the multiplication of aquaculture facilities, entailing discharge of nutrients and chemicals into the sea. As in the rest of the Adriatic Sea Basin, marine litter is the most apparent in the Bosnia and Herzegovina coastal areas, half of it coming from coastal and recreational activities.

Coastal tourism, which is the major current and potential activity in Neum, became a major impact threat since the town has 4,000 inhabitants and receives more than 20,000 tourists per day in summer, which is currently the maximum capacity of local infrastructure, especially for sewage.

Eastern coast considerations

Along the Eastern coast, solid waste is one of the main identified sources of pollution; there are no sanitary landfills and numerous dumping sites. Due to the karstic nature of the terrain, leachates from waste dumping sites are quickly released into the sea, increasing health risks for the local population and endangering tourism activities. Marine litter in shallow waters, although identified as a visible and serious problem, is only collected on a voluntary basis by the local divers associations, which organize regular regional sea floor clean-up actions twice a year. Once the divers extract the waste from the sea floor and place it on solid ground, it becomes the responsibility of the public utility company in Neum responsible for solid waste management. In the past two years, efforts have been made through the EU-financed IPA Adriatic DeFishGear project to highlight

the importance of the sound disposal of marine litter. However, no concrete and preventive legal/technical/practical measures have been undertaken so far to minimize inputs of marine litter (especially plastic) in the marine environment.

The priority pollution hotspot sites are Ploče and the delta of the Neretva and Rijeka Rivers. Ploče and the Neretva River Delta are an important transboundary site receiving pollution that originates from both Croatia and Bosnia and Herzegovina. The Neretva River discharges nutrients originating from agricultural run-off and untreated municipal wastewater from the upriver sources in Bosnia and Herzegovina. Actually, in Bosnia and Herzegovina, a very high percentage of non-revenue water is usually explained by the low price, which does not provide for recovery of all costs. Consequently, the water policy project concludes that a system should be set up in Bosnia and Herzegovina in which the use of economically real rates of water fees and prices of water services would secure non-profit and self-sustainable financing of the water sector.

The Bosnia and Herzegovina part of the Adriatic Sea is still one of the best-preserved regions in the Mediterranean, but wastewaters flowing from the hinterland into the sea are still the biggest polluter. Three main rivers (the Neretva – by far the biggest – Krka and Cetina) all flow out through Croatia, making political and technical cooperation on water management issues with Croatia extremely important. Besides, there is no suitable landfill for controlled disposal of solid waste or its processing. Illegal construction, without any wastewater treatment system, also poses a big potential threat to coastal areas. The Neum Municipality gives top priority to the wastewater collecting system run by a public company (Mareko). It is an old system dating back to Yugoslavia, which takes the waters to Croatia where there is a joint treatment station (primary treatment) and run-off in the open sea (-70 m). In spite of the smooth cooperation with Croatia, the primary treatment system is getting old and the secondary system is still incomplete.

In conclusion, the three main pollution sources in the Bosnia and Herzegovina part of the Adriatic discharge basin are solid waste, municipal wastewater and agricultural run-off (nutrients).

Trawling and dredging disturbance

Though it is currently estimated that the total production of marine fisheries is around 5 million tons, there is no control and no official data to back this up. It is therefore impossible to assess any possible

impact from trawling or dredging in the Bosnia and Herzegovina coastal area.

Ocean-based pollution

The main regional challenge is the issue of ballast waters from maritime transport, which are recognized as one of the main vectors for the spread of invasive species in the Adriatic Sea. The introduction of invasive species and loss of biodiversity further threatens the tourism and fishing activities, including in the Bosnia and Herzegovina coastal area.

Climate change impact

Climate change is expected to seriously affect Bosnia and Herzegovina, with a significant increase in torrential flooding and land erosion (both expected to heavily affect the coastal areas), in addition to the overall Mediterranean and Adriatic increase in water temperature. The country has adopted and ratified the COP21 Paris Agreement.

9.3 Coastal and maritime activities

Exploitation of marine resources

In Bosnia and Herzegovina, there are around 20 small-scale fishers using gill nets. Their reported (though not official) catch is about 5 Mt of fish caught by artisanal fishers, which are sold directly to customers or transferred to the fish stores of the marine cage farms for marketing. Shellfish (oyster and mussel) farming takes place within Neum-Klek Bay while marine aquaculture in the form of cage culture of sea bass and sea bream is practised by two farms ("Karaka maricultura" and "Ancora commerce"). As pointed out in the 2012 State of the Environment Report of Bosnia and Herzegovina, missing data in the aquaculture and fishery sectors hamper the implementation of specific projects and actions. Nevertheless, Neum Bay in Bosnia and Herzegovina and Mali Ston Bay in Croatia are considered to be Adriatic Sea "endangered areas" due to intensive aquaculture area close to the Neretva River Delta.

Other maritime activities

The main maritime activity in Bosnia and Herzegovina is coastal tourism, which generates about 1,300 jobs in the high season. The activity is increasing and has valuable growth potential, which could be triggered through better coordination with other tourism areas (e.g. Mostar) in the Herzegovina-Neretva Canton of Bosnia and Herzegovina and Croatia. There are 18 registered hotels, over 20 small accommodation providers and a large number of

unregistered/family accommodation providers.

Regarding maritime transport, there are no maritime ports in operation in the country though there are ideas of planning the construction of a harbour in Neum. Instead, the Croatian ports are used. Road connectivity from Neum to the hinterland of Bosnia and Herzegovina is not easy; one option using small winding roads allows travel within Bosnia and Herzegovina; the second option is through the Neretva River Delta and Croatia.

Marine renewable energies such as offshore wind energy or wave energy are not expected to be used as new energy sources in the short or medium term, as no specific plans exist at present. So far, according to the Network of Managers of Marine Protected Areas in the Mediterranean, no marine protected areas have been declared and no potential area is currently being discussed along the coast of Bosnia and Herzegovina.

Therefore, there is no national or cross-border competition among the different maritime activities currently experienced, though the authorities of Bosnia and Herzegovina claim there is a need for regulation of shipping administration and of fisheries/aquaculture, mostly in regard to product quality control.

Besides, a number of problems have been created in the coastal area as a consequence of the permanent and strong pressure of competitive demands for land on the coast provoked by the attractiveness of such locations.

Marine protected areas network

As a whole, the geomorphology of the Adriatic Sea and the small distance between the two opposite coasts of the basin would be very favourable to the development of a system of small coastal protected areas that could increase their connectivity and be complemented by a wide offshore corridor conservation area represented by possible EBSAs in the Northern and Central Adriatic. Bosnia and Herzegovina, even with its small coastal area, could have its part in this network, especially considering a continuum with the Kelk Peninsula, which is currently preserved from any human land-based activity.

9.4 Legal, policy and institutional framework

Both entities are stakeholders in Adriatic Sea protection, the Federation of Bosnia and Herzegovina through Neum coastal zone, Neretva surface water and groundwaters related to the Adriatic Sea system, and Republika Srpska through the Trebinje groundwater system and Adriatic Sea groundwater system.

Legal framework

There has been no specific marine regulation to date. No law relating to the water sector has been adopted at the state level but Laws on Water have been adopted by the entities, in January 2008 by the Federation of Bosnia and Herzegovina and June 2006 by Republika Srpska. These two laws are broadly in line with the EU WFD (2000/60/EC), including coastal waters monitoring and management in the case of the Federation of Bosnia and Herzegovina. Coastal waters are defined by law as surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters.

The WFD includes coastal waters issues up to one nautical mile at sea. All marine territory of Bosnia and Herzegovina, once clearly defined, will be included within this limit. Therefore, the current Laws on Water, in line with the WFD regarding coastal water issues, offer an adequate legal framework. Overlapping and beyond this one nautical mile at sea, in the framework of the EU acquis, Bosnia and Herzegovina will have to implement the EU Marine Strategy Framework Directive (2008/56/EC) as well. This makes the setting up of a new marine environment policy of the utmost importance in the future.

The 2005 Law on Internal and Nautical Navigation of the Federation of Bosnia and Herzegovina regulates, among other matters, navigation and safety of all kinds of vessels, shipment, captaincy and control of navigation in the national waters of the Adriatic Sea, working conditions on waterways, maintenance and marking of waterways, and building structures on the coast and in the coastal area.

The classification of seawater is based on approximately 24 parameters (physical, chemical and microbiological) measured several times a year in one location at sea under the Institute of Public Health of the Federation of Bosnia and Herzegovina. Bathing waters quality is measured twice a month during the period June to August. Since 2001, the state of bathing water has been registered as "satisfactory".

Policy framework

State level

Although the existing legislation of Bosnia and Herzegovina contains many regulations and rules related to coastal area management, there are no

specific standards for coastal area management in general. There is therefore no integrated coastal zone management (ICZM) policy and strategy in Bosnia and Herzegovina. The current preparation of a Coastal Area Management Plan (CAMP) under the Mediterranean Action Plan and its Regional Activity Centre for Priority Action Programme (RAC/PAP) represents a first step in the establishment of ICZM and maritime spatial planning practice in the country and its integration into the preparation of the new Spatial Plan of Bosnia and Herzegovina for the period 2008–2028 (the previous one was enacted in 1981).

The 2017 Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina 2015–2020 and the 2014 Fifth National Report of Bosnia and Herzegovina to the Convention on Biological Diversity reported that there is a lack of high quality, valid and, in particular, recent data on biological diversity, including the marine environment. There is no system or institutional structure that is responsible for the collection, processing, integration and further updating of data on biological diversity in a systematic way.

Federation of Bosnia and Herzegovina

The 2009 Development Strategy for the period 2010–2020 gives an elaborated overview of the status of the waters, recognizing their importance, and the urgent need for their sustainable protection and for future modernization and development of water infrastructures. Its main goals for the water sector are the legal and institutional reform of the sector, the integration of water management into the economic system and safeguarding the good status of the surface and groundwaters. Harmonization with the EU environmental acquis is also established as an objective in the Strategy in respect of water-related legislation.

The 2007 Spatial Plan of the Federation of Bosnia and Herzegovina for the period 2008–2028, though not yet adopted, is an overarching strategic document serving as a basis for defining space utilization and preparing development plans. The latter will define monuments and areas of natural heritage, and objectives of spatial development, protection, utilization and land use planning (but not in the maritime domain). The Spatial Plan of the Neum Municipality, which is under consideration, will have to be in line with the Spatial Plan of the Federation of Bosnia and Herzegovina.

A strategy for tourism has been defined but not yet adopted. It covers each of the 10 cantons, the coastline being part of the Herzegovina-Neretva Canton. Coastal tourism is given a very limited share in

national tourism. Since 2007, Neum Municipality has been preparing a strategic and land-use management plan with feedback to the public in 2016. It is a 10-year plan comprising zoning and regulations (though illegal construction is increasing) including tourism, marine aquaculture and a port for small boats. It does not look as if this local plan aligns well with that of the Federation, which instead plans a trade and defence harbour on the Klek Peninsula. The distribution of spatial planning competences is still an issue at the various administrative levels within Bosnia and Herzegovina.

Institutional framework

Federation of Bosnia and Herzegovina

The relevant authorities of the Federation of Bosnia and Herzegovina and the Herzegovina-Neretva Canton prepare plans for the defence of the coastal zone and inner sea against sudden pollution from ships, and for the timely organization of relevant actions. In practical terms, there is only one coast guard and three assistants in Neum using a small boat (9 m) with limited power. In the event of a most dangerous situation, there would be coordination with Croatian vessels. The Herzegovina-Neretva Canton and the municipality of Neum are the implementing local governments in the coastal area.

Regulations and standards

Although the existing legislation of Bosnia and Herzegovina contains many regulations and rules related to coastal area management, there are no specific standards for the coastal area management in general.

Currently, seawater classification is in four classes: first class water quality, where breeding shellfish is allowed; second class water quality that can be used for swimming, recreation and water sports; third class water quality where fishing is allowed; and fourth class water quality in inland harbours. Following this regulation, there are no third and fourth class seashore waters in the areas of Mali Ston and Neum Bay.

Coastal management and planning

No integrated coastal zone management (ICZM) is carried out in Bosnia and Herzegovina, though there is one feasibility study in preparation (CAMP, PAP/RAC, Mediterranean Action Plan), "Establishment of a system for monitoring sea quality in the coastal zone of Bosnia and Herzegovina through introduction of the ICZM process in Bosnia and Herzegovina". One of the major sources is the ongoing

updating process of the National Action Plan (NAP 2016) for the implementation of the Mediterranean Action Plan (MAP) Land-Based Sources Protocol and its Regional Plans to achieve Good Environmental Status (GES) for pollution related to the Med Ecosystem Approach (EcAp) ecological objectives as applied to the four river basin areas, the Neretva, Krka and Cetina, and Trebisnjica River Basins, and the coastal area of Neum.

Sustainable Development Goals related to this chapter

Bosnia and Herzegovina's current position vis-à-vis relevant targets is described in box 9.1.

9.5 Participation in international agreements and processes

The country is party to 46 multilateral environmental agreements, including the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, and its four protocols (Dumping, Emergency, Land-based Sources, Specially Protected Areas). Nonetheless, the 1995 Amendments of the Barcelona Convention and other protocol amendments are not yet ratified.

Bosnia and Herzegovina ratified the Maritime Labour Convention in 2010, which entered into force on 20 August 2013. This has to be linked to the country's previous (1993) signature and acceptance of the Convention of the International Maritime Organization (IMO), itself part of the Convention on the Law of the Sea, which was ratified in 1994 by Bosnia and Herzegovina.

The other important international/regional initiatives in which Bosnia and Herzegovina is participating are the Adriatic Ionian Initiative, initiated with the 2000 post-conflict Ancona Declaration, and, more recently, the 2014 EU Strategy for the Adriatic and Ionian Region (EUSAIR). The EUSAIR ambition is to promote economic growth and prosperity in the eight countries of the Region by improving their attractiveness, competitiveness and connectivity.

The country is also a member of the Forum of Adriatic and Ionian Chambers of Commerce to strengthen socioeconomic development in the Adriatic and Ionian Region, the Forum of Adriatic and Ionian Cities, the UNIADRION university network, the South-East Europe Transport Observatory, and the Energy Committee, an international organization dealing with energy policy that includes the EU and eight other contracting parties, including Bosnia and Herzegovina.



Box 9.1: Targets 6.3, 14.1, 14.2, 14.5, 14.a and 14.c of the 2030 Agenda for Sustainable Development



Goal 6: Ensure availability and sustainable management of water and sanitation for all

Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Target 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

These targets are particularly relevant to the coastal area of Bosnia and Herzegovina, which is affected by solid waste and nutrient pollution. The main rivers carrying pollutants to the sea are the Neretva (from the nearby towns of Konjic, Mostar and Čapljina), Trebišnjica (from the towns of Bileća and Neum), Krka and Cetina Rivers. About 500,000 people live in the Adriatic Sea Watershed Basin. Urban effluents are discharged to the rivers or to the sea without treatment. Solid waste is deposited on dumps without sanitary control. Industrial effluents are also not effectively treated, thus creating local problems in the receiving water bodies. The main identified hotspots are:

- Mostar, the only agglomeration with more than 100,000 inhabitants, and its treatment of wastewater and regulated collection and disposal of waste according to EU standards;
- Neum, the only municipality located in the Mediterranean coastal area of Bosnia and Herzegovina, which lacks proper treatment of water, collection and disposal of waste according to EU standards, and experiences pressure from fisheries;
- Čapljina, with wastewater management and transboundary impact, specially related to solid waste management and production of marine litter in the Neretva River Delta;
- Trebinje, characterized by wastewater management and transboundary impact, specially related to solid waste management and collection and treatment of leachate.

In order to achieve targets 6.3 and 14.1, in particular, for its coastal area, Bosnia and Herzegovina should develop and implement an integrated policy and management framework for its coastal area.

Target 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

This target is dependent on the extent of achievement of Target 14.1. Environmental quality is essential for underpinning coastal and maritime activities in Bosnia and Herzegovina and in the Adriatic-Ionian Region, with two pivotal topics identified in the Action Plan of the Strategy for the Adriatic and Ionian Region: marine environment and transnational terrestrial habitats and biodiversity.

Bosnia and Herzegovina should develop and implement an overall coastal and marine strategy, embedded into the macro-region's economies and societies, which will contribute to bolstering the resilience of the coastal and marine socio-ecosystem in the face of existing and/or potential impacts of climate change and to achieve Target 14.2.

Target 14.5: By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

No marine protected areas have been declared and no potential such area is currently being discussed along the coast of Bosnia and Herzegovina.

Nevertheless, Bosnia and Herzegovina took some steps forward. Already, the 2017 Strategy and Action Plan for Protection of Biological Diversity 2015–2020 includes coastal waters under its Target 15 (By 2020, map and evaluate the benefits from forest, agricultural and water ecosystems, and strengthen the environmental permit mechanism and supervisory inspection within protected areas, areas of special interest and areas from the Natura 2000 ecological network plan).

Target 14.a: Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries

There was limited progress on research and innovation. The Council for Science of Bosnia and Herzegovina was recently established as an advisory and technical body in the area of science and technology. However, the country's investment in research and innovation remains low.

According to the 2016 report on the European Neighbourhood Policy and Enlargement Negotiations of Bosnia and Herzegovina, preparations on education and research and innovation policy are at an early stage. Bosnia and Herzegovina participated in different cultural programmes as well as research networks and activities. In this regard, the Action Plan of the Strategy for the Adriatic and Ionian Region pillar on "Maritime and marine governance and services" gives a number of possible initiatives, such as "Twin Fish", focusing on training and networking activities with the aim of boosting capacity-building and of twinning projects between EU and non-EU stakeholders on Common Fisheries Policy; "MSP and ICM training and mutual support"; "Maritime skills circulation", developing networks of academies and training institutes on maritime profiles/professions; "Adriatic-Ionian data cloud supporting maritime governance and services", establishing knowledge-based innovative communities and IT platforms for sharing data and exchanging knowledge; and "Citizens exploiting the Region's blue potential", promoting awareness about the macro-region's potential in terms of blue economy, new technologies, aquaculture and fisheries.

The participation of Bosnia and Herzegovina in the pillar "Maritime and marine governance and services" of the Action Plan of the Strategy for the Adriatic and Ionian Region will help to increase scientific knowledge, research capacity and transfer of marine technology.

Target 14.c: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS [the United Nations Convention on the Law of the Sea], which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want

Indicator 14.c.1: Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources

Bosnia and Herzegovina is party to UNCLOS by succession. UNCLOS is seen as the "sea constitution", which is supported by a number of conventions in all sectors (such as those of the International Maritime Organization, the Barcelona Convention and the Convention on Biological Diversity), which means that any ratification contributes to the implementation of UNCLOS. In this regard, the ratification of the 1995 Amendments to the Barcelona Convention and its protocols will help Bosnia and Herzegovina to progress in the achievement of target 14.c.

Photo 9: Fish farm



In 1996, the Government of Bosnia and Herzegovina and the Government of Croatia signed an agreement on water management referring to water management activities on watercourses, streams and groundwater

bodies with transboundary characteristics. Within this political framework, the Commission for Water Management was established, comprising two subcommissions for the Adriatic Sea Basin and the

Black Sea Basin. A Transboundary River Basin Management Framework was completed and adopted in 2015, contributing to the foundation of an Adriatic RBMP together with three other RBMPs in Croatia, the Federation of Bosnia and Herzegovina and Republika Srpska.

9.6 Assessment, conclusions and recommendations

Assessment

Generally, the marine environment in Bosnia and Herzegovina is in good condition. However, the elaboration of the current state of the investigated marine water body indicates that it is exposed to significant anthropogenic influence that needs to be better assessed. According to the 2016 MAP/Land-Based Sources Protocol National Action Plan, although improvements have been realized, particularly regarding the 2012 provision of the new legislation platform that is well aligned with the EcAp-Good Environmental Status targets, there is no regulation related exclusively to sea water quality and monitoring, especially regarding nutrients from diffused pollution sources, including underground aquifers, marine litter in the coastal area of Neum and related upstream solid waste management, including landfills.

Clearly, when considering the management of its coastal area, Bosnia and Herzegovina and its entities might frame their policies, programmes and activities in the larger regional context, bilaterally with Croatia and multilaterally within the Central Adriatic Region and beyond, the Adriatic Ionian Region and its EUSAIR Action Plan. The geomorphology of the Adriatic Sea and the small distance between the two opposite coasts of the basin are favourable to the development of a system of small coastal protected areas that could increase their connectivity and be complemented by a wide offshore corridor conservation area represented by possible Ecologically and Biologically Significant Areas (EBSAs) in the Northern and Central Adriatic. Bosnia and Herzegovina, even with its small coastal area, could play its part in this network, especially considering a continuum with the Kelk Peninsula, which is currently preserved from any human land-based activity.

Coastal tourism, the most promising maritime activity in Bosnia and Herzegovina but also that which has the greatest environmental impact, is another example of the importance of bilateral and multilateral initiatives in the region.

As stated in the EUSAIR Action Plan, the net gains of a joint approach will not only increase tourist flows and access to new tourism markets but will help promote among tourism stakeholders the establishment of generally accepted standards and rules, and improved cooperation between public bodies and private tourism associations.

Conclusions and recommendations

Protocols of the Barcelona Convention

Bosnia and Herzegovina is not party to the 1995 Amendments and the Integrated Coastal Zone Management Protocol of the Barcelona Convention. Moreover, the country did not implement the Coastal Area Management Plan under the Mediterranean Action Plan and its Regional Activity Centre for Priority Action Programme, which has recently been submitted to the MAP National Focal Point and to the MAP-PAP/RAC. This would then support the preparation of a national integrated coastal zone management strategy to be mainly implemented by the Federation of Bosnia and Herzegovina, Herzegovina-Neretva Canton and Neum Municipality.

On the other hand, the implementation of the already ratified Dumping and Emergency Protocols could be strengthened through active consideration of some of the corresponding provisions of the IMO Convention already signed and accepted in 1993 by Bosnia and Herzegovina. As a matter of fact, though IMO is explicitly mentioned in only one of the articles of the United Nations Convention on the Law of the Sea (Article 2 of Annex VIII), several provisions in the Convention refer to the "competent international organization" in connection with the adoption of international shipping rules and standards in matters concerning maritime safety, efficiency of navigation and the prevention and control of marine pollution from vessels and by dumping.

Recommendation 9.1:

The Governments of the Federation of Bosnia and Herzegovina and Republika Srpska, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should enforce the Dumping and Emergency Protocols of the Barcelona Convention.

Coastal zone management and marine pollution

The Federation of Bosnia and Herzegovina and Herzegovina-Neretva Canton (in Mostar and Neum) prepare plans for the defence of the coastal zone and inner sea against sudden pollution from ships, and for the timely organization of relevant actions, but

effective coordination, capacity and means of intervention are lacking. This hampers the achievement of SDG Target 14.C, the IMO being one of the major players in UNCLOS implementation.

Recommendation 9.2:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina and Republika Srpska, should prepare:

- (a) *A national integrated coastal zone management strategy;*
- (b) *A contingency plan on marine pollution; and*
- (c) *A state of the environment report on the Adriatic Sea by Bosnia and Herzegovina.*

EU Strategy for the Adriatic and Ionian Region and its Action Plan

Bosnia and Herzegovina participates in the 2014 EU Strategy for the Adriatic and Ionian Region, in particular in one of the Action Plan pillars related to environmental quality. This participation aims to ensure the good environmental status of the marine and coastal environment, halt the loss of biodiversity and degradation of ecosystem services and restore them, and improve waste management by reducing waste flows to the sea, including solid waste, nutrients and other pollutants from rivers and landfill leakage. This would help Bosnia and Herzegovina achieve SDG Targets 14.1 and 6.3. In addition, this could lead to the strengthening of plans and interventions in the event of sudden pollution from ships at sea.

Recommendation 9.3:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina and Republika Srpska, should implement the EU Strategy for the Adriatic and Ionian Region and its Action Plan.

State law on use and protection of the Adriatic Sea

Herzegovina-Neretva Canton and Neum Municipality development strategies seem rather disconnected from the fishery policies of the Federation of Bosnia and Herzegovina, aquaculture and coastal tourism activities. There is no overall vision encompassing water resources management as well as the main maritime activities that currently take place in the area (coastal tourism, aquaculture and fishing) through balanced and relevant spatial planning for human activities and development. In practice, spatial planning is mainly aimed at defining locations for construction and does not take into sufficient account

public interest or environmental concerns. Coordination between Herzegovina-Neretva Canton and Neum Municipality is lacking on spatial and urban plans, which are not harmonized, particularly when defining roads and construction areas in the coastal area. Better coordination on spatial and urban plans would be a good step towards reaching SDG Target 14.2.

Recommendation 9.4:

The Council of Ministers of Bosnia and Herzegovina, in cooperation with the Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Herzegovina-Neretva Canton, should develop a state law on use and protection of the Adriatic Sea.

Protected areas

Bosnia and Herzegovina has not declared marine protected areas. Rather than considering a possible single and isolated marine protected area, the development of a system of small coastal protected areas along the Eastern Adriatic coastline could increase their connectivity and be complemented by a wide offshore corridor conservation area represented by possible Ecologically and Biologically Significant Areas (EBSAs) in the Northern and Central Adriatic. The EUSAIR Action Plan and network could be used for such a joint endeavour. Designation of marine and coastal protected areas would support the achievement of SDG Target 14.5 in respect of 10 per cent of coastal and marine areas, but also other relevant targets, such as targets 6.6, 14.1 and 14.2, and also the Aichi Target 11 of the Convention on Biological Diversity.

Recommendation 9.5:

The Government of the Federation of Bosnia and Herzegovina, in cooperation with the Government of Herzegovina-Neretva Canton, should:

- (a) *Enforce the existing laws on spatial planning and construction;*
- (b) *Develop a system of small coastal protected areas along the Adriatic coastline.*

Marine research

Bosnia and Herzegovina has access to various initiatives linked to knowledge and research on maritime issues in the context of the EUSAIR Action Plan pillar "Maritime and marine governance and services". These initiatives focus on training and networking activities to boosting capacity-building and on twinning projects between EU and non-EU stakeholders, to develop networks of academies and training institutes on maritime profiles/professions,

establish knowledge-based innovative communities and IT platforms for sharing data and exchanging knowledge, and promoting awareness about the macro-region's potential in terms of blue economy, new technologies, aquaculture and fisheries. The participation of Bosnia and Herzegovina in these initiatives would support the achievement of SDG Target 14.a to increase scientific knowledge, research

capacity and transfer of marine technology.

Recommendation 9.6:

The Governments of the Federation of Bosnia and Herzegovina and Republika Srpska, in cooperation with the Council of Ministers of Bosnia and Herzegovina, should enhance the development of marine research.

Chapter 10

WASTE MANAGEMENT

10.1 Practices and trends in waste management

Separation and sorting

Municipal solid waste and similar waste

Generation and collection

Data collection on municipal solid waste (MSW) in Bosnia and Herzegovina has improved since 2011 and datasets from 2011 onwards are available for several aspects of MSW generation and collection at the national level. At the national level, a slight decrease can be seen in the amounts of generated MSW between 2011 and 2015 – with the exception of 2014, when, due to the flooding, the amount of MSW was the highest in this period (table 10.1) – although between 2013 and 2015 the amount also increased, so it is not a stable trend. This is reflected by the amount of MSW generated per capita – 340 kg/person/year in 2011 and 326 kg/person/day in 2015, which was significantly lower than in the neighbouring countries, except Serbia (Croatia 393 kg, Montenegro 533 kg, Serbia 259 kg) and much lower than the EU average (476 kg). There are also data on MSW collected by the entities' statistics agencies, but the total of the entity data does not correspond to the data at the national level and the difference is so great that it cannot be justified by the lack of data from Brčko District.

Separate collection has been systematically and gradually introduced in both entities of the country during recent years, starting in 2011 in the Federation of Bosnia and Herzegovina by the adoption of the first legislative act regulating this field. The available data on separate collection on the national level show that, parallel to the introduction of the system of operators, which aimed to increase the rates of separate collection and recycling, the separate collection rate has decreased from 10 per cent to 5 per cent (table 10.2). The available entity data are even more confusing: whereas in the Federation of Bosnia and Herzegovina the rate of separate collection of MSW was 6.9 per cent in 2015, in Republika Srpska it was only 0.3 per cent ("separately collected fractions"). Such data for Brčko District are not available.

The statistical methodology of data collection distinguishes separately collected packaging waste from separately collected waste other than packaging. This is why it might be relevant to take into account the amount of collected packaging waste in addition to separately collected (non-packaging) waste. It might better reflect the rate and trend in separate waste collection.

Table 10.1: Amount of generated municipal waste in Bosnia and Herzegovina, 2011–2015

	2011	2012	2013	2014	2015
Generated municipal waste, tons	1 306 663	1 302 866	1 119 267	1 334 522	1 248 718
Annual amount of municipal waste per person, kg/person/year	340	340	314	352	326
Amount of municipal waste per person, kg/person/day	1.00	1.00	0.86	0.95	0.89
Collected municipal waste in the Federation of Bosnia and Herzegovina (1)	709 471	635 475	629 455	656 216	655 476
Collected municipal waste in Republika Srpska (2)	381 185	376 438	388 767	n.a.	403 452
Total collected waste based on the data of entities	1 090 656	1 011 913	1 018 222	n.a.	1 058 928

Source: Agency for Statistics of Bosnia and Herzegovina, 2013–2016.

Notes: (1) Statistical Yearbook of the Federation of Bosnia and Herzegovina. (2) Institute of Statistics, Republika Srpska.

Table 10.2: Amount of waste collected by communal services in Bosnia and Herzegovina, 2011–2015, tons

	2011	2012	2013	2014	2015
Total	1 027 006	964 121	881 538	987 546	924 051
Separately collected waste	98 968	69 679	55 071	58 706	45 369
Garden and park waste	39 578	46 192	29 685	20 651	22 362
Other municipal waste	881 978	884 468	775 942	885 443	839 528
Packaging waste	6 482	13 782	20 840	22 746	16 792

Source: Agency for Statistics of Bosnia and Herzegovina, 2013–2016.

Table 10.3: Source of waste collected by municipal enterprises, 2011–2015, tons

	2011	2012	2013	2014	2015
Total	1 027 006	964 121	881 538	988 768	924 051
Households	836 145	759 782	693 027	751 917	715 204
Productive and service activities	176 185	183 325	166 027	211 513	184 164
Public communal services	14 676	21 014	22 188	24 116	24 684

Source: Agency for Statistics of Bosnia and Herzegovina, 2013–2016.

Federation of Bosnia and Herzegovina

The biggest novelty and most significant improvement in waste management since 2011 in the Federation of Bosnia and Herzegovina is the introduction of the system of operators. The first Rulebook on the management of packaging and packaging waste was issued in 2011 and became effective from 2012. It was followed by the adoption of the Rulebook on the management of waste from electric and electronic products, which became effective from 2013. Both legislative acts have been amended since their approval. The Rulebook on the management of packaging and packaging waste was amended in 2013 and then was even suspended in 2016 for five months, while the Rulebook on the management of waste from electric and electronic products was amended in 2014 and was suspended for seven months, on the decision of the Competition Council of Bosnia and Herzegovina (a state regulatory body). After their suspension, both Rulebooks became effective again by the end of 2016 and they were both effective as of April 2017.

The aim of the system of operators is to contribute to the reduction of waste generation and to ensure that a higher amount of the waste streams concerned is being recycled or reused. Manufacturers and the first distributors of the imported goods (i.e. packaged goods or electronic or electrical equipment (EEE)) registered in the territory of the Federation of Bosnia and Herzegovina (or Republika Srpska if they distribute in the Federation of Bosnia and Herzegovina) are subject to the rules and must manage and dispose properly of the waste that they or their products produce. Under the system of operators, the companies that are subject to the rules on management of packaging waste or waste electronic or electrical equipment (WEEE) can fulfil their obligations either by contracting the operators to do what is required in order to comply with the rules or, alternatively, by paying a (punitive) levy for the Environmental Protection Fund of the Federation of Bosnia and Herzegovina.

However, the fees are set in the rules in such a way that the fees payable by operators are much more favourable for companies than the levies they

themselves would pay to the Environmental Protection Fund. Levies for the Fund are more than 10 times higher in the case of WEEE and even higher than the fee that is to be paid by operators for the same amount of output (waste), so it absolutely encourages the companies to sign contracts with operators. Based on the current rules, operators are not obliged to separately collect municipal waste and they rarely do it, because it is much easier for them to collect the required amount of waste from companies.

On the other hand, operators have to fulfil recycling/reuse rates set in the rules. The targets increased from 8 per cent in 2012 to 35 per cent in 2016 in the case of packaging waste (table 10.4) and, in the case of WEEE, from 8 per cent to 20 per cent in the fifth full calendar year since the beginning of an operator's operations. Operators are also obliged to process a certain share of the separately collected waste, ranging from 5 per cent to 30 per cent in the case of packaging waste (table 10.5) and from 50 per cent to 80 per cent according to the type of electronic or electric goods in the case of WEEE.

The Environmental Protection Fund of the Federation of Bosnia and Herzegovina coordinates the system of operators. The Fund has prepared the database of potential subjects to the rules (which contains approximately 4,500 companies) and receives the biannual reports submitted by the companies on the fulfilment of their obligation. In 2017, more than 1,000 companies were registered as subject to the packaging rules and over 350 companies were registered as subject to the WEEE rules. The fulfilment of obligations is controlled by the Administration for Inspection Affairs of the Federation of Bosnia and Herzegovina; if an inspection reveals that a company has not reported (properly) on its obligations, the levy has to be paid to the Fund. There is no possibility of retroactively signing a contract with operators to fulfil the unfulfilled obligations. There are separate coordinating bodies to supervise the operation of both rules, comprising representatives of the Environmental Protection Fund, Ministry of Environment and Tourism, Administration for Inspection Affairs and operators.

Table 10.4: Targets for recycling for operators in the Federation of Bosnia and Herzegovina, 2012–2016, %

	2012	2013	2014	2015	2016
To be reused or recycled	8	13	20	25	35

Table 10.5: Specific targets for recycling for operators in the Federation of Bosnia and Herzegovina by type of packaging, 2014–2016, %

Type of package	Required minimum amount to be reused or recycled by operators		
	2014	2015	2016
Glass	5	8	12
Metal	4	6	10
Paper	20	25	30
Plastic	8	12	16
Wood	5	8	12
Multilayer material	5	8	10
Package that contains/is polluted with hazardous material	5	8	10

The Environmental Protection Fund also operates the scheme based on the Decree on Levies on Plastic Bags (OG FBiH, No. 9/14), adopted in 2014. The Decree relates to plastic bags made of plastic material not thicker than 20 micrometres and which do not have separately attached handles. The fee is 0.05 KM per plastic bag. Any company that sells a plastic bag or uses it for own purpose is subject to the Decree, but companies that produce or import such bags are not. The Fund has already recognized that this system could be amended so that the calculation and fee were based on weight and the subjects to the Decree would be the producers/importers of plastic bags. In addition, the 20 micrometre limit should be changed to 50 micrometres. These changes would certainly improve the reporting and payment rate and better contribute to reducing the use of such bags.

The Fund collected approximately 500,000 KM in 2013 from packaging waste and WEEE levies, but that amount was around 100,000–150,000 KM in 2016 because the companies paid the fee for the operators and not the much higher levy to the Fund. The Fund also collected around 2 million KM from plastic bags in 2016. It collected 6 million KM in 2014, due to the switch to thicker bags, which are not subject to the levy.

The use of collected funds is regulated by the Law on the Environmental Protection Fund of the Federation of Bosnia and Herzegovina. Based on the Law, 70 per cent of the collected funds is transferred to the cantons (divided proportionally among the cantons according to the payments and seat of the obligated companies) and 30 per cent is granted by the Fund to municipalities, NGOs, etc. via calls for applications,

and this amount is strictly used for the purpose of waste management. The 70 per cent of the funds that is transferred to the cantons can be spent according to the decision of the cantonal governments and is not necessarily spent on waste management. In addition, the cantons do not have to report on spending of the funds that they receive through this scheme.

Republika Srpska

In Republika Srpska, the system of operators was enabled by the 2013 Law on Waste Management and by the Decree on Management of Packaging Waste (OG RS, No. 36/15). It works on a very similar basis as the system in the Federation of Bosnia and Herzegovina: manufacturers or the first distributors of the imported packaging that is registered in the territory of Republika Srpska are subject to the rules and must therefore manage and dispose properly of the packaging waste that they produce or distribute. Under the system of operators, the subjects of the rules can fulfil their obligations either by contracting the operators to do what is required in order to comply with the rules or, alternatively, by paying the so-called levy on charging the environment with packaging waste. The 2012 Decree on Fees for Environmental Packaging Waste Burden provides the calculation methodology of the levies. It also defines the targets for recycling of the waste that was separately collected within this system: 25 per cent for 2015 and 35 per cent for 2016.

Landfilling/final disposal

The predominant method for waste disposal in Bosnia and Herzegovina is landfilling. According to the

Agency for Statistics of Bosnia and Herzegovina, between 2011 and 2015, the rate of waste permanently disposed of in landfills varied between 67 per cent and 79 per cent (table 10.6). The recovery rate was increasing during this period, but it did not reach 1 per cent by 2015. There is a huge gap between the total amount of generated MSW and the total amount of disposed waste, which suggests that about 20–30 per cent of the collected MSW ends up at unidentified locations, most possibly on illegal dumpsites. However, the situation is not much better in the case of the reported disposed amounts because they are mostly disposed of in dumpsites and not in landfills. According to preliminary planning, the country would be divided into 16 regions for the purpose of waste management and all the regions would have at least one landfill. By the end of 2016, 13 landfills were already in operation or under construction. The remaining regions where the solution of building a modern landfill is not yet assured as of early 2017 are Gacko and Foca in Republika Srpska.

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, the disposal rate of MSW varied between 89 and 97 per cent in the period 2011–2015, which reflects the low recycling rates. According to the 2016 Statistical Yearbook of the Federation of Bosnia and Herzegovina, there were 47 disposal sites in 2015 on the territory of the Federation, of which only four are operating landfills. There were also 340 illegal dumpsites, based on the inventory from 2011 (Waste Management Plan 2012–2017 of the Federation of Bosnia and Herzegovina). Despite the Second Solid Waste Management Project financed by the World Bank (box 10.1), the construction of landfills has showed slow progress, mainly due to the significantly longer than anticipated process of obtaining the required permits for urban planning/location, environmental assessment and construction, and delays in obtaining intermunicipal agreements for the establishment of the regional landfills.

In 2016, the operating landfills on the territory of the Federation of Bosnia and Herzegovina were:

- Regional landfill Sarajevo (Smiljevici);
- Regional landfill Zenica (Moscanica);
- Regional landfill Tuzla (Desetine);
- Regional landfill Mostar (Uborak).

The landfills that were in the planning phase or under construction were:

- Regional landfill Livno (Koricina);
- Regional landfill Bihac (Karanovac);

- Regional landfill Zivinice-Separacija 1 (Tuzla);
- Regional landfill Gornji Vakuf.

In parallel with the construction of landfills, old dumpsites have been rehabilitated, recultivated and closed in the affected regions and in Neum, Bosanska Krupa (Krivodol) and Srebrenik (Babunovac).

Republika Srpska

In Republika Srpska, the rate of permanent disposal of MSW ranged between 65 per cent (2015) and 80 per cent (2011), with a decreasing trend over the period. The decreasing trend cannot be explained by either higher recycling rates or higher recovery rates, but it is more than probable that most of the difference ends up at illegal dumpsites, whereas the officially recorded disposed amounts are partly disposed of in landfills and partly on "official" dumpsites.

In 2010, a detailed inventory of illegal dumpsites in Republika Srpska was made by the Institute of Construction in Banja Luka, with an estimation of the financial resources needed for their rehabilitation. However, this inventory does not contain the smaller, absolutely informal dumpsites. Thus, the 270 identified dumpsites in Republika Srpska include those that were used mostly by public companies for dumping waste in large quantities in the absence of a landfill, rather than all the locations where smaller amounts of waste are dumped by the population or companies.

In Republika Srpska, there were five operating regional landfills by the end of 2016:

- Regional landfill Banja Luka (Ramici);
- Regional landfill Bijeljina (Brijesnica);
- Regional landfill Zvornik (Crni Vrh);
- Regional landfill Prijedor (Kurevo);
- Regional landfill Dobojo.

Brčko District

There is no operating regional landfill in Brčko District; nor is one under construction. There are plans for building a landfill but Brčko District, due to its special status within the country, was not included in the World Bank's Secons MSW Project, which makes it improbable that the construction of a landfill can be started in the near future. However, a study aimed at identifying the most favourable location on the territory of Brčko District for construction of the landfill (i.e. Centre for Waste Management) has been prepared. The study encompassed the selection of a location based on a multicriteria analysis. Twelve potential locations were evaluated, based on the given

criteria. Of these, nine were excluded from further analysis, based on preliminary assessment, because they are not considered suitable for future construction. Finally, three locations were shortlisted: the existing dumpsites in Brčko District, Barnjaci and Kladje. Since then, no further steps have been taken on this issue.

Manufacturing waste, waste from the energy sector, mining and quarrying waste (state level only)

Data on the amount of waste from production activities is collected by the Agency for Statistics of Bosnia and Herzegovina and by the statistics institutes of both entities. However, data are not harmonized and the datasets are not continuous.

In 2014, the total generated amount of waste from production activities was slightly more than 4 million tons, of which 8,408 tons were hazardous waste (table 10.7). The biggest share in waste from production activities was waste from the energy sector (i.e. from

electricity, gas, steam and air conditioning supply), accounting for 66 per cent of total manufacturing waste. The merged data from the entities' statistics institutes show a significantly lower accumulated amount than those of the state level in 2014: 17.6 million tons in the Federation of Bosnia and Herzegovina and 64 million tons in Republika Srpska, while the state data show only 4 million tons of this type of waste. The reason for inconsistencies in published data of the state and entity statistical offices is the exclusion of certain waste types, such as mineral waste, from the state statistics on generated waste.

Construction and demolition waste

In 2017, for the first time, the Agency for Statistics of Bosnia and Herzegovina published the total amount of construction and demolition waste (CDW) for the year 2014. It amounted to 252,310 tons. About 98.5 per cent of the waste is mineral waste from construction and demolition; only 0.002 per cent of the total amount was classified as hazardous waste.

Table 10.6: Disposed waste in Bosnia and Herzegovina, 2011–2015, tons

	2011	2012	2013	2014	2015
Total	1 073 954	925 740	897 666	988 768	954 163
Permanently disposed of in landfill	1 034 327	873 008	894 183	984 989	941 551
Removal of waste in other way	36 896	50 747	101	110	421
Recovered waste	2 731	1 985	3 382	3 669	12 189

Source: Agency for Statistics of Bosnia and Herzegovina, 2013–2016.

Box 10.1: World Bank Second Solid Waste Management Project

The World Bank has been and remained the main donor and financing institution of investments in waste management in Bosnia and Herzegovina. After its successful first project, in 2009 it launched the US\$39.86 million second project with the objective to improve the availability, quality, environmental soundness and financial viability of solid waste management services in participating utilities/regions. It was envisaged the project would be completed in February 2014 but, according to a revised plan, it is expected to be completed in October 2017. The main result of the project would be to build and start the operation of six new regional sanitary landfills. Other results to be achieved by the project are:

- Establishing four new intermunicipal waste management districts;
- Reducing the share of waste not disposed in sanitary landfills in the areas involved by 60 per cent;
- Closing and rehabilitating 25 per cent of the estimated 1,200 illegal dumpsites in Bosnia and Herzegovina;
- Achieving higher citizen satisfaction with waste management services;
- Increasing the cost recovery rate of participating utilities.

The six regional landfills that will be completed within the project are:

- Livno-Koricina;
- Bihac-Karanovac;
- Zivinice-Separacija 1 (Tuzla);
- Gornji Vakuf;
- Zvornik;
- Prijedor.

There is also a parallel technical assistance project, financed by the Swedish International Development Agency (SIDA), called Building Long Term Sustainability for Integrated Solid Waste Management in Bosnia and Herzegovina. Its objective is to enhance the technical, financial and managerial capacities of participating municipalities that are essential for running a sustainable waste management system in the long term.

Table 10.7: Waste from production activities, 2014, tons

	Total	of which, hazardous waste
Total	4 057 058	8 408
Mining and quarrying	85 277	372
Manufacturing industry	1 304 823	7 883
Electricity, gas, steam supply and air conditioning	2 666 958	153

Source: Agency for Statistics of Bosnia and Herzegovina, 2013–2016.

Of the entities, only Republika Srpska published separate data for CDW. It was 428,607 tons for 2014, so there is also a huge discrepancy between the entity-level and state-level data.

Hazardous waste

Hazardous waste is only measured and published in the case of waste from production activities and CDW, whereas the hazardous waste content of MSW and, more importantly, the amount of medical waste, is not yet being collected. The state-level data show that production activities generated 8,408 tons and CDW 516 tons of hazardous waste. Based on these data, it can be concluded that the current level of hazardous waste production is relatively low in Bosnia and Herzegovina, at least that related to industry and to the construction sector.

Agricultural waste

There is no data collection on agricultural waste at any level of Bosnia and Herzegovina.

Medical waste

Federation of Bosnia and Herzegovina

There are no reliable statistical data on medical waste production, as the Federation of Bosnia and Herzegovina does not have a registry system for generated medical waste. The most recent estimation of the amount of medical waste generation was made in 2009 (8,150 tons). The results of research conducted by the Institute of Public Health of the Federation of Bosnia and Herzegovina in 2011–2012 showed that 55 per cent of potentially infectious waste, 23 per cent of chemical waste and 20 per cent of pharmaceutical waste from health institutions was disposed of in municipal landfills. This research has also shown that 42 per cent of health facilities in the Federation of Bosnia and Herzegovina has made a medical waste management plan in accordance with the Rulebook on medical waste management. The majority of hazardous medical waste is infectious waste, which is usually heat treated (sterilized), while other hazardous

waste (chemical and pharmaceutical) is managed by an authorized disposal company under a contract with the health institutions. Non-hazardous medical waste is generally disposed of by utility companies.

The equipment for the safe disposal of infectious waste is located in three medical institutions (University Clinical Centre of Sarajevo, General Hospital "Abdulah Nakaš" Sarajevo and the Institute of Public Health in Central Bosnia Canton). Infectious and potentially infectious medical waste, including sharp objects, is treated by a sterilization process with microwave devices then the waste is crushed in special crushers. It is an automated system that functions in a manner that reduces the ground volume of infectious waste, and then combines high temperature and steam pressure to perform sterilization. To dispose of their medical waste, other medical institutions appoint utility companies or licensed companies engaged in the effective disposal of infectious medical waste, or export their chemical and pharmaceutical waste to other countries.

A certain number of healthcare institutions in Bosnia and Herzegovina incinerate their medical waste. Even though the main clinics in Sarajevo have achieved progress towards safer medical waste management, there is still a significant risk to public health at the state level. Research conducted as part of the preparation of the Waste Management Plan 2012–2017 of the Federation of Bosnia and Herzegovina indicated that medical waste in the Federation is being partly sterilized, melted and burned, as well as sold to companies authorized for disposal of hazardous waste or, in the worst-case scenario, it is collected by public utility companies. Non-hazardous waste is mainly handed over to public utility companies along with mixed municipal waste, while a minor part is sterilized or autoclaved.

Chemical and pharmaceutical waste generated in health institutions is collected in suitable containers and stored in hospital pharmacies (pharmaceutical waste) or in secondary storage. This type of waste can be treated by burning in special incinerators for hazardous waste at temperatures of at least 1,700 °C.

However, these incinerators do not exist in Bosnia and Herzegovina. Chemical and pharmaceutical waste is exported by authorized companies to the countries where such facilities exist (mostly Austria, Germany or Italy). A proportion of chemical waste is recycled. Pathological waste requires special treatment. Pathological waste is buried in the cemeteries on the basis of contracts between healthcare institutions and funeral companies. In Bosnia and Herzegovina, crematoria do not exist.

In 2012, the Association for Research and Development of Tuzla prepared the *Good Practice Handbook on Medicinal Waste Management*, which gave a comprehensive overview of the practices that should be implemented in order to establish sound medical waste management. Though the Handbook was based on the law of the Federation of Bosnia and Herzegovina, it can be easily replicated in Republika Srpska because both regulations are based on related EU legislation.

Republika Srpska

In Republika Srpska, medical waste is treated according to the type of waste:

- Pharmaceutical waste is collected and disposed of via two intermediary companies in Austria;
- Pathological waste is buried, infectious waste is sterilized in various ways and some health facilities burn it in improvised incinerators;
- Chemical waste that is in the liquid state, mainly after certain neutralization, is discharged into the sewerage system;
- Microbiological waste is sterilized and deposited in landfills for municipal waste;
- Radioactive waste is under the jurisdiction of the State Regulatory Agency for Radiation and Nuclear Safety (since 2011);
- RTG films and developers from health facilities are mostly sold to companies that extract silver from the films.

There are no adequate incinerators in Republika Srpska. The idea for the treatment of waste is to use a combination of saturated water vapour and microwaves to convert the infectious medical waste into non-hazardous waste, which can be safely deposited at regional sanitary landfills. Most health facilities, such as hospitals, clinics and health centres, have begun to separate and classify hazardous medical waste within the facility itself. However, after sorting, only a small percentage of that waste is properly disposed of. Large amounts of medical waste, although separated and sorted, are handed over to utility companies and taken to dumpsites and landfills,

which poses a great risk to the health of all persons who come into contact with it and in general for the environment.

There are several health facilities in Republika Srpska that use single-chamber waste incinerators in an uncontrolled way. Although the Clinical Centre in Banja Luka and the general hospital "Sveti Apostol Luka" in Doboj have made progress towards safer treatment of medical waste, there are still risks to public health. The Banja Luka Clinical Centre burns high inbred wastes, such as syringes and pathological waste (i.e. partial and placental), at a clinic using an old incinerator with a capacity of 1,000 kg per day, at a temperature of 800 °C. It is difficult for an old clinical incinerator to comply with modern standards and, moreover, inhabitants living in this area complain about smell and smoke from this object.

Radioactive waste (state level only)

The regulation of activities related to the generation and/or disposal of radioactive waste is the responsibility of the State Regulatory Agency for Radiation and Nuclear Safety, which issues regulations on radioactive waste (Law on Radiation and Nuclear Safety, OG BiH, No. 88/07, and Rulebook on radioactive waste management, OG BiH, No. 68/15). Based on IAEA classification, Bosnia and Herzegovina is a category B country (with multiple applications of radiation sources), i.e. a country that uses radionuclides in medicine, industry and research, and was therefore obliged to prepare a strategy for radioactive waste management. The 2014 Strategy for Radioactive Waste Management created an inventory of existing stored radioactive sources in Bosnia and Herzegovina (tables 10.8 and 10.9), which can in fact be considered as radioactive waste. These are stored in temporary storage facilities for radioactive material in Bosnia and Herzegovina. There are centralized temporary storage facilities in both entities. There is a certain number of temporary storage facilities in the companies that use or used radiation sources for their regular business activities. Nuclear medicine departments have premises for temporary storage of radioactive waste until the activity level falls below the clearance level, when the waste is considered to be non-radioactive waste. The radioactive waste storage in the country is in line with the relevant international standards (IAEA and EURATOM).

The National Implementation Plan (NIP) for the Stockholm Convention on Persistent Organic Pollutants in Bosnia and Herzegovina summarizes the activities and progress made by 2015 in the field of POPs management in Bosnia and Herzegovina.

Table 10.8: Overview of stored and sealed radioactive sources by category and type of application

IAEA category	Application	Temporary	
		User's temporary storage	central storage facilities
1	Total	0	0
	Calibration	0	4
2	Total	0	4
	Calibration	0	4
	Fixed and portable industrial gauges	1	0
3	Total	1	4
	Fixed and portable industrial gauges	117	40
	Brachytherapy (LDR)	0	6
	Calibration	0	7
4	Total	117	53
	Fixed and portable industrial gauges	19	8
	Calibration	0	10
	Other: Calibration	0	1 028
	Other: Smoke detectors	0	2 847
5	Total	19	3 893

Table 10.9: Overview of stored radiation sources from lightning rods

Radionuclide	Dismantled and stored
Eu 152-154	133
Co-60	15
Total	148

Persistent organic pollutants waste (state level only)

The NIP's inventory reveals that POPs pesticides have never been produced in Bosnia and Herzegovina. The import and use of most POPs pesticides (DDT, hexachlorobenzene, chlordane, heptachlor, aldrin, dieldrin, endrin, toxaphene) were banned from the early 1970s, while mirex was never permitted for trade in Bosnia and Herzegovina. Pesticides containing the active substances lindane and endosulfan have been banned since 2008. DDT pesticides were not produced on the territory of Bosnia and Herzegovina, nor were they imported, exported or used after 1989, and the existence of stockpiles and wastes of DDT has not been confirmed, according to this inventory.

The POPs Pesticides Inventory Group concluded that there is a possibility that, between 2008 and 2013, a certain amount of POPs pesticides (5,722 kg in total) was imported to Bosnia and Herzegovina in consignments of other pesticides – insecticides based on chlorinated hydrocarbons. The inventory of POPs pesticides also showed that there are no stockpiles of POPs pesticides in Bosnia and Herzegovina. However, most probably they are still present in the country (presumably, stockpiles of endosulfan and lindane) in

the form of packaging disposal that was dealt with in an uncontrolled manner because there was no organized way for disposing of packaging of hazardous chemicals and packaging waste. The Group identified several locations as potentially contaminated with POPs pesticides, which were large production conglomerates engaged in intensive agricultural production at the time that POPs were in wider use (in Banja Luka, Gradiska, Mostar, Orasje, Samac and Sarajevo); therefore, there is a possibility that some POPs pesticides may have been used in these areas.

The NIP inventory of PCBs has shown that PCB mixtures were never manufactured in Bosnia and Herzegovina, nor was there any production of equipment containing PCBs, but liquids containing PCBs are still being used, mostly in closed systems (in power plant equipment). According to the inventory, the known presence of PCBs is 82 tons, while the suspected amount is 169 tons. The amount of imported PCBs was about 350 kg in the period from 2008 to 2013, while the exported amount was about 2,500 tons, in the form of transformers, capacitors and other PCB wastes. However, the total amount of waste containing PCBs that is ready to be exported from Bosnia and Herzegovina for final disposal is much larger, amounting to 106,167 kg, of which 72 per cent is capacitors, 25 per cent transformers and 3 per cent oil in barrels.

The presence of polybrominated diphenylethers (PBDEs), hexabromobiphenyl (HBB), perfluorooctane sulfonate (PFOS) and its salts, and perfluorooctane sulfonyl fluoride (PFOSF) in Bosnia and Herzegovina is significantly smaller, though not negligible. Due to

low production and limited use, most materials containing HBB were disposed of decades ago and therefore they were not included in the NIP inventory. PBDEs were most often used for treatment of polyurethane foam used in the transport sector and in manufacturing of the housings of electrical and electronic equipment (EEE); therefore, the inventory focused on substances that were applied in the transport sector and EEE in Bosnia and Herzegovina. The preliminary inventory has shown that PBDEs are not produced in Bosnia and Herzegovina and only used in products that are manufactured in or imported to Bosnia and Herzegovina. The amount of PBDEs in the transport sector and EEE was calculated based on the UNEP guidelines.

PFOS might be present in products such as textiles, furniture, clothing, leather products and various industrial and household cleaning products, and in firefighting foams used to extinguish fires caused by liquid fuels. The NIP inventory states that Bosnia and Herzegovina has never manufactured PFOS, only imported products that may contain PFOS. The preliminary inventory of PFOS in Bosnia and Herzegovina was based on statistical data on the import, production and export of consumer products and questionnaires sent to significant consumers of firefighting foam, such as fire brigades. Based on the responses to the questionnaires, the total quantity of firefighting foam in stocks in Bosnia and Herzegovina amounts to 8,455 litres, i.e. the range of amounts of PFOS in Bosnia and Herzegovina is approximately 4–13 litres. The total annual estimated amount of PFOS based on statistics in 2012 was between 47 (lowest possible) and 285 (highest possible) tons in Bosnia and Herzegovina.

There is no regular monitoring of POPs in Bosnia and Herzegovina, and institutions carry out only periodic monitoring and measurement of POP substances in waters (rivers and lakes). The Food Safety Agency, in cooperation with the Plant Health Protection Administration and Veterinary Office, carries out measurements based on the Regulation on Maximum Residue Levels of Pesticides in or on Food and Feed of Plant and Animal Origin (OG BiH, No. 89/12). However, there were no data on analysis of traces of PCBs and other substances that are on the list of the Stockholm Convention. There is no institution responsible for systematic monitoring of POPs in the biome, due to the lack of a monitoring scheme on this issue in Bosnia and Herzegovina.

Specific streams

In Bosnia and Herzegovina, the separate collection and management of the different waste streams is still

at a moderate level. In the Federation of Bosnia and Herzegovina, until June 2017 only packaging waste and WEEE were involved in the system of operators for the management of specific waste streams, based on the principles of extended producer responsibility (see the detailed description of the scheme below, under "Separate collection").

According to the approved amendment of the Law on Waste Management, as of 14 June 2017 similar rules will apply for the other specific waste streams which have not been involved in this scheme so far: batteries, used tyres, construction and demolition waste, sludge, end-of-life vehicles, used oil, medical waste, animal waste, waste that contains PCBs or asbestos, and waste from the production of titan-dioxid. The detailed rules will be defined within one year of the adoption of the amendments. In Republika Srpska, only packaging waste is managed under the system of operators, while in Brčko District there is no law regulating this field. Until implementation of the amended law begins in the Federation of Bosnia and Herzegovina, the predominant part of specific waste streams (except packaging waste and WEEE in the Federation of Bosnia and Herzegovina) will end up in dumpsites and landfills, as is currently the almost exclusive practice in their treatment throughout the whole territory of Bosnia and Herzegovina.

Transboundary movement of waste (state level only)

Based on the bulletin of the Agency of Statistics of Bosnia and Herzegovina (First release, Year 1, No. 5, 2016), the total amount of non-hazardous waste exported in 2015 amounted to 104,376 tons, which is a steep decline (-47.7 per cent) from 2014. The total exported quantities (based on weight) of non-hazardous waste for the period 2009–2015 show a trend of gradual decline, mostly because of the reduced amount of sludge and ash waste exported. Textiles made up 60 per cent of total exported waste and glass was also significant (20 per cent). The total amount of imported non-hazardous waste in 2015 amounted to 17,707 tons, which is a moderate increase (15.5 per cent) on 2014. The amount of imported non-hazardous waste for the period 2009–2015 indicates a trend of continuous decrease in paper, cardboard, rubber and metal waste, while the import of textiles and plastic waste maintained a growing trend. Datasets of total amounts of exported and imported waste are not available for earlier years, but only for selected types of waste (metal, glass, textiles, paper and cardboard, plastic, sludge and ash, rubber) and there are discrepancies between these data and the total amounts.

The transboundary movement of hazardous waste is strictly regulated and in line with the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. Due to the nature of this activity, it is only measured on the state level. Based on the last report of the Bosnia and Herzegovina Focal Point for the Basel Convention, covering the period of 2010–2013, three companies obtained permission exclusively for export, and thus there was no legal import of hazardous waste into Bosnia and Herzegovina. The permitted export amounts for the years 2011–2013 varied between 3,000 and 3,700 tons. Used lead batteries for cars made up the biggest share of this amount by far, accounting for more than two thirds of total exported hazardous waste, though with a declining trend: from 3,258 tons in 2011 to 2,500 tons in 2013. Plates of used lead batteries (830 tons), pharmaceutical and cytostatic waste (179 tons) and asbestos from demolition waste (119 tons) were also among the top exported materials from Bosnia and Herzegovina. During this period, only three companies were engaged in hazardous waste export, while, according to the latest available list, there are six companies licensed for such activity operating in the Federation of Bosnia and Herzegovina. There is neither a list available of the licensed companies operating in the territory of Republika Srpska, nor a separate report prepared for such activities in Republika Srpska. This, together with the fact that data are only available until 2013, suggests that coordination of the implementation of the Basel Convention could be further improved in Bosnia and Herzegovina.

10.2 Pressures from waste

Dumpsites, even if used regularly by public companies, do not fulfil the elementary conditions for the long-term disposal of waste. They thus represent a serious threat to the environment and health, mostly by polluting the soil and groundwater and threatening the drinking water base. Hazardous and medical waste (an estimated 1,000 tons of expired medicines and other waste from the period of the war) disposed of on these dumpsites represents a serious risk to human health as well as to flora and fauna. The slow pace of rehabilitation and closing of these dumpsites means that these risks will be present at least into the next decade. In the absence of a comprehensive inventory, surveys and monitoring of these dumpsites, only estimations could be done of the extent and impact of the improper waste management practices in Bosnia and Herzegovina; however, they were not performed in recent years, not even for the purpose of preparation of the two entities' waste management strategies and plans.

There were several cases in recent years of residents living near industrial areas or landfills and NGOs reporting irregularities or illegal activities related to waste in those locations.

In 2013, in Stup, near Sarajevo, a private company planned to install an incinerator to burn animal, medical and mixed waste. The biggest problem was the inadequate location, because it was planned to be built on a site that was not suitable for such activity. In addition, the company could not prove that there is a laboratory in Bosnia and Herzegovina that can perform the necessary measurements of dioxin and furan concentrations. Eventually, the company did not obtain permission to build the incinerator.

Another serious issue was revealed by NGOs in 2015: a factory for pyrolysis of used tyres in Lukavac has been operating without an environmental permit. The factory has now been closed.

There was an issue with the landfill in Sarajevo in 2016, first reported by residents living nearby. There were problems with leaking gas that caused small explosions within the landfill, which was due to the lack of maintenance, which had been limited by the public prosecutor's investigation for war crimes. This resulted in higher odour pollution around the landfill. Since then, the Sarajevo Canton communal company "RAD" has done the necessary maintenance works and the issue has been resolved.

10.3 Legal, policy and institutional framework

Legal framework

Federation of Bosnia and Herzegovina

The Law on Waste Management remained unchanged until June 2017, when amendments were adopted to ensure the legal framework for the waste management operators, to better regulate the specific waste streams and to establish a waste information system to be run by the Environmental Protection Fund of the Federation of Bosnia and Herzegovina. Major improvements in the legislation were made with the adoption in 2011 of the Rulebook on the management of packaging and packaging waste, which became effective in 2012, and the adoption of the Rulebook on the management of waste from electric and electronic products, which became effective in 2013. In addition, the 2014 Decree on Levies on Plastic Bags represented an important step in the reduction of packaging waste in the Federation of Bosnia and Herzegovina. After adoption of the amendments to the Law on Waste Management, the detailed rules relating to the

management of specific waste streams now need to be defined.

Republika Sprska

The 2013 Law on Waste Management introduces several new terms and enables the system of operators in Republika Srpska. The Law also introduced the following novelties: the regulation of types and classification of waste; renewal of waste management planning and the setting of deadlines on the entity and municipal levels for closing dumpsites; the introduction of management of special waste streams; and renewal of licensing procedures. The management of specific waste streams (beside packaging waste) should be further developed; the precondition for that is the adoption of an adequate legal framework, meaning that the system of operators would be extended to the waste streams which are not yet covered by it, similarly to the new amendments approved in the Federation of Bosnia and Herzegovina.

The Law on Communal Activities determines provision of special public interest, utility activities of special public interest and manner, and the organization of public utilities and the way they are financed. In terms of this Law, communal activities of special public interest also cover the disposal of waste from residential buildings and business premises.

Brčko District

In Brčko District, the highest act on waste management is the Law on Waste Disposal Management. Since its approval, several rulebooks were approved to regulate this sector in detail. However, enforcement of this Law is at a low level, since the basic preconditions for proper waste management (i.e. the existence of a landfill) are not yet ensured.

Policy framework

Federation of Bosnia and Herzegovina

The most important strategic document for waste management in the Federation of Bosnia and Herzegovina is the Waste Management Strategy, part of the Environmental Protection Strategy of the Federation of Bosnia and Herzegovina for the period 2008–2018. It defines the policy and strategic goals based on the relevant EU legislation, which was transposed via the Law on Waste Management. The overall objective defined by the Strategy is to "protect the environment, promote and stimulate the sustainable use of resources through setting up an

integrated system of waste management". The Strategy has also introduced the indicators in this field based on the EEA methodology; however, the monitoring and review of these indicators was not established.

Operational goals for municipal waste (Strategic Goal 7.2 of the Waste Management Strategy) are in the Waste Management Plan for the period 2012–2017. It defined all the relevant measures for the Federation related to waste management and reduction. Moreover, it defined the indicators for the measurement of improvement in waste management for 2011, 2014 and 2018. Cantons are obliged to elaborate their cantonal waste management plans. Despite this obligation, an appropriate follow-up or monitoring system for the cantonal waste management plans was not set up on level of the Federation of Bosnia and Herzegovina. Most of the cantons had prepared and approved their waste management plans, mostly for the period 2015–2020, but such a plan is still lacking in Hercegovina-Neretva, West Hercegovina and Posavina Cantons. There are no enforcement measures or sanctions envisaged when a canton fails to fulfil this obligation. However, the areas that the regional landfills serve do not corresponding exactly to the borders of cantons, or even the entities; thus, such cantonal plans have no real role in the planning of waste management in the Federation of Bosnia and Herzegovina.

Republika Srpska

There is no policy document on waste management in Republika Srpska. The draft waste management strategy for the period from 2016 to 2025 has not been approved. However, if approved, it would be the most important policy document on waste management in Republika Srpska. The draft strategy identified eight regions that need to prepare their respective regional waste management plans, and defined the deadlines for the Government and municipalities for selection of the location of landfills (where there is not yet a landfill) and deadlines for the closure of existing dumpsites.

Brčko District

In Brčko District, the Environmental Protection Strategy for the period 2016–2026 is the highest policy document concerned with environment management. It comprises the Waste Management Strategy that evaluates the waste management situation, determines long-term waste management objectives and enables conditions for rational and sustainable waste management.

Sustainable Development Goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis relevant targets is described in box 10.2.

Institutional framework

State level

Ministry of Foreign Trade and Economic Relations

The Ministry has no specific roles related to waste management, given that this field is under the responsibility of the entities. However, it has general

and coordinating activities and it is the responsible body at international level, especially for accession, ratification and implementation of multilateral environmental agreements.

Agency for Statistics of Bosnia and Herzegovina

The role of the Agency is to define, collect, process and publish data related to waste management at the state level, thus creating the most comprehensive and single database covering the whole territory of the country. The Agency performs separate data collection and prepares reports for Brčko District; however, there is no separate waste-related data available for Brčko District.



Box 10.2 Relevant targets of the 2030 Agenda for Sustainable Development



In Bosnia and Herzegovina, the coordination of the tasks and activities related to fulfilment of the SDGs has so far been done mostly by United Nations offices, primarily by UNDP and also by some other intergovernmental organizations and NGOs, such as the Friedrich Ebert Foundation. Several workshops, meetings and studies have been undertaken, and a website is dedicated to this purpose. In Bosnia and Herzegovina, none of the waste-related SDGs and indicators has been selected as priority ones.

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

Indicator 3.9.2: Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)

Indicator 3.9.3: Mortality rate attributed to unintentional poisoning

There are no evidence-based data or estimations on the effects on human health in Bosnia and Herzegovina, of either regular landfills or non-sanitary landfills, illegal dumpsites or other illegal activities connected to waste.

There are no data on the impacts of non-sanitary landfills (legal dumpsites) and illegal dumpsites on human health in Bosnia and Herzegovina, though in principle such data could be obtained by the detailed assessment of medical reports on causes of death.

Goal 12: Ensure sustainable consumption and production patterns

Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

Indicator 12.4.1: Number of parties to international multilateral environmental agreements on hazardous waste and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement.

Bosnia and Herzegovina is party to the Basel and Stockholm Conventions and is fully implementing them.

Indicator 12.4.2: Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment

Medical waste is not measured in Bosnia and Herzegovina and the amount of hazardous waste is only measured in the case of productive activities and construction and demolition waste; neither the total amount of hazardous waste nor the related per capita data for Bosnia and Herzegovina can be defined. Further steps must be taken in order to prepare data for this indicator, by starting data collection for medical waste and merging the data on hazardous waste from different fields.

Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

Indicator 12.5.1: National recycling rate, tons of material recycled

There are no official data on the amount or ratio of waste recycling or reusing, on either the state or entity levels.

Photo 10: Used car collection point

Inter-Entity Coordination Body for the Environment

The Inter-Entity Coordination Body for the Environment contributed to the harmonization of the laws on waste management of the entities.

Federation of Bosnia and Herzegovina

For the Federation of Bosnia and Herzegovina, the Ministry of Environment and Tourism is in charge of waste management issues. The Ministry of Health and the Ministry of Agriculture, Water Management and Forestry are also involved in waste management related to their respective competences. The Institute for Statistics is responsible for collecting waste-related statistical data. The Administration for Inspection Affairs is in charge of inspections arising from legislation related to waste. The Environmental Protection Fund of the Federation of Bosnia and Herzegovina is in charge of implementing the system of operators and collecting the levies on plastic bags.

The Federation of Bosnia and Herzegovina consists of 10 cantons and their competences are described in the Constitution and, according to the Constitution, the cantons are in charge of waste management in the Federation of Bosnia and Herzegovina. Each of the cantons has its own ministry responsible for waste issues; however, at cantonal level, there is a lack of funds and capacity in the field of waste management, and thus coordination of the construction of landfills

and approval of other relevant legislative acts and measures is done by the Ministry of Environment and Tourism.

Republika Srpska

In Republika Srpska, the Ministry of Civil Engineering, Physical Planning and Ecology is in charge of waste management. The Environmental Protection and Energy Efficiency Fund carries out tasks related to the collection of levies for the management of special waste streams and also coordinates the system of operators. Local self-government units also have their roles in the provision of waste management services, namely to:

- Adopt a local waste management plan and a common management plan for waste;
- Provide the conditions for waste management services and take care of their implementation;
- Regulate, provide, organize and conduct municipal waste management.

In their territories, in accordance with a special regulation in line with the draft waste management strategy for the period 2016–2025, local government units regulate the procedure for collection services in the field of municipal waste management.

Republika Srpska Institute of Statistics is responsible for the collection and dissemination of waste-related data in Republika Srpska.

Brčko District

Within the Government of Brčko District, the Department of Spatial Planning and Property Issues and its Sub-department of Spatial Planning, Urban Development and Environmental Protection are in charge of waste management. Within this Sub-department, four officers are responsible for activities related to environmental protection issues and supervision of the application of ecological standards, including issues related to waste management.

The Brčko District Government reorganized its former Utilities Department, which was responsible for running the utility infrastructure (a water supply, sewerage, waste and power supply company), into a public company called JP "Komunalno Brčko" (Utility Enterprise Brčko), which has operated since 2008.

Information measures

In both entities in Bosnia and Herzegovina, awareness-raising and education projects in the field of waste management are financed systematically through the entity's environmental fund via annual calls for applications; NGOs are eligible to apply for one of the calls for applications. In Republika Srpska, the call for applications under thematic field 1.4. (education and awareness-raising on separate collection of waste and its recycling or reuse – open exclusively to NGOs) resulted in the funding of 16 projects worth 65,000 KM in total. The amount of co-financing provided by the Environmental Protection and Energy Efficiency Fund varied between 2,000 KM and 8,000 KM, so the projects were of smaller scale. In the Federation of Bosnia and Herzegovina, 12 projects were financed in 2016 through a similar scheme. However, the call for applications to which NGOs (along with public companies) were eligible to apply did not exclusively cover the field of waste management. Of 12 funded projects, the project titles of two explicitly indicated that they related to the issue of waste management, but most probably most of the other projects also tackled this issue to some extent. The total budget of the funded projects, 593,000 KM, was almost 10 times the budget for those in Republika Srpska.

Operators of packaging waste and WEEE collection and recycling systems in both entities also play an active role in awareness-raising: they mostly finance smaller (indirect) actions aimed at promoting public awareness in the field of waste management (such as

children's and students' games and competitions, celebrations on Earth Day etc.), but they also distribute containers for municipalities and build smaller "islands" for separate collection for MSW, which they are not obliged to do, but do so voluntarily.

Despite these awareness-raising activities, the state of play shows that these efforts are still not strong enough to sensitize the population to proper waste management: throwing waste alongside the streets and roads is still common and public awareness on waste issues and waste management is relatively low. For example, this was a serious obstacle in the selection of locations for landfills in the World-Bank-financed MSW projects and in Brčko District, where the landfill location is still not decided because of the "not-in-my-backyard" effect, while dumpsites are still being used without any measure to prevent the pollution of the environment.

Participation in international agreements and processes

Bosnia and Herzegovina acceded to the Basel Convention in 2001 and is fully implementing its requirements. However, the country has not yet accepted the Ban Amendment of the Convention. In Bosnia and Herzegovina, the entities share the responsibility for the implementation of the rules and procedures arising from this Convention. Accordingly, in Republika Srpska, the Ministry of Physical Planning, Civil Engineering and Ecology is responsible for the implementation, while in the Federation of Bosnia and Herzegovina, the Ministry of Environment and Tourism is the competent authority, and is also designated as the Focal Point for Bosnia and Herzegovina. Regarding Brčko District, there is no authority designated to deal with the Basel Convention requirements nor have these tasks transferred to any authority of either entity. In practice, the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska sends its data to the Focal Point, which merges the data with those of the Federation of Bosnia and Herzegovina, and prepares and submits the single report to the Convention Secretariat.

Bosnia and Herzegovina ratified the Stockholm Convention on Persistent Organic Pollutants in 2010 but has been slow in implementing it. Despite the deadline of June 2012 for submission of the first NIP, it was eventually published in 2015. A capacity-building project financed by the Norwegian Water Research Institute also undertook surveys to assess the levels of environmental contaminants in selected water bodies. The official contact point for the

Convention is the Ministry of Foreign Trade and Economic Relations.

10.4 Assessment, conclusions and recommendations

Assessment

There has been some improvement in waste management in Bosnia and Herzegovina since 2011, first by the adoption of the system of operators in both entities, which sets the ground for long-term sustainable waste management by stimulating separate collection and reuse and recycling. On the other hand, the introduction of the operators system did not solve the issues with municipal waste management because the operator system exists parallel to the MSW management services and does not interfere with it, because the rules do not oblige the operators to cover the MSW; thus entities still lack long-term solutions for proper MSW management.

Although waste statistics are not reliable, there is a huge difference between the amounts of generated MSW and disposed waste, which suggests that about 20–30 per cent of the collected MSW ends up on illegal dumpsites. The completion of the long-awaited regional landfills would be only the first, though most important, step towards creating an MSW system that is sustainable. There are deficiencies with the management of other types of waste, most significantly of medical waste – even its quantities are unknown. Significant funds and investments will certainly be required for the development of adequate facilities for the proper disposal of medical waste.

Conclusions and recommendations

System of operators

The adoption of the system of operators in both entities sets the basis for sustainable waste management. The system stimulates separate collection and reuse and recycling. However, the systems show some bottlenecks: waste stream, such as batteries, medicines, used tyres and end-of-life-vehicles are not included in the systems. Introducing and monitoring new waste streams in the operators systems would help Bosnia and Herzegovina measure its progress towards the waste-related aspect of SDG Target 12.4 (By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment) and Target 12.5 (By 2030, substantially

reduce waste generation through prevention, reduction, recycling and reuse).

Recommendation 10.1:

The Ministry of the Environment and Tourism of the Federation of Bosnia and Herzegovina and the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska should extend and improve their respective system of operators in order to accelerate and ensure the better fulfilment of the goals set by the adoption of these systems.

Recommendation 10.2:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District should involve their respective administration for inspection in enforcement activities as an important part of implementation of the system of operators.

Recommendation 10.3:

The Government of Brčko District should adopt a system of operators for selected waste streams similar to those that operate in the Federation of Bosnia and Herzegovina and in Republika Srpska, starting with the systematic separate collection of waste, in order to enhance the recycling and reuse of the waste generated.

Waste statistics

Despite the improvement in waste statistics, there are serious discrepancies among data at the state and entity levels. Similarly, data for medical and agricultural waste and waste-related data for Brčko District are lacking. This could be explained by the limited efforts at coordination by the statistical bodies at the different administrative levels. However, the range of collected data on the state and entity levels is not harmonized, and separate waste-related data for Brčko District are not available.

There are waste types and streams, such as agricultural, medical, radioactive waste and POPs, and other selected waste streams, that might be subject to separate collection and extended producer responsibility but are not covered by data collection at all. Hazardous waste is only measured in the case of waste from productive activities and from construction and demolition, while the hazardous waste content of MSW and the amount of medical waste is not being collected at this time. The lack of these data hampers the measurement of the progress made by the country towards the waste aspect of SDG Target 3.9 (By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination).

Recommendation 10.4:

The Agency for Statistics of Bosnia and Herzegovina, the Government and Office of Statistics of the Federation of Bosnia and Herzegovina and its cantonal authorities, the Government and Institute of Statistics of Republika Srpska and the Government of Brčko District, should improve data reporting and information collection on all types of waste in order to provide the basic information needed for the development of sound waste management mechanisms, ensuring the efficiency of waste data collection and consolidation, as well as consistency and correspondence with actual waste flows.

Materials recovery from waste

With the introduction of the system of operators for packaging waste, both entities made a significant step towards promoting the separate collection, reuse and recycling of waste, with ambitious targets. Other waste streams are not included in these schemes. Their inclusion would help the country fulfil SDG Target 12.5 (By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse).

Recommendation 10.5:

The Ministry of the Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska and the Government of Brčko District, in cooperation with other competent institutions, should scale up and promote materials recovery from waste through separate collections, reuse and recycling, and foster business development based on circular economy principles.

Regional sanitary landfills

Despite the financial support of international organizations, e.g. the World Bank, to build regional sanitary landfills, the envisaged plan to cover the whole country with regional landfills had not been completed by the end of 2016, mainly due to problems with the significantly longer than anticipated process of obtaining the required permits for urban planning/location, environment and construction, and delays in obtaining intermunicipal agreements for the establishment of the regional landfills.

There was some progress with the closure of illegal dumpsites, which was connected to regional landfill construction. Inventories of illegal dumpsites were prepared in both entities, but there are no data on the impact from illegal/uncontrolled dumpsites on human health and the environment. However, while Bosnia and Herzegovina does not yet measure Indicator 3.9.3

Mortality rate under SDG Target 3.9 (By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination), from the waste perspective, the closure of illegal/uncontrolled dumpsites would help the country to show progress on Indicator 3.9.3.

Recommendation 10.6:

The Governments of the Federation of Bosnia and Herzegovina and its cantonal authorities, Republika Srpska and Brčko District, in cooperation with municipalities, should:

- (a) *Accelerate the construction of regional sanitary landfills and the establishment of financially, socially and environmentally sound municipal waste management systems;*
- (b) *Close open dumpsites that are currently being used and remediate their territory.*

Medical waste

Since 2011, the practice of hazardous medical waste management in Bosnia and Herzegovina has remained unchanged. Medical waste might be subject to separate collection, but the lack of data hampers sound medical waste management.

Recommendation 10.7:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District should apply international best practices in order to improve medical waste management.

Awareness-raising

Despite the awareness-raising campaigns and several actions taken in both entities to promote sustainable waste management, the importance of waste management remains low in public opinion. It gains focus in public debate only when a serious pollution or malfunction of landfill occurs. In some regions, popular opposition to the construction of landfills seriously hindered the establishment of a modern waste management system, while dumpsites are still being used.

Recommendation 10.8:

The Ministry of the Environment and Tourism of the Federation of Bosnia and Herzegovina and the cantonal authorities, the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska and the Government of Brčko District, in collaboration with the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina and other partners, should:

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- (a) *Raise public understanding and awareness of sustainable waste management to facilitate further progress on the development of regional landfills, prohibition of illegal dumping of waste, separation of waste, and minimizing the generation of waste in households;*
- (b) *Make efforts to distribute information widely on waste generation and management, relevant policy documents, and the development and establishment of legislation.*

Chapter 11

BIODIVERSITY AND PROTECTED AREAS

11.1 Trends in species and ecosystems

Due to its specific geographical position, Bosnia and Herzegovina is one of the richest countries in Europe in terms of biodiversity. It is located at the crossroads of several biogeographical regions and therefore has specific environmental, climatic and geomorphological conditions. The entire country hosts 252 ecosystems and unique biotopes that are important from both a European and global conservation perspective. The large variety of land, freshwater, marine and underground habitats has resulted in an abundance of species and subspecies, with a high number of species including endemic examples. Bosnia and Herzegovina is part of the wider Mediterranean Region that has been identified as the third most important biodiversity hotspot in the world with respect to the number of endemic plant species. The notable variability of wildlife and high degree of biological diversity at the species, genetic and ecosystem levels (Bosnia and Herzegovina is among the top five countries in Europe in respect of biodiversity) is a result of this ecological heterogeneity of space, geomorphologic and hydrological diversity, and climate diversity.

The fact that vascular flora account for about 5,000 confirmed taxa of species and subspecies places Bosnia and Herzegovina among the most diverse countries in Europe. The country also has higher percentages of endangered plants (19 per cent) compared with other European countries. There are 1,859 species of 217 genera within the group of cyanophyta and algae. On average, 74 per cent of fungi species on the International Union for the Conservation of Nature (IUCN) Red List for Europe can be found in Bosnia and Herzegovina forest ecosystems. The country is home to a number of endemic species and habitats as well as a series of relict ecosystems. As much as 3 per cent of the total endemic flora of the Balkans (1,800 species) is contained within the flora of Bosnia and Herzegovina.

Although there was little to no progress since 2011 in terms of creating official inventories of species in the country or a proper biodiversity monitoring system, a

step forward was taken in assessing the trends in species by adopting entity Red Lists. The Red List of Endangered Species of Flora and Fauna of Republika Srpska contains 818 species of vascular plants, 304 bird species, 46 fish species, 57 mammal species, 20 amphibian species, 25 reptile species and 273 insect species. The Red List of Endangered Wild Species and Subspecies of Plants, Animals and Fungi of the Federation of Bosnia and Herzegovina contains 658 plant species, 27 mammal species, 40 bird species, 6 reptile species, 4 amphibian species and 36 fish species, as well as thousands of different species of invertebrates.¹⁰ The Red Lists have not been harmonized and there is no single/harmonized List at the state level. Harmonization of the existing Lists would pose a major issue since, for instance, the Red List of Republika Srpska does not contain the conservation status of listed species and the methodologies used for compiling the Lists are not mutually synchronized and for the large part do not follow the internationally recognized IUCN Red List Methodology.

The 2008, the EU IPA project Support to Implementation of the Birds and Habitats Directives in Bosnia and Herzegovina (2012–2015) came up with analysis of the distribution of habitat types and species in the country, and a draft proposal on the Natura 2000 sites. Altogether, 70 different habitat types and 208 species, of which 109 are birds, have been recorded and distributed into the proposed 122 Natura 2000 sites. The project also came up with a database compiling the distribution of species of habitats in the selected 122 potential Natura 2000 sites and their conservation status.

The database was not made public after the project's completion. The database is currently based in and under the ownership of the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, and even though it is regarded as functional, it is not operational due to political disputes over centralized databases like this one.

¹⁰ ≈ 11,896 species of invertebrates
http://www.mvteo.gov.ba/org_struktura/sektor_prirodni_re_sursi/odjel_zastita_okolisa/Izvje%C5%A1taji_o_stanju_ok

http://www.mvteo.gov.ba/org_struktura/sektor_prirodni_re_sursi/odjel_zastita_okolisa/Izvje%C5%A1taji_nadle%C5%BEnih_institucija/BiH/default.aspx?id=2669&langTag=bs-BA

11.2 Trends in development and management of protected areas

The territory of protected areas in Bosnia and Herzegovina is small, and its percentage share of the total territory of the country is well below the European average. The existing 30 protected areas in the country cover only 2.07 per cent of the national territory (1,063 km²). The MDG Progress Report 2013 for Bosnia and Herzegovina states that:

"... the amount of territories designated as protected areas in Bosnia and Herzegovina is ... extremely low in terms of the percentage of protected territory compared to the total territory of Bosnia and Herzegovina, far below the European standard. The management of existing protected areas is also a matter of considerable concern. These areas are not properly monitored and management remains understaffed and insufficiently supported by the responsible levels of governance, which has resulted in the degradation of these sites and a potential loss of the biological basis for their conservation status. With the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development coming into effect in January 2016, territory of protected areas in Bosnia and Herzegovina became a target of the SDG 15 – Life on Land, with the aim to conserve and restore the use of terrestrial ecosystems such as forests, wetlands, drylands and mountains by 2020. Halting deforestation is also vital to mitigating the impact of climate change. Urgent action must be taken to reduce the loss of natural habitats and biodiversity, which are part of our common heritage."

From 2013 to this date, 1,525.44 ha has been designated as protected (10 areas designated as protected – 2 protected landscapes, 1 forest park, 7 caves).

At present, there are four national parks in Bosnia and Herzegovina: National Park "Kozara", National Park "Sutjeska" and National Park "Drina" located in Republika Srpska and National Park "Una" in the Federation of Bosnia and Herzegovina. Establishment and management of these national parks are in accordance with IUCN Category II (table 11.1).

11.3 Trends in development and management of ecological networks

The process of developing the Natura 2000 network of habitats and species is ongoing in Bosnia and Herzegovina. A more detailed review of habitats and

species initiated in 2006 by the World Wildlife Fund's Mediterranean Programme Office (WWF-MedPo) through the project European Heart of Life was published in 2015 under the title *Natura 2000 Bosnia and Herzegovina*. This publication provides an overview of information on habitats and species from Annex I and II of the Habitats Directive that are located in Bosnia and Herzegovina. The data overview was based on field research and, to a greater extent, on existing reference data.

The most important result of the project is the creation of a digital database through the geographic information system (GIS) on the Arc GIS platform. The publication and an interactive map of Natura 2000 in Bosnia and Herzegovina was also developed, offering an overview and detailed information on the species and habitats from the Habitats Directive present in Bosnia and Herzegovina. The project also aimed at strengthening the national capacities for the identification of habitats and species that exist in Bosnia and Herzegovina that are protected by EU legislation.

Further activities and the implementation of the project Support to the Implementation of the Birds Directive and the Habitats Directive in Bosnia and Herzegovina (October 2012–2014) supported the initial steps in the development of the Natura 2000 network across the country, an appropriate strategy for its implementation and its management plans. The project included six components:

- Development of proposals for the Natura 2000 area;
- Development of guidelines for preparation of Natura 2000 management plans;
- Development of management plans for three selected Natura 2000 localities (Tišina, Orjen and Vranica);
- Preparation and approval of draft regulations/decrees to support the establishment of the Natura 2000 network;
- Establishment of the information system for the Natura 2000 network;
- Communication support to the Natura 2000 project and network in Bosnia and Herzegovina.

Under the projects and other activities implemented (workshops, exhibitions), which also involved the governmental and nongovernmental sectors, scientific institutions, representatives of international and local communities, three pilot areas of the Natura 2000 network in Bosnia and Herzegovina were established: Tišina Pond, Mt Orjen–Bijela Gora and Mt Vranica.

Table 11.1: Overview of the existing protected areas in Bosnia and Herzegovina, as of July 2017

Entity	Location	Year	IUCN		Area (ha)
			category	Category	
Federation of Bosnia and Herzegovina	Una	2008	II	National park	19 800.0
	Blidinje	1995	V	Protected landscape	35 800.0
	Protected Landscape Bentbaša	2017	V	Protected landscape	160.9
	Hutovo Blato	1995	V	Protected landscape – Ramsar Site	7 411.0
	Skakavac waterfall	2002	III	Natural monument	1 430.7
	Lake Prokoško	2005	III	Natural monument	2 225.0
	Vrelo Bosne – spring	2010	III	Natural monument	603.0
	Tajan Park	2009	III	Natural monument	3 510.0
	Bijambare	2003	V	Protected landscape	497.0
	Konjuh	2009	V	Protected landscape	8 016.6
	Trebević	2014	V	Protected landscape	400.2
	Vjetrenica cave*	1950	V*	Category not recognized in the new Law on Nature Protection	4 770.0
	Republika Srpska	Lom Primeval Forest	2012	Ia	Strict nature reserve	297.8
Janj Primeval Forest		1956	Ia	Strict nature reserve	295.0
Sutjeska		1962	II	National park	16 052.3
Kozara		1967	II	National park	3 907.5
Ljubačevo cave		2008	III	Natural monument	45.5
Žuta Bukva		2012	III	Natural monument	0.5
Orlovača cave		n/a	III	Natural monument	27.0
Rastuša cave		n/a	III	Natural monument	11.4
Ledana pit		n/a	III	Natural monument	28.3
Vagan cave		2013	III	Natural monument	12.0
Area for resource management “University City”		2012	VI	Protected area with sustainable use of natural resources	27.4
Pavlova cave		2013	III	Natural monument	13.4
Đatlo Cave		2013	III	Natural monument	43.4
Velika pećina (cave)		2015	III	Natural monument	820.9
Slatina Forest Park		2016	VI	Protected area with sustainable use of natural resources	35.7
Girska cave		2015	III	Natural monument	25.4
Pećina pod lipom (cave)		2015	III	Natural monument	6.1
Ledenjača cave	2015	III	Natural monument	7.4	

Sources: <http://www.unep.ba/protected-areas.html>; UNEP/GEF project Achieving Biodiversity Conservation through Creation, Effective Management and Spatial Designation of Protected Areas and Capacity Building.

Note: Category is according to the Law on Nature Protection in the entities.

The project Establishment of the Emerald Network in Bosnia and Herzegovina (December 2004–January 2006) was launched with the signing of the agreement between the representatives of the Council of Europe and the Centre for Ecology and Natural Resources. It was a pilot project aimed at strengthening training and methodology development tools at the national level. However, the project has not resulted in the establishment of the Emerald Network in Bosnia and Herzegovina.

As shown by scientific research and reference indicators, Bosnia and Herzegovina is extremely rich in biological diversity and loss of habitat is caused by a broad spectrum of anthropogenic factors. The conversion of habitat (change in purpose) is recognized as one of the major drivers of biological diversity loss.

Pressures and threats by anthropogenic activities on the primary types of habitats (forests, vegetation habitats in the crevices of rocks, dominantly represented in relict-refugial ecosystems of canyons and gorges, wetland vegetation types – alpine mires, alluvium and estuaries of rivers, karst fields) transform them into secondary- or tertiary-type habitats. For example, construction of infrastructure, roads, quarries, water reservoirs and irrigation systems affect habitats by their fragmentation, alteration and irreversible loss, which directly affects the populations of certain species. Excessive and uncontrolled exploitation of sand, gravel and other river materials leads to changes in the regime of surface water and groundwater, resulting in the destruction of habitats of plant and animal species in lower river courses, primarily of the Bosna and Drina Rivers, and in some parts of the Sava River, Vrbas River and other rivers. These interventions have a large impact on the

environment in general, while, in terms of habitat destruction, river sandbanks, steep banks, river islands, river branches and other river flow elements are lost. In addition, fertile agricultural lands with agribiological diversity are threatened nowadays due to the process of urbanization and conversion into construction land. Adoption and implementation of planning documents at all levels in Bosnia and Herzegovina has been slow, leading to uncontrolled urbanization and fragmentation and loss of agricultural, forest, wetland and other habitats.

11.4 Performance and gaps in biodiversity monitoring networks

No biodiversity monitoring system is in place to provide quality data on the status of biodiversity in the country. The country does not have an institution tasked to monitor the state of biodiversity, while the entities lack capacities to establish their own monitoring systems stipulated in their respective Law on Nature Protection.

According to the Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina 2015–2020, the existing protected areas do not fully implement the system of protection, monitoring and sustainable use. The reason for this lies in the lack of budgetary allocations, inadequate structure of employees, lack of management plans, failure to appoint the institution responsible for the management of the protected areas, and the like. The budget allocations depend on the capacities to allocate funding by individual cantons in the Federation of Bosnia and Herzegovina and are not uniform, while for national parks the allocations are provided by the entity. In most cases, the budget allocations are used for salaries, running costs and maintenance.

A comprehensive information system as a key tool for effective monitoring and objective insight into the state of natural heritage is not developed. With such a system, further degradation of natural resources could be prevented and harmonization of development activities with biodiversity would be enabled. Planning of new protected areas, as well as infrastructure, in environmentally sensitive individual zones, does not take into account the visual identity and values of the landscape. No methodology is developed that would allow constant monitoring of conditions and changes in the protected areas and their surroundings, in particular for the purpose of increasing the size of protected areas.

There is a lack of professional institutions to be involved in all spheres involving the preservation, protection, monitoring and sustainable management of

protected areas. Local communities are not involved in all spheres of activity in a protected area. A more efficient system of long-term protection of the most valuable and most important natural areas characterized by a high degree of biological diversity, according to the existing environmental EU criteria and standards, is not established to ensure adequate protection of natural heritage.

11.5 Pressure on biodiversity

The inappropriate integration of land, water and biodiversity concerns into development planning has resulted in the emergence of threats of biodiversity loss. Data on biodiversity in Bosnia and Herzegovina are scarce, fragmented and often outdated. In spite of the country's rich biodiversity, international obligations and growing anthropogenic pressures, nature conservation efforts remain insufficient.

Unsustainable use of land and forests, habitat conversion, vegetation succession and invasive alien species, overexploitation of natural resources, waste mismanagement, inadequate fire protection, illegal hunting and fishing, and climate change are the major threats to biodiversity in Bosnia and Herzegovina.

Unprecedented rainfall in May 2013 resulted in the worst floods the region has seen in more than 100 years. In Bosnia and Herzegovina, these floods killed more than 20 people and displaced a further 90,000 and resulted in billions of dollars worth of damage across the region. The floods are estimated to have cost the country some 15 per cent of overall GDP in lost output and damages. The severe floods affected over one third of the country's territory in 2014.

The impacts of this flood were amplified by earlier weather events in the region, further exacerbating the negative effect they had on growth in 2014. A drought in the summer of 2012 and a severe winter that same year stymied the agriculture sector, reduced energy generation, hindered tourism and slowed construction more than usual around the region.

The severe impact these extreme events are having on economies in the region highlights the overall economic vulnerability of the whole region. Policymakers in the Balkans Region continue to explore options to help avoid or, at the very least, mitigate these shocks well.

The findings of the NBSAP revision process outline the following threats, which have been identified as having led to the decrease of populations in many species and reduction of coverage of priority habitats:

- Succession of habitats, due to depopulation of rural areas as a result of wartime destruction and economic changes on the one hand (abandonment of traditional modes of exploitation of meadows and pastures through mowing and grazing), and intensification of agricultural production on the other, threatens many habitats.
- Forest fires and floods are one of the root causes of modification of habitats, since the country is heavily affected by the consequences of climate change.
- Unsustainable/uncontrolled collection of wild plants and fungi species and illegal logging, as well as unsustainable hunting and fishing practices, are also contributing factors for biodiversity decline.
- Continual unplanned urbanization leads to direct uptake of habitats and disturbance of species and habitats on large parts of the country's territory.
- Surface water intake for energy production and irrigation has resulted in almost all rivers being under great direct and indirect anthropogenic pressures (e.g. reservoirs that have been built on some rivers); also, pollution of groundwater due to agricultural and forestry activities (widespread use of chemicals) threatens especially endogenic fauna and aquatic organisms.
- According to the First and Second National Communications of Bosnia and Herzegovina under the UNFCCC (2009, 2013), significant impacts of climate change are expected to occur on plants with habitats in mountainous areas of Bosnia and Herzegovina. The ecosystems situated in karst landscapes are also very vulnerable to climate change, and they are subjected to other intensive anthropogenic pressures at the same time. Among them, wetlands karst fields are particularly sensitive to the impacts of climate change.
- Through the UNCCD National Action Programme development for Bosnia and Herzegovina, land degradation has also been identified as a major threat to biodiversity, ecosystem stability and an array of socioeconomic segments. Because of the interconnectivity between ecosystems across scales, land degradation triggers destructive processes that can have cascading effects across the entire biosphere. Loss of biomass through vegetation clearance and increased soil erosion produces GHGs that contribute to global warming and climate change. Land degradation and desertification affects biodiversity and global climate change through soil and vegetation losses. Overexploitation of forests causes accelerated erosion, loss of soil, loss of water, biodiversity loss, and eventual

transformation of former forest ecosystems into steppe-desert area.

11.6 Legal, policy and institutional framework

Legal framework

Nature conservation in Bosnia and Herzegovina is regulated by the Law on Nature Protection in both entities and Brčko District. This area is regulated within a set of environmental laws, which, together with the conservation of nature, regulate protection of the environment, air, water and waste management, and provide for establishment of a fund for environmental protection. State laws related specifically to the environment do not exist.

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, biodiversity protection and the sustainable use of natural resources are governed by the Law on Nature Protection and Law on Environmental Protection. Relevant laws for the area of biodiversity in the Federation also include the Law on National Park "Una" (OG FBiH, No. 44/08) and the following secondary legislation:

- Regulation on Natura 2000;
- Rulebook on establishing a system of deliberate keeping and killing of protected animals (OG FBiH, No. 46/05);
- Rulebook on establishing and managing an information system for protecting nature and monitoring (OG FBiH, No. 46/05);
- Rulebook on the contents and manner of drafting protected area management plans (OG FBiH, No. 65/06);
- Rulebook on new measures for research and preservation for the purpose of preventing negative impact on animal species either by capture or killing (OG FBiH, No. 65/06);
- Rulebook on the contents and manner of maintaining registries of protected areas (OG FBiH, No. 15/06);
- Rulebook on the requirements for accessing protected areas (OG FBiH, No. 15/06);
- Red List of Endangered Wild Species and Subspecies of Plants, Animals and Fungi.

The 10 cantons of the Federation are adopting their own laws on nature protection in accordance with the Law on Nature Protection of the Federation of Bosnia and Herzegovina; the tasks of nature protection in the canton shall be carried out by the cantonal ministry responsible for environmental protection. Furthermore, each canton shall prepare a nature

protection plan for the respective area, a proposal for declaration of a landscape or natural monument as a protected area shall be carried out by the cantonal ministry, and a regulation on proclamation of the protected area established in paragraph 2 of this article shall be adopted by the cantonal legislator.

Republika Srpska

In Republika Srpska, nature conservation is regulated by the Law on Nature Protection and the Law on Environmental Protection. In addition, laws on national parks, i.e. the Law on National Parks, Law on National Park "Kozara", Law on National Park "Sutjeska" and Law on National Park "Drina" (OG RS, No. 63/17), have direct relevance for nature protection. Relevant secondary legislation is as follows:

- Rulebook on establishing a monitoring system for deliberate keeping and killing of protected animals (OG RS, No. 85/05);
- Rulebook on establishing and managing an information system for protecting nature and monitoring (OG RS, No. 85/05);
- Rulebook on official uniform, authorization and use of service weapon by the Surveillance Service in national parks (OG RS, No. 83/11);
- Rulebook on interior ordinance in national parks (OG RS, No. 83/11);
- Rulebook on the Register of Protected Natural Resources (OG RS, No. 55/15);
- Regulation on the Red List of Endangered Species of Flora and Fauna of Republika Srpska (OG RS, No. 124/12);
- Rulebook on the contents, establishment and enforcement of the management measures in protected areas (OG RS, No. 83/15);
- Rulebook on the nature protection label, procedures and conditions for its use (OG RS, No. 50/16);
- Rulebook on special technical-technological solutions to enable undisturbed movement and safe communication of wild animals (OG RS, No. 66/17).

Brčko District

The basic set of environmental laws in Brčko District was adopted in June 2004; the Law on Nature Protection (OG BD, No. 24/04, 1/05, 19/07, 9/09) is related to biodiversity.

Policy framework

Biodiversity conservation and protected areas are being increasingly recognized as one of the top

national priorities in the updated national environmental legislation and several recent national strategic documents, such as the 2012 State of the Environment Report, National Environmental Action Plan (NEAP), environmental protection strategies of the two entities and the NBSAP.

Specifically, biodiversity conservation through the creation of protected areas has been identified as a priority in the 2003 NEAP, as well as the NBSAP. The NEAP foresees the total coverage of protected areas to reach 15–20 per cent of the national territory; the existing NBSAP identifies specific actions by 2018, identifying an increase in protected areas, the mainstreaming of biodiversity into other sectorial plans and mapping of biodiversity-rich areas. Both the 2017 NBSAP (2015–2020) and the 2014 Fifth National Report to the CBD specifically mention the need for enhanced biodiversity management in the country. The Fifth National Report to the CBD, for example, praises initial attempts by the conservation authorities in Bosnia and Herzegovina to list endangered plant and animal species and emphasises "the importance of spatial protection of valuable ecosystems and sites and finding the most appropriate regimen of protection".

One of the targets in the revised NBSAP, "By 2016, specific biological diversity of Bosnia and Herzegovina (canyon, upland, high mountain and marshland ecosystems, karst fields and alluvial plains) mapped and protected in accordance with the spatial documents in effect", has now been prolonged until 2020. This target aims to achieve Aichi Target 11 – expansion of protected area networks and effective management. The Spatial Plan of the Federation of Bosnia and Herzegovina for the period 2008–2028 (not yet adopted) incorporates a provision on protecting a total of 18.06 per cent of the entity's territory by 2028, while the Spatial Plan of Republika Srpska adopted in 2015 sets 15.51 per cent of protected areas in this entity as the target for 2025.

The obligations under the CBD are regularly met and provide the basis for the general information on the biodiversity status of the country. The 2017 NBSAP has been created in line with the Strategic Plan 2011–2020 of the CBD. The updated NBSAP has been adopted at the entity level and by the Council of Ministers of Bosnia and Herzegovina in May 2017 and sets key national biodiversity targets for the set period (box 11.1). Bosnia and Herzegovina also adopted the Action Programme to Combat Land Degradation and Mitigate the Effects of Drought in Bosnia and Herzegovina. This is a product of a multisectoral approach to the issue and a key instrument in national implementation of the Convention to Combat

Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD).

Sustainable Development Goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis relevant targets is described in box 11.2.

Box 11.1: National targets for biological diversity

GLOBAL STRATEGIC GOAL A: Address the underlying causes of biological diversity loss by mainstreaming biological diversity across government and society

1. By 2020, increase the public awareness level in the field of biological diversity protection.
2. By 2020, integrate biological diversity values into development strategies and strategic plans, with an emphasis on rural development.
3. By 2020, reduce negative and increase positive incentives and subsidies in order to conserve biological diversity.
4. By 2019, prepare and adopt plans for sustainable production and consumption of natural resources.

GLOBAL STRATEGIC GOAL B: Reduce the direct pressures on biological diversity and promote sustainable use

5. By 2020, prepare and implement sustainable management programmes for all fishing waters (fisheries basis).
6. By 2019, prepare and implement strategies for development of aquaculture and ranching of commercially significant fish species (for water ecosystems that are not habitats for rare and endemic species).
7. By 2020, certify all state-owned forests in Bosnia and Herzegovina.
8. By 2020, establish and develop a system for sustainable agricultural production, especially organic and integrated production, and conservation and breeding of indigenous species.
9. By 2020, establish a system for treatment of industrial and utility wastewaters and monitoring of pesticide and fertilizer consumption.
10. By 2018, prepare strategies for invasive species.

GLOBAL STRATEGIC GOAL C: Improve the state of biological diversity by safeguarding ecosystems, species and genetic diversity

11. By 2020, map and urgently protect the specific biological diversity of Bosnia and Herzegovina (canyon, mountain, alpine and wetland ecosystems, karst fields and alluvial plains) in compliance with the applicable spatial planning documents.
12. By 2020, complete the inventory of: (i) flora, fauna and fungi in Bosnia and Herzegovina; (ii) ecosystems and types of habitats in Bosnia and Herzegovina.
13. By 2020, develop the red books of plants, animals and fungi, and adopt action plans for protection of the most endangered taxa.
14. By 2020, prepare and implement in situ and ex situ programmes for protection of domestic varieties, breeds and their animal relatives, including their inventory and establishment of indigeneity parameters.

GLOBAL STRATEGIC GOAL D: Enhance the benefits to all from biological diversity and ecosystem services

15. By 2020, map and evaluate the benefits from forest, agricultural and water ecosystems, and strengthen the environmental permit mechanism and supervisory inspection within protected area spaces, areas of special interest and areas from the Natura 2000 ecological network plan.
16. By 2020, restore 30 strip-mine lakes into wetland habitats, increase the productivity of all categories of forests, preserve the existing area of flood alder and willow forests, and increase the regulated urban green areas by 20 per cent.
17. By 2018, prepare the legislation and establish the conditions for ratification and implementation of the Nagoya Protocol.

GLOBAL STRATEGIC GOAL E: Enhance implementation through participatory planning, knowledge management and capacity-building

18. By 2017, establish centres for preservation and implementation of traditional knowledge and practices, particularly in rural areas of interest.
19. By 2020, strengthen the role of the scientific research and professional institutions, NGO sector and media, including improvement of scientific technologies.
20. By 2017, prepare and adopt the strategy for mobilization of financial resources for conservation of biological diversity.
21. By 2020, establish and strengthen cooperation for improved protection and sustainable use of biological diversity in the countries of the Western Balkans.



Box 11.2: Targets 2.5, 6.6, 11.4, 14.2, 14.5 and targets under Goal 15 of the 2030 Agenda for Sustainable Development

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Target 2.5: By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

Progress achieved in terms of conservation of genetic diversity is primarily reflected in introducing the topic in various strategic documents on agriculture development and protection of biological diversity. The Medium Term Agricultural Sector Strategy for the Federation of Bosnia and Herzegovina (2015–2019) and the Strategic Plan for Rural Development of Republika Srpska (2016–2020) propose an increase in incentives and subsidies for organic and integrated production such as on-farm and ex situ collection of autochthonous cultivars for plant propagation, as well as to adopt the List of autochthonous and native breeds and the Catalogue of recognized breeds or hybrids. The Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina 2015–2020 (NBSAP) also lists measures related to genetic diversity.

While the entities took some steps to support the implementation of Target 2.5, Bosnia and Herzegovina should implement measures relevant to Target 2.5, as recommended by the NBSAP. These measures include: identifying and evaluating the state of existing indigenous genetic resources, improving existing and drafting new laws and by-laws dealing with genetic resources issues, drafting and implementing programmes for sustainable use of genetic resources, favouring agricultural practice based on breeding of indigenous domesticated plant varieties and breeds of domestic animals, and creating the in situ and ex situ protection of endangered species.

Goal 6: Ensure availability and sustainable management of water and sanitation for all

Target 6.6: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

Target 16 of the NBSAP is to restore 30 strip-mine lakes into wetland habitats, increase the productivity of all categories of forests, preserve the existing area of flood alder and willow forests and increase the regulated urban green areas by 20 per cent by 2020. Target 9 of the NBSAP proposes that, by 2020, it is necessary to establish a system for treatment of industrial and utility wastewater and monitoring of pesticide and fertilizer consumption.

By implementing Targets 9 and 16 of the NBSAP, Bosnia and Herzegovina would implement Target 16.6.

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage

In terms of natural heritage, Target 11 of the NBSAP is to map and urgently protect the specific biological diversity of Bosnia and Herzegovina (canyon, mountain, alpine and wetland ecosystems, karst fields and alluvial plains) in compliance with the applicable spatial planning documents, by 2020. The Spatial Plan of the Federation of Bosnia and Herzegovina for the period 2008–2028 (not yet adopted) incorporates a provision to protect a total of 18.06 per cent of the entity's territory by 2028, while the Spatial Plan of Republika Srpska sets 15.51 per cent of protected areas in this entity as the target for 2025. Significant efforts should be made by both entities to achieve this national biodiversity target and preserve the exceptional natural world of Bosnia and Herzegovina.

Regarding cultural heritage, Bosnia and Herzegovina has been party to the UNESCO World Heritage Convention since 1993; it has three inscribed monuments and eight on the tentative list. The National Commission for UNESCO of Bosnia and Herzegovina should continue efforts to safeguard the rich cultural and historical heritage of the country.

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Target 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

Target 14.5: By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

As for the marine ichthiofauna, there are no data on qualitative-quantitative composition and distribution, nor studies of marine ichthiofauna in Bosnia and Herzegovina (the coastal area of Neum-Klek Bay) recently carried out. The lack of a law on marine fishing that would regulate exploitation and conservation of this very important natural resource and of coastal and marine strategy stands out as a special problem. The ongoing UNEP/GEF project Achieving Biodiversity Conservation through Creation, Effective Management and Spatial Designation of Protected Areas and Capacity Building (2017–2019) will enable conditions for the establishment of a botanical reserve "Mediterranetum" in the area of Neum-Klek Bay, which would be the first marine protected area in the country.

Bosnia and Herzegovina should:

- (a) Adopt a law on marine fishing and a coastal and marine strategy, embedded into the macro-region's economies and societies, which will contribute to bolster the resilience of the coastal and marine socioecosystem in the face of existing and/or potential impacts of climate change, and to achieve Targets 14.2 and 14.5;
- (b) Implement Target 15 of the NBSAP.

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

Although the percentage of the territory under some regime of protection is considerably smaller than those at the European and regional levels, there is some progress towards this target, which, in addition to the existing protected areas, is also reflected in the designation of new ones. For example, the current project Achieving Biodiversity Conservation through Creation, Effective Management and Spatial Designation of Protected Areas and Capacity Building (2017–2019), conducted by UNEP and Bosnia and Herzegovina governmental partners, should expand the country's protected areas coverage by some 5 per cent of the total national territory, trebling the existing area under protection to about 101,000 ha.

Target 15 of the NBSAP is to map and evaluate the benefits from forest, agricultural and water ecosystems, and strengthen the environmental permit mechanism and supervisory inspection within protected areas, areas of special interest and areas from the Natura 2000 ecological network plan, by 2020.

Bosnia and Herzegovina should implement Target 15 of the NBSAP.

Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

The mere fact that forests cover 2,709,769 ha, or about 53 per cent of the total land area of Bosnia and Herzegovina, indicates their importance in providing multiple benefits to the broader community. According to the Action Programme to Combat Land Degradation and Mitigate the Effects of Drought in Bosnia and Herzegovina and the CORINE 2006 database, forest areas have been reduced by 1,352.22 ha (3.88 per cent). The biggest reduction, of 946.42 ha, is related to transition of forest areas into group class Artificial Surfaces, in the process of which 521.97 ha of broad-leaf forest (311) area was lost. Development of the forestry programme is currently underway in the Federation of Bosnia and Herzegovina. The forestry programme has been adopted by the Government of the Federation of Bosnia and Herzegovina and subsequently sent to the Parliament of the Federation of Bosnia and Herzegovina for adoption. In 2012, Republika Srpska adopted the Forestry Development Strategy (2010–2020). The legal framework consists of the Law on Forests in Republika Srpska and Law on Forests in Brčko District; however, in the Federation of Bosnia and Herzegovina, the law failed. In July 2017, the Government of the Federation of Bosnia and Herzegovina adopted the proposed new law on forests, which has been forwarded to the Parliament for a second hearing.

The 2015 Donor Management Report emphasizes the necessity of preparation of sustainable forest management plans and establishment of fire management systems, which, among other topics, includes the means for fire prevention and firefighting. According to the Report of the Agency for Statistics, total damage from fire in the period 2008–2013 was 1,203,393 m³.

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina should speed up the forest management programme and promote its adoption by the Parliament of the Federation of Bosnia and Herzegovina.

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Forestry and Water Management of Republika Srpska and the Department of Spatial Planning and Property Issues of Brčko District should prepare sustainable forest management plans and establish fire management systems.

Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

A number of significant aspects of economic development affect the land degradation in Bosnia and Herzegovina, the most important being agriculture, industry, forest management, the energy sector, urbanization and traffic. In the forest management context, FSC certification of all publicly owned forests has been achieved in Republika Srpska on the territory of 23 forest estates. In the Federation of Bosnia and Herzegovina, the certification process for publicly owned forests in accordance with these standards has been completed only in some cantons.

Bosnia and Herzegovina has achieved some progress in the implementation of EU Directive 2008/1/EC (IPPC Directive), especially in terms of issuing environmental permits in the industrial sector. The PRTR has been introduced in the Federation of Bosnia and Herzegovina, but Republika Srpska still lacks a PRTR and does not issue environmental permits to industrial enterprises based on PRTR-collected pollution data.

In the field of urbanization, it is necessary, in the process of passing the Spatial and Regulation Plans, to take into consideration the aspect of land conservation and protection and to harmonize the new and current Regulation Plans with the Spatial Plans.

Target 15.4: By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development

The Spatial Plan of the Federation of Bosnia and Herzegovina for the period 2008–2028 stipulates the establishment of 14 new protected areas with a total spatial coverage of about 4,488 km² (18.5 per cent of the entity's territory), of which 4240.96 km is in mountainous areas. The Spatial Plan of Republika Srpska sets 15.51 per cent of protected areas as the target for

2025 and a significant portion of this is mountainous. Two of the three national parks in Bosnia and Herzegovina, Sutjeska (16052.34 ha) and Kozara (3907.54 ha), are mostly mountain ecosystems. The country should continue with efforts to protect its Key Biodiversity Areas, many of which are mountainous, and pay special attention to the severe impacts of climate change on the mountain ecosystems.

Target 15.6: Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed

Given the importance of cross-border movement and use of genetic resources of Bosnia and Herzegovina, and the commercial and/or any other type of profit arising from this, Bosnia and Herzegovina did not ratify the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD. The ratification process has been stalled since 2014 due to political disagreements between entity governments.

Following the objective of Target 17 of the NBSAP, Bosnia and Herzegovina should prepare the legislation and establish the conditions for ratification and implementation of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD.

Target 15.7: Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products

In 2009, Bosnia and Herzegovina acceded to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Nevertheless, implementation is lagging. There is a lack of relevant regulations and competent authorities are not designated.

Bosnia and Herzegovina should take further steps to enforce CITES by adopting several regulations, such as lists of threatened and protected wild species, and the manner and procedure of issuance of permits by customs authorities and other competent bodies, and by nominating relevant authorities.

Target 15.8: By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species

Bosnia and Herzegovina's progress towards this target is partial since the lists of present invasive species have not been published, but there are some relevant decisions and action plans at the entity level on monitoring, control and reduction of the negative effects of some of these species, primarily those that exert harmful effects on human health. Target 10 of the NBSAP is to prepare strategies related to invasive species by 2018.

To implement Target 15.8 and Target 15 of the NBSAP, Bosnia and Herzegovina should prepare strategies related to invasive species, which include the identification of species and populations of invasive animals, plants and fungi, and formation of databases, preparation of strategy for invasive species and formation of the system for monitoring and definition of methods for control of the spread of invasive species.

Target 15.9: By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

Bosnia and Herzegovina has adopted the Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina 2015–2020 and the Action Programme to Combat Land Degradation and Mitigate the Effects of Drought in Bosnia and Herzegovina. Republika Srpska has adopted the Strategy of Nature Protection, Strategy on Waste Management for the period 2017–2026 and Air Protection Strategy. The Federation of Bosnia and Herzegovina has the Environmental Protection Strategy for the period 2008–2018 that comprises the Strategy on Nature Protection, Waste Management Strategy, Air Protection Strategy and Water Protection Strategy. In addition, Republika Srpska has a draft version of the Forestry Development Strategy 2010–2020. Integration of biodiversity is present in the Spatial Plans of the Federation of Bosnia and Herzegovina and Republika Srpska as well as of local communities.

Target 2 of the NBSAP is to integrate biological diversity values into development strategies and strategic plans, with an emphasis on rural development by 2020.

To start fulfilling the implementation of Target 2 of the NBSAP, Bosnia and Herzegovina should prepare the Study on Economics of Ecosystems and Biodiversity and harmonize the existing and new development strategies, including poverty reduction, with national biological diversity targets, and integrate national biological diversity targets into existing and new spatial plans.

Target 15.a: Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

In Bosnia and Herzegovina, the entities' environmental funds are regulated by the Law on the Environmental Protection Fund of the Federation of Bosnia and Herzegovina and the Law on the Fund and Financing of Environmental Protection of Republika Srpska and by other by-laws.

In addition to these Funds, funds from international donors have been used in Bosnia and Herzegovina, and a portion of these is directed towards the goal of biological diversity conservation. Currently, there is no formalized donor coordination

mechanism. International donors have funded the implementation of projects in the area of environmental protection, agriculture and forestry, which also include in part the area of biological diversity protection, but there are no accurate figures on how much money was invested/earmarked exclusively for this domain.

Donor members active in the environmental/climate action sector are Sweden/SISA, Japan/JICA, the EU, the USA/USAID, UNEP, UNDP, the World Bank, the UK, Norway, Slovenia, the Czech Republic, Hungary, UNICEF, Croatia, Germany, Italy, the EBRD, the Danish Emergency Management Agency (DEMA), Save the Children, Global Environment Fund (GEF), Western Balkans Investment Framework (WBIF), Special Climate Change Fund (SCCF) and OSCE.

Target 20 of the NBSAP is about the preparation of the strategy for mobilization of financial resources by 2017.

To implement Target 15.a and Target 20 of the NBSAP, Bosnia and Herzegovina should prepare a strategy for mobilization of financial resources, which would allow the establishment and expansion of financial flows to support the conservation of biological diversity in Bosnia and Herzegovina.

Institutional framework

At the state level, there is no institution dealing with the environment, including conservation of biodiversity.

In the Federation of Bosnia and Herzegovina, the Ministry of Environment and Tourism has some competences relating to biodiversity protection and protected areas management. It is also the designated State Institution of Bosnia and Herzegovina (National Focal Point) for the CBD. Furthermore, it drafts and proposes spatial plans, primary and secondary legislation and has the competence for the IUCN protected area Categories I and II. The Ministry of Spatial Planning and the Ministry of Agriculture, Water Management and Forestry also have some environmental competences, including spatial planning of protected areas. Although envisioned in the newly adopted Law on Nature Protection of the Federation of Bosnia and Herzegovina, the institute for nature protection has not been established yet.

In Republika Srpska, the Ministry of Spatial Planning, Civil Engineering and Ecology has some competences related to biodiversity protection and protected areas management. It drafts and proposes spatial plans, primary and secondary legislation and has the competence for the IUCN protected area Categories I and II. The Ministry of Agriculture, Forestry and Water Management addresses strategies, policies, standards and regulations within its competence (in the areas of agriculture, forestry and water management). Republika Srpska hosts the only government expert institution dealing with nature conservation in the country, the Institute for the Protection of Cultural, Historical and Natural Heritage of Republika Srpska, operating under the Ministry of Education of Republika Srpska.

The jurisdiction over the designation of protected areas in the Federation of Bosnia and Herzegovina is

regulated between the cantons and the Federation by their respective parliaments. In Republika Srpska, expert tasks involving the protection of nature and natural resources are performed by the Institute for Protection of Cultural, Historical and Natural Heritage of Republika Srpska, which develops the Expert Base, i.e. the Study for Protection of the Protected Area, based on which an act designating the protected area is passed. If protected areas are located in the area of both entities (which has not yet happened), the proposal for protection is to be provided by the two responsible entity ministries, in accordance with Inter-Entity Environmental Protection Programme.

The complex political organization of the country is one of the main reasons for a lack of coordination and delivery among the institutions dealing with nature conservation in Bosnia and Herzegovina.

According to the NBSAP 2015–2020, one of the most prominent problems encountered in attempting to address the issue of management of social trends and resources in Bosnia and Herzegovina is the issue of coordination. It includes the organization of the management structure, a complex scheme of jurisdictions granted to administrative structures at different levels, and the issue of political will for joint actions within the country's borders. Problems in the management of biological diversity are multiplied because it is not only about the protection of nature and special natural values (for which entity ministries of environment have responsibility), but that there are no mechanisms for the sustainable use of biological diversity. The domain of biological diversity management delves deep into the economic and commercial sectors, such as forestry, agriculture, water management, energy and others. Bosnia and Herzegovina is also facing a problem of coordination in nature management: horizontal (linking with the sectors) and vertical (coordination of work at different levels).

Photo 11: Traditional hay storage in rural areas

11.7 Participation in international agreements and processes

Although Bosnia and Herzegovina is party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, there is an evident lack of legislation and implementation mechanisms concerning protection of the wildlife and prevention of illegal logging, which goes hand in hand with poor understanding of this issue by legislators, judicial institutions and law enforcement agencies. This unregulated system contributes to other negative causes and consequences, such as corruption, degradation of the environment and the misbehaviour of certain parts of the community, which further worsens the situation.

The country's participation in the CBD processes has been strong and all obligations to date have been completed, mostly with the support of United Nations agencies. However, failure to ratify the Nagoya Protocol due to political disagreements casts some negative light on this record.

11.8 Assessment, conclusion and recommendations

Assessment

Organizations/institutions/individuals with an interest in the preservation and protection of biodiversity in

Bosnia and Herzegovina, and which participated in the NBSAP revision process, identified the following root causes of biodiversity loss in Bosnia and Herzegovina: low awareness about the benefits of nature conservation, lack of evidence-based decision-making, insufficient harmonization among stakeholders and different levels of governance in the country, lack of economic instruments for protected areas and scarce human and financial resources for nature conservation. In addition, the country has been in a socioeconomic and political transition, coping with high rates of poverty.

Socioeconomic challenges, such as unemployment and poverty, have resulted in communities focusing on immediate economic priorities rather than environmental issues, including biodiversity. Thus, biodiversity conservation is not seen as a national priority. Although, in the long run, biodiversity used in a sustainable manner can contribute to economic growth and poverty alleviation, it is now being used mostly as a source of resource exploitation.

There is a lack, at all administrative levels, of the capacity and resources necessary for implementation of biodiversity conservation measures. Threats to biodiversity come not only from biological and physical processes but also from institutional issues. Conservation authorities are understaffed and there is an evident lack of financial resources to implement relevant legislation and other tasks, including

planning, establishment and supervision of protected areas.

Missing or inadequate conservation measures were identified as one of the greatest issues in biodiversity conservation in Bosnia and Herzegovina. Inadequate mainstreaming of the available, constrained financial resources and human capacity is evident. Foremost in this problem is the failure to adequately value biodiversity in decision-making, and this is exacerbated by shortcomings in knowledge of biodiversity and the lack of commitment and capacity to manage ongoing threats.

There is insufficient harmonization of legislation and strategic documents relating to biodiversity conservation. As biodiversity conservation is a true cross-cutting issue, one of the major obstacles is mainstreaming it into the array of economic sectors. There is overlapping of responsibilities/competences concerning the use of wild species and issuance of permits and fees collection between different institutions, while some key roles are lacking in the institutional framework (i.e. a nature protection agency in the Federation of Bosnia and Herzegovina).

There is no coordinated/adjusted policy framework. This results in poor coordination among sectoral strategies, the overlapping of existing relevant legislation (nature, spatial planning, forestry), and imprecise and overlapping legislation regulating the use of space and natural resources at the different levels of governance in the country (state, entity, cantonal, municipal). Most of the planned secondary legislation for the area of biological diversity exists, but most of the actions these acts provide for have not been implemented. As one example, the Rulebook on establishing and managing an information system for protecting nature and monitoring has been adopted but the information system and biodiversity monitoring do not exist. Furthermore, the following operational objectives are defined in the Environmental Protection Strategy of the Federation of Bosnia and Herzegovina for the period 2008–2018 in order to enable protection of biological diversity, by:

- Establishing a federal institution responsible for the protection of biological and geological diversity;
- Inventorying species of flora, fauna and fungi and identifying habitat types;
- Assessing the vulnerability of species of flora, fauna and fungi, and habitats and living communities, in accordance with IUCN;
- Establishing a sustainable network of existing and new protected areas;
- Strengthening legislation;

- Monitoring and controlling invasive species;
- Establishing ex situ conservation;
- Monitoring the state of biological diversity;
- Developing and strengthening the CHM;
- Strengthening information technology services and providers;
- Strengthening inter- and intra-entity cooperation;
- Raising public awareness.

These objectives are awaiting actions to be implemented for their realization.

The lack of institutional capacity was identified as a root cause of inadequate biodiversity conservation. Sometimes, implementation of developed policy documents and/or guidelines is delayed due to the lack of capacity of relevant institutions for their implementation and enforcement. The establishment of new protected areas was also hindered by this barrier and low political interest in conservation policy and measures.

There is also a lack of inclusive approaches and information sharing in protected area planning and management. Local communities are given a strong role in the decision-making process when it comes to spatial designation of protected areas in Bosnia and Herzegovina – which is why very low awareness about the importance of nature conservation and the modalities of protected area governance and benefit sharing is a troublesome issue, especially in expanding the protected area network.

One of the major barriers to nature conservation in the country is a widespread lack of awareness regarding biodiversity issues among the population. In particular, knowledge and awareness about biodiversity values and protected areas, as well as sustainable use of resources, is rather limited. The general opinion that any activity is forbidden within protected areas still exists in some parts of the country; thus, general resistance towards the establishment of new protected areas still exists among local communities. In addition, there is insufficient awareness about the values of protected areas and the ecosystem services they provide. Information sharing is extremely limited and data on biodiversity is scattered among several academic institutions.

Conclusion and recommendations

National biodiversity targets

There has not been progress in terms of biodiversity since 2011, apart from the improvements to the legal framework. The Law on the Fund and Financing of Environmental Protection of Republika Srpska, Law

on Nature Protection of the Federation of Bosnia and Herzegovina, and Law on Nature Protection of Republika Srpska were revised and the NBSAP was adopted. Progress in collecting environmental data and reporting on the state of biodiversity remains hindered. Budgetary allocations for nature conservation and biodiversity monitoring are low and insufficient for proper conservation measures. Public involvement and interest in the matters of nature conservation is sporadic and often misguided when it comes to local communities' understanding of and support for establishing new protected areas on their territory. Nonetheless, the number of protected areas in the country is slowly increasing, as nature conservation is being recognized in the adopted spatial planning documents and several projects aimed at increasing the national protected area network in Bosnia and Herzegovina.

The current capacities for the implementation of the CBD and the development of legislation in line with EU requirements are not sufficient. In addition, there is an evident lack of infrastructure and institutional support (centres, institutes, agencies and public administration bodies) for adequate protection and sustainable management of biological diversity. Institutions lack cooperation and networking. A framework for the implementation of environmental conventions is not functional. Since 1954 in Bosnia and Herzegovina, there have been 153 areas that belong to one of the protection levels, including protected landscapes, monuments of nature or protected habitats (e.g. forest seed components). However, the classification and registration of these areas are still not in line with the new legislation.

Recommendation 11.1:

The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska and the Government of Brčko District should uphold adopted national biodiversity targets as key strategic goals for the country with regards to conservation and support their timely implementation at all relevant administrative levels.

Institutional framework

In order to achieve the CBD targets and the targets arising from the NBSAP (2015–2020), it is necessary to take actions to address the issues of lack of capacity and inefficient coordination of relevant competent institutions. In this context, it is necessary to place focus on certain priority issues, such as strengthening scientific and technical research in the domain of

nature protection, according to the priority issues, and the creation of databases.

Recommendation 11.2:

- (a) *The Government of the Federation of Bosnia and Herzegovina should establish an institute on nature protection to deal with tasks related to biodiversity and protected areas in order to reach the protected areas coverage targets set by the Spatial Plan of the Federation;*
- (b) *The Government of Republika Srpska should strengthen the capacities of the Institute for Protection of Cultural, Historical and Natural Heritage in terms of staffing and budgetary allocations in order to reach the protected areas coverage targets set by the Spatial Plan of Republika Srpska.*

Recommendation 11.3:

The Governments of the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District, in collaboration with the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, should:

- (a) *Formalize the cooperation of the institutions dealing with tasks related to biodiversity and protected areas on sharing biodiversity data and linking relevant databases (i.e. protected area registers) to enable effective international reporting and national monitoring of biodiversity;*
- (b) *Ensure the inclusion of biological diversity concerns in policies of the economic sectors at the highest level of management, and the initiation of coordination activities among the different levels of management, in order to achieve the national targets set out in the National Biodiversity Strategy and Action Plan for the period 2015–2020.*

Natura 2000

Major concerns related to the decision-making process are lack of data, unavailability of existing data, lack of integration and application of various data classification and processing criteria, depending on various sources, poor data quality (in some cases, illogicalities and contradictions in the data collected) and lack of an adequate database.

The 2008 EU IPA project Support to Implementation of the Birds and Habitats Directives in Bosnia and Herzegovina (2012–2015) came up with a database compiling the distribution of species of habitats in the selected 122 potential Natura 2000 sites and their conservation status. The database is not made

available publicly. The database is currently based in and under the ownership of the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, and even though it is regarded as functional, it is not operational due to political disputes over centralized databases like this one.

Recommendation 11.4:

The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, in cooperation with the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska and the Government of Brčko District, should make available the database compiling the distribution of species of habitats in the selected 122 potential Natura 2000 sites and their conservation status to the conservation authorities and academia.

Nagoya Protocol

Although necessary preparation work was completed in 2014, Bosnia and Herzegovina's accession to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization is still pending.

Recommendation 11.5:

The Ministry of Foreign Trade and Economic Relation of Bosnia and Herzegovina, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina and the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska should prioritize finalization of the process of ratification of the Nagoya Protocol to meet the country's obligations under the Convention on Biological Diversity.

Chapter 12

FORESTRY AND ENVIRONMENT

12.1 Current situation

Forests and forestlands are important natural resources in Bosnia and Herzegovina. The second National Forest Inventory (NFI), which was conducted between 2006 and 2009, provides the most up-to-date forest information. Forest cover has increased in recent years, especially since 2011. In 2011, the forest and forestland area in the Federation of Bosnia and Herzegovina was 1,172,974 ha and in Republika Srpska 982,893 ha. The second NFI shows that these areas have increased to 1,692,700 ha in the Federation of Bosnia and Herzegovina and 1,525,800 ha in Republika Srpska from 2006 to 2009 (table 12.1).

These recent data and increase in forest cover is acknowledged in the forestry policy and strategy documents of both entities. This increase of forests is linked to the change of methodology in the forest inventory from taxation to a statistical approach, and to the fact that the forest area has increased due to natural regeneration and natural reforestation in the abandoned land.

Forest structure

The current data show that forests cover 56.2 per cent (1,465,600 ha) of the entire territory of the Federation of Bosnia and Herzegovina (2,608,587 ha). Together with other wooded land, which includes shrubs, bare

land and other forestland, all forests and forestland areas constitute 64.89 per cent of the entity's territory. Of these forests, 1,028,700 ha or approximately 39.4 per cent can be classified as forests that are productive (table 12.1).

As for Republika Srpska, forests cover 57.87 per cent (1,426,000 ha) of the entire territory of the entity (2,464,100 ha) and, of these forests, 46 per cent are classified as productive forests.

The coppice forests amount to 596,600 ha or 40 per cent of all forests in the Federation of Bosnia and Herzegovina and 47 per cent in Republika Srpska.

A concern for forestry in Bosnia and Herzegovina is mined areas. In the Federation of Bosnia and Herzegovina, about 125,190 ha, or 10 per cent of all categories of forests and forestlands, are known or presumed to have been mined. The Forestry Development Strategy of Republika Srpska also indicates that 10 per cent of total forest area is affected by mined areas. The actual mined areas are probably slightly lower as much wider areas are demarcated as under mining for security reasons. These areas create safety and environmental problems and economic loss. Activities on demining forestland are progressing very slowly in relation to actual needs. Forests and forestland are not included among the priorities in the demining plans.

Table 12.1: Structure of forests and forestland by vegetation form, 2009

	Federation of Bosnia and Herzegovina (ha)	Republika Srpska (ha)	Brčko District (ha)	Bosnia and Herzegovina (ha)	%
1. High forests	869 000	773 300	10 100	1 652 400	51.1
2. Coppice forests	596 600	652 700	2 900	1 252 200	38.7
1+2. All forests	1 465 600	1 426 000	13 000	2 904 600	89.8
All available forests, productive character	1 028 700	1 132 600	11 400	2 172 700	68.5
3. Shrubs	92 100	38 500	-	130 600	4.0
4. Bare lands	126 900	60 300	-	187 200	5.8
3+4. Shrubs and bare lands	219 000	98 800	-	317 800	9.8
5. Other forestland	8 100	1 000	-	9 100	0.3
FAO* forests (1+2+3+5)	1 565 800	1 465 500	13 000	3 044 300	94.2
6. All forests and forestlands	1 692 700	1 525 800	13 000	3 231 500	100.0

Source: Preliminary data of second State Forest Inventory in Bosnia and Herzegovina, Ministry of Agriculture, Water Management and Forestry, Federation of Bosnia and Herzegovina, 2017.

Note: * Forests are defined according to FAO classification.

The forest in Bosnia and Herzegovina has a typical structure of forests in South-East Europe, which consists of high and coppice forests. Forests in Bosnia and Herzegovina comprise a large diversity of types, ranging from coastal Mediterranean forest to mountain forest. Coniferous forests are spread in the highlands, mixed forests in the mid altitudes, and broadleaf forests in low-level terrain.

In terms of forest types, broadleaf forest is predominant, accounting for 65.8 per cent of forests in the Federation of Bosnia and Herzegovina and 74.2 per cent in Republika Srpska (table 12.2).

Natural regeneration is dominant in the forests; merely 4.3 per cent of the forest stands are artificial stands, whereas naturally regenerated high forest (44.3 per cent) and coppice (29.7 per cent) are the dominating stand origin. The structure of state-owned forests is better than that of private forests, which could be seen by their lower share of coppices and higher share of high forest.

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, the total growing stock in the state-owned forests amounts to 161,294,352 m³ with conifers accounting for

62,058,507 m³ (approximately 38 per cent) and deciduous forests 99,235,845 m³ (62 per cent) (table 12.4). The average stock of all forests is 192.4 m³/ha, with high forests 243.3 m³/ha and coppice forests 85.2 m³/ha. Of all forests, high forests represent 86.4 per cent and coppice forests 13.6 per cent.

The total annual increment of forests is 4,418,953 m³ of which 1,875,274 m³ (around 42 per cent) are in conifers and 2,543,679 m³ in broadleaf (around 58 per cent). In high forests the average annual increment is 6.26 m³/ha, while the annual increment of coppice forests is 3.23 m³/ha (table 12.5). The average annual growth of forests is 5.27 m³/ha.

The total allowable cut for all forests amounts to 3,068,322 m³, of which 1,343,940 m³ (44 per cent) is in conifers and 1,724,382 m³ (around 56 per cent) in broadleaf. The allowable cut is mostly realized in the high forests, with an overall volume of 2,674,336 m³, around 87.2 per cent of the total cut.

The relationship between the annual increment and allowable cut shows that the annual allowable cut is 1,350,631 m³ less than the annual increment (69 per cent of the increment). Having an allowable cut that is less than the annual increment is positive in terms of providing better conservation of forest resources.

Table 12.2: High and coppice forests by softwood and hardwood, 2009

	Federation of Bosnia and Herzegovina		Republika Srpska		Bosnia and Herzegovina	
	(ha)	(%)	(ha)	(%)	(ha)	(%)
Broadleaf	964 400	65.8	1 058 700	74.2	2 035 600	70.1
Mixed forests	304 000	20.7	204 300	14.3	508 300	17.5
Coniferous	197 200	13.5	163 000	11.4	360 700	12.4
Total	1 465 600	100	1 426 000	100	2 904 600	100

Source: Preliminary data of second State Forest Inventory in Bosnia and Herzegovina, Ministry of Agriculture, Water Management and Forestry, Federation of Bosnia and Herzegovina.

Table 12.3: State-owned forest and forestlands in the Federation of Bosnia and Herzegovina, by forest category

Broad category	Area (ha)	%
High forests with natural regeneration	493 991	39.70
High degraded forests	15 925	1.30
Forest cultures	62 987	5.10
Total high forest	572 903	46.10
Coppice	265 413	21.30
Total under forest (overgrown forestland)	838 316	67.40
Forestland areas appropriate for afforestation	166 193	13.40
Forestland areas inappropriate for afforestation	113 299	9.10
Total for management	1 117 807	89.90
Under mines	125 190	10.10
Total	1 242 997	100.00

Source: Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, 2016.

Table 12.4: Growing stock in the Federation of Bosnia and Herzegovina, 2015

Category	Coniferous (m ³)	Broadleaf (m ³)	Total (m ³)	m ³ /ha	%
High forests	62 058 507	77 317 639	139 376 146	243.30	86.40
Coppice forests	0	21 918 206	21 918 206	85.20	13.60
Total	62 058 507	99 235 845	161 294 352	192.40	100.00

Source: Forest Office and Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, Information on Forest Management in 2015 and Plans for Management in 2016, 2015.

Table 12.5: Annual increment of forests in the Federation of Bosnia and Herzegovina, 2015

Category	Coniferous (m ³)	Broadleaf (m ³)	Total (m ³)	m ³ /ha	%
High forests	1 875 274	1 712 155	3 587 429	6.26	81.20
Coppice forests	0	831 524	831 524	3.23	18.80
Total	1 875 274	2 543 679	4 418 953	5.27	100.00

Source: Forest Office and Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, Information on Forest Management in 2015 and Plans for Management in 2016, 2015.

Republika Srpska

Due to different data processing methodologies, data on forests in Republika Srpska vary in different sources. Preliminary data of the second state forest inventory of Bosnia and Herzegovina gives 1,598,615 ha forest and forestland area in Republika Srpska, of which 1,384,530 ha is overgrown forestland. According to the Forestry Development Strategy, forest and forestland amounts to 1,282,412 ha. The Spatial Plan of Republika Srpska assumed that forest cover should be increased by approximately 300,000 ha according to the CORINA programme.

The Forest Cadastre provides information related to forests and forestry (table 12.6). The total surface of forest and forestland in Republika Srpska amounts to 1,302,384 ha. Data from 2015 show 1,002,055 ha of state-owned forest and forestland, of which 750,767 ha is overgrown forestland. Privately owned forest and forestland amounts to 300,329 ha, 23 per cent of which (291,407 ha) is overgrown land. The structure of state forests is better – high forests with natural regeneration account for 46.8 per cent of the state forest, but just 36 per cent of private forests. On the other hand, coppice forest makes up just 20.6 per cent of state forest, but 60.2 per cent of private forests.

Based on the Forest Cadastre data, the total growing stock of forests in Republika Srpska is 238,362,758 m³ (table 12.7). State-owned forests extend to 191,740,318 m³ or 80.4 per cent of the total forest stock, and private forests are estimated at about

46,622,440 m³, 19.6 per cent of the total forest stock. The total annual increment of state-owned forests is 5,167,966 m³, and of private forests 1,645,109 m³.

In 2015, total forest reserves in public forests in Republika Srpska increased to 191.74 million m³, compared with 188.20 million m³ in 2009. Private forest reserves were estimated at 42.8 million m³ in 2009, and 46.6 million m³ in 2015.

Large areas of degraded forests and coppices are the result of economic pressure, overcutting, unplanned work and illegal logging over a long period. The average volume increment of the forests in Republika Srpska is 6.9 m³/ha (2.8 per cent). Overall productivity is variable but, generally speaking, is lower than the production potential of specific forest habitats. State forests have a larger increment (about 2.7 m³/ha on average) than private forests.

Road forest density

One of the indicators of the intensity of forestry is the density of forest roads. Low density results in part of the forest resource being, in practical terms, out of reach for any kind of intervention: forest use, forest protection and silviculture. The average road density in the Federation of Bosnia and Herzegovina was 10.9 m/ha (in 2013) and 9.05 m/ha in Republika Srpska (in 2012). The average road density in Bosnia and Herzegovina is 9.97 m/ha. These densities are significantly below those in other European countries with a similar topography: Switzerland has 40 m/ha, Austria 36 m/ha, Germany 35 m/ha and France 26 m/ha.

Table 12.6: Forest and forestlands by forest category in Republika Srpska, 2015

Broad category	State forest		Private forest		Total	
	(ha)	(%)	(ha)	(%)	(ha)	(%)
Total	1 002 055	100.00	300 329	100.00	1 302 384	100.00
High forests with natural regeneration	469 167	46.80	108 248	36.00	577 415	44.30
High degraded forests	19 610	2.00	1 525	0.50	21 135	1.60
Forest cultures	55 347	5.50	974	0.30	56 321	4.30
Coppices	206 642	20.60	180 660	60.20	387 302	29.70
Areas appropriate for afforestation and management	168 851	16.90	7 353	2.40	176 204	13.50
Areas inappropriate for afforestation and management	63 108	6.30	1 569	0.50	64 677	5.00
Usurpation	19 330	1.90	0	0.00	19 330	1.50

Source: Forest Cadastre, Public Enterprise "Šume Republike Srpske", 2015.

Table 12.7: Forest growing stock and increments in Republika Srpska, m³

	State forest		Private forest		Total	
	stock	Increment	stock	Increment	stock	Increment
High forests with natural regeneration	156 585 970	3 811 691	24 136 154	756 851	180 722 124	4 568 542
High degraded forests	3 767 393	79 792	236 439	6 865	4 003 832	86 657
Forest cultures	8 650 729	471 811	141 324	7 062	8 792 053	478 873
Coppices	22 736 226	804 672	22 108 523	874 331	44 844 749	1 679 003
Total	191 740 318	5 167 966	46 622 440	1 645 109	238 362 758	6 813 075

Source: Forest Cadastre, Public Enterprise "Šume Republike Srpske", 2015.

Forest fires

Forest fires are a common occurrence in Bosnia and Herzegovina and result in incalculable damage, despite the fact that this area is not in the category of high risk within the European framework. There were particularly frequent and catastrophic forest fires in 1999, 2000, 2003, 2007 and 2012. Direct damage includes loss of timber stock, ground vegetation and other forest products, and the costs of firefighting and remediation and recultivation of the burned area.

According to the report entitled Forest Fire Suppression in Bosnia and Herzegovina (Sarajevo, 2014), indirect damage is 10–17 times greater than direct damage and includes change of habitat and loss of all the diverse functions of forests. The degree of damage depends on the age and area of forest, tree species and vegetation, and the type of fire and its severity. Areas differ in their vulnerability to forest fire. Fire inflicts maximum damage only on raised crops and young stands, which are completely destroyed only for a short time.

According to some unofficial sources, the main reasons for forest fires in Bosnia and Herzegovina are controlled burning (field clearing in spring and residual stubble burning in summer) and negligence when lighting fires in or near forests during hunting and recreational activities. There are some cases of

arson, but these are not proved as there is no official investigation or court verdict. Forest fires from natural causes are minimal. The data between 2010 and 2012 show that the number and area affected by fires tended to increase.

Federation of Bosnia and Herzegovina

Fire protection in the Federation of Bosnia and Herzegovina is organized through the cantonal administrations for forestry, forest management companies and the Directorate of Civil Protection at the cantonal level. It is implemented through annual plans to protect forests from fire, which include basic information on forests, risk assessment and forest fire prevention measures, and organization of firefighting operations.

Fires require joint action by all institutions as well as the entire community. It should be emphasized that there is a need for allocation of financial resources for the establishment of a high-quality fire protection system that combines prevention, control and rehabilitation of burned areas. In terms of economic costs, fires cause considerable losses to forestry enterprises by destroying wood resources and timber assortments and exposing the enterprises to additional costs of rehabilitation of both the fire-damaged area and the new plantation.

Table 12.8: Forest fires in the Federation of Bosnia and Herzegovina, 2011–2015

	2011	2012	2013	2014	2015
Fires (number)	682	1 082	318	180	342
Burnt area (ha)	830	43 317	2 424	377	7 227
Burnt wood mass (m ³)	6 894	831 488	7 145	1 158	7 735
Burnt seedlings (pcs)	237 785	710 990	53 245	103 795	122 716
Estimated damage (KM)	5 047 159	47 753 101	2 267 212	1 422 487	2 640 913

Source: Forest Office and Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, Information on Forest Management in 2015 and Plans for Management in 2016, 2015.

Photo 12: Sawmill**Table 12.9: Forest fires in Bosnia and Herzegovina, 2010–2012**

	2010			2011			2012		
	RS	FBiH	Total	RS	FBiH	Total	RS	FBiH	Total
Burned area (ha)	1 523	350	1 913	14 970	1 796	16 767	25 509	41 718	67 227
Fires (number)	79	1 036	1 117	298	2 806	3 104	546	5 324	5 870
Average burned area per fire (ha/fire)	19	0	2	50	1	5	47	8	..

Source: Forest Fire Fighting in Bosnia and Herzegovina, Sarajevo, 2014.

The costs of recultivation of the affected area are not calculated. The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina has no reliable data on the total number of forest fires, affected area or costs incurred as a result of forest fires, nor the spatial component of the affected area (i.e. there is no mapping data).

Republika Srpska

Fire is a major threat to forests in Republika Srpska. From 2011 to 2015, each year 12,120 ha on average,

or 1.1 per cent of the total forest area, was damaged by fire. The majority of the fires in forests occurred in the state-owned forests, but private forests have also suffered a high degree of damage by fire.

Public Enterprise "Šume Republike Srpske" (Šume RS) organizes regular fire monitoring and control through the Forest Guard Service and independent Fire Protection Service. At least 0.04 per cent of the total budget of "Šume RS" is invested in fire protection.

Table 12.10: Damage by fire in the state and private forests of Republika Srpska, 2011–2015

			2011	2012	2013	2014	2015
Total	total		20 312	33 781	415	290	5 804
	Burned area (ha)	ground	20 312	33 167	415	288	5 786
		high	20 246	614	-	2	18
		Felled timber (m ³)	109 736	177 761	1 993	630	13 837
State forest	total		14 619	24 379	293	205	4 744
	Burned area (ha)	ground	14 553	23 765	293	203	4 726
		high	66	614	-	2	18
		Felled timber (m ³)	73 382	69 455	760	438	10 121
Private forest	total		5 759	9 402	122	85	1 060
	Burned area, ha	ground	5 759	9 402	122	85	1 060
		high	-	-	-	-	-
		Felled timber (m ³)	36 354	108 306	1 233	192	3 716

Source: Statistical Yearbook of Republika Srpska, 2016.

It is reported that 7,600 ha are areas designated under protected forests and 14,800 ha are forests registered as special purpose forests in Bosnia and Herzegovina. With the introduction of FSC standards in the country, the concept of high conservation value forest (HCVF) has been introduced. HCVFs are determined within the forest management area based on their significance, biodiversity concentration, rare and endangered ecosystems and importance of providing basic needs to local communities. Based on FSC certification reports of four certified forest companies, there are 75,530 ha (i.e. around 2.5 per cent of total forest cover) of HCVF forest in Bosnia and Herzegovina (FAO, 2015).

Other wooded lands

Federation of Bosnia and Herzegovina

Other wooded lands are divided into two categories: productive forestland and unproductive areas. According to the annual report of the Ministry of Agriculture, Water Management and Forestry, productive forestlands that are suitable for afforestation amount to about 166,192.5 ha – the area under the forest can be increased because a large proportion of these areas has poor production potential but could be afforested by using appropriate tree species in accordance with natural and ecological conditions. Non-productive areas amount to 113,298.6 ha.

Republika Srpska

The area designated "other forestland" in Republika Srpska amounts to 231,959 ha or 23.2 per cent of the total forest and forestland area. Forestland in Republika Srpska is divided into two main categories: areas appropriate for afforestation and management (168,851 ha or 16.9 per cent) and areas not appropriate for afforestation and management (63,108 ha or 6.3 per cent).

Type of forest management, including ownership

Forest resource ownership and management are carried out at the entity level – the entity transfers management rights to sub-entity administrations (the cantons in the Federation of Bosnia and Herzegovina) or directly to public forest companies. In addition, some public forests within the protected areas are managed by public institutions responsible for management of protected areas (e.g. national parks, protected landscapes). Financial resources for forest management come mainly from selling wood and wood products.

Federation of Bosnia and Herzegovina

According to the second NFI, the Federation owns 82 per cent of forests (1,242,997 ha) and private people and other legal entities own the remaining 18 per cent.

Table 12.11: Forests by ownership in the Federation of Bosnia and Herzegovina

Ownership	ha	%
Entity forests	1 242 997	82
Private Forests (estimated values)	277 000	18
Total	1 519 997	100

Source: Forest Office and Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, Information on Forest Management in 2015 and Plans for Management in 2016, 2015.

Box 12.1: Karst in forest areas

The 174,662 ha of karst is of concern in Republika Srpska forestry. The largest surface area of karst, 144,061 ha or about 83 per cent of uncovered forestland, could be suitable for afforestation and management. There are very few economically valuable forests in the karst region (about 22,000 ha) of which only 3,617 ha are accessible in high forests. According to the Law on Forests, karst is managed on the basis of a long-term, 10-year programme of management.

Forest management and forestland in the karst area is predominantly based on the use of commonly used forest functions.

Only locally successful afforestation with pine trees has been carried out, and due to the difficult conditions of production today, large areas have been left to spontaneous development of broadleaved vegetation. In order to develop forestry in the area of karst, as well as to improve the condition of the forest fund, a special organizational unit, the "Centre for management of the karst" was established at the Public Enterprise "Šume RS" in Trebinje. The work of this Centre is based primarily on raising new cultures and providing maximum protection of the forest fund in the karst areas.

The existing legislation in the jurisdiction of the Federation of Bosnia and Herzegovina (Law on Concessions) provides for concessions for natural resources, including for forests and forestland. Forest law did not allow concessions on forests and forestland. Currently, users of forests (public forest management enterprises) pay a fee for use, in accordance with the provisions of the legal regulations at the cantonal level.

The current state of private forests in the Federation of Bosnia and Herzegovina in terms of growing stock, growth and openness is worse than that of public forests. Private forest owners face numerous problems in managing their forests. Owners have to seek approval from the administration for all the work they do in their forests. One of the most dominant issues facing private forests in Bosnia and Herzegovina is fragmentation. Private forest owners cannot attract investment to the forests due their size and fragmentation. This situation results in abandonment of forests by their owners, which leads to further devastation and degradation of private forests.

Republika Srpska

In Republika Srpska, forest management is centralized and vertically integrated. The forestry administration system is reportedly well functioning (comprising forest law, action plans, annual planning, management and a monitoring system).

Forest management is undertaken and forest production organized by the Public Enterprise "Šume RS". Forest and forestland areas are divided into forest management areas, which are controlled and exploited by the Public Enterprise "Šume RS". Only it is allowed to manage public forests, based on 10-year plans and corresponding annual plans. Any use of forests by private companies, whether for forestry or non-forestry purposes, should be done through contract with the Public Enterprise "Šume RS" or one of its divisions.

Entity-owned forest amounts to 793,320 ha (73.05 per cent of the total overgrown forest area) and private forests 292,627 ha (26.95 per cent). Private forests are divided into 600,000 cadastral parcels owned by about 340,000 owners. The private forests face numerous problems, including:

- Large areas of degraded and devastated forests (over 60 per cent of the total area of private forests were created as a result of unplanned work and illegal logging during the war, especially in abandoned rural areas);
- A large number of owners (0.8 ha per owner with an average cadastral parcel of 0.45 ha);
- Unclearly defined boundaries of the plot and unprotected property relations;
- Problems of usurpation; the private forest cadastre is not regulated, and updating of changes is not timely;
- Unresolved property–legal relations and fragmentation of property, which makes management difficult;
- Poor accessibility of private forests.

The management of private forests is at a very low level compared with the relatively intensive management of state forests. The management of private forests was not regarded by decision makers as being of great importance and, at the same time, the private forest owners were not actively improving their management. To change this situation, the association of private forest owners "Naša Šuma" (<http://www.nasasuma.com>) was established in 2006 in Čelinac with the mission of improving the situation in private forest management. The Ministry of Industry, Energy and Mining has provided support to the private sector in the form of subsidies to export-orientated companies in the wood processing industry (mostly on improvement of facilities, but also for achieving required standards). The total amount of support provided in the period 2006–2013 was around 27.5 million KM (106 companies received subsidies in 2013).

Table 12.12: Forest areas by type of ownership in Republika Srpska, as on 31 December 2015, ha

	Total	In state ownership	In private ownership
Pure stands, of which:	359 567	289 540	70 027
Broadleaf	311 302	244 256	67 046
Conifer	48 265	45 284	2 981
Mixed stands, of which:	726 380	503 780	222 600
Broadleaf	411 909	211 724	200 185
Conifer	68 934	60 673	8 261
Broadleaf and conifer	245 537	231 383	14 154
Total	1 085 947	793 320	292 627

Source: Statistical Office of Republika Srpska.

Table 12.13: Annual felling in the Federation of Bosnia and Herzegovina, 2012–2015, million m³

	2012	2013	2014	2015
Total	2.51	2.66	2.57	2.57
Type of ownership				
State-owned forest	2.45	2.58	2.47	2.46
Private forest	0.07	0.09	0.10	0.11
Type of forest				
Broadleaf	1.33	1.32	1.24	1.27
Conifers	1.18	1.34	1.33	1.30

Source: Statistical Yearbook of the Federation of Bosnia and Herzegovina 2016

Logging and illegal logging, afforestation, reforestation, productivity

The second NFI suggests that 5.7 million m³ of timber is harvested per year (10-year average). Compared with an annual increment of more than 11 million m³, this means that only around 50 per cent of the annual increment is used for wood production. Coppice forests are harvested at an even lower rate (43 per cent).

The issue of illegal logging in Bosnia and Herzegovina has been widely recognized by state administrations of both entities. The illegal logging is done by private people for subsistence needs (especially for firewood) and by organized groups of people for harvesting, transporting and processing at facilities without a permit (Regional Environmental Center, *Illegal Logging Activities in Bosnia and Herzegovina*, 2010). However as noted in the REC report, the scale of illegal logging has been reduced in recent years due to effective control mechanisms.

Federation of Bosnia and Herzegovina

According to the report of the Forest Office and Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, *Information on Forest Management in 2015 and Plans for Management in 2016*, the annual allowable cut is 3.07 million m³, of which 1.34 million m³ is conifers

(44 per cent) and 1.72 million m³ or about 56 per cent broadleaf species. The logging is mostly done in high forests (2.67 million m³, around 87.2 per cent of the total cut) and in coppice forests (0.4 million m³, 12.8 per cent). Table 12.13 shows annual felling from 2012 to 2015. In 2015, the annual felling was lower than the annual allowable cut by 0.57 million m³ or 81.5 per cent.

Table 12.14 shows the number of cases of illegal logging and trafficking that have been recorded and submitted to law enforcement authorities. Misdemeanour charges refer to illegal cutting or trafficking of up to 2 m³ of wood, whereas criminal charges apply to more than 2 m³ of wood. According to *Information on Forest Management in 2015 and Plans for Management in 2016*, based on the amount of illegally harvested timber in 2015, 36,897 m³ were damaged, to the value of 2,560,595 KM (data received from cantonal forest offices).

Afforestation and reforestation work is financed from the revenues that the users of state forests (i.e. public forest management companies) realize by selling forest timber products and other forest products, and from other sources. In accordance with the Regulation on Forests, which was valid until November 2011, the funds have been transferred into a special budgetary account of the Federation of Bosnia and Herzegovina (20 per cent) and the budgets of the cantons (80 per cent).

Table 12.14: Illegal logging and trafficking in Bosnia and Herzegovina, 2011–2015, number

	2011		2012		2013		2014		2015	
	Submitted	Adjudicated	Submitted	Adjudicated	Submitted	Adjudicated	Submitted	Adjudicated	Submitted	Adjudicated
Misdemeanour	4 841	1 395	3 279	1 252	2 230	995	4 624	1 903	3 762	1 856
Crime	1 101	118	2 567	253	2 446	154	1 636	214	956	344
Total	5 942	1 513	5 846	1 505	4 676	1 149	6 260	2 117	4 718	2 200

Source: Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, 2017.

Table 12.15: Silviculture works in the Federation of Bosnia and Herzegovina, 2011–2015 and plan for 2016, ha

	2011	2012	2013	2014	2015	Plan for 2016
Afforestation	1 204	896	938	1 277	929	2 150
Completing forest cultures	437	258	657	408	226	2 811
Nursing forest cultures	3 253	3 052	2 860	2 645	2 286	3 795
Nursing natural offspring	519	282	720	511	626	754
Melioration of degraded forests	106	159	0	0	218	1 264
Melioration of coppice forests	3 316	2 709	2 244	2 169	1 991	2 809
Total	8 835	8 039	7 893	7 010	6 277	13 583
KM	6 028 910	4 054 394	4 868 717	7 109 704	6 521 073	9 495 392

Source: Forest Office and Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, Information on Forest Management in 2015 and Plans for Management in 2016, 2015.

Silviculture work is mainly directed to afforestation, support to natural regeneration and melioration of degraded forests. In 2015, 929 ha were afforested, less than the 1,163.3 ha planned. The area under all kinds of silviculture works has been continuously decreasing in the past five years (table 12.15). This results in unsustainable forest management overall.

As noted in Information on Forest Management in 2015 and Plans for Management in 2016, the primary cause of such a reduction in silviculture work is a lack of legal regulation in the Federation of Bosnia and Herzegovina and the overall economic crisis in the country.

Republika Srpska

Trees can be felled only after selection and marking in accordance with the guidelines given in the forest management plans. Prior to any felling the forest management company makes a felling declaration – permission for felling – to the competent forestry inspector. According to the data presented, the level of logging was 3.2 million m³ (table 12.16), which is 47 per cent of the total increment. This is an acceptable level considering sustainable management principles. More precisely, in 2015, a total of 734.64 ha have been reforested and afforested (table 12.17).

According to the Report on the Execution of Production and Financial Plan for 2015 of the Public Enterprise "Šume RS", 22,988 m³ were illegally

logged in 2015 – 17 per cent more than in 2014 (19,658 m³). Illegal logging is not evenly distributed. The value of illegally logged timber is estimated at 3.2 million KM, of which only 82,772 KM were subject to law enforcement processing and charges.

With illegal logging increasing during the last several years, more activity is required to prevent it. The reason for increasing illegal activities could be the economic crisis and non-efficient punishment practice in the previous period.

Productivity

In Bosnia and Herzegovina, forests and forestland cover more than 50 per cent of the total territory and activities linked to forests play a large part in the country's economy. Forest-based activities and forest-based and wood processing industries contribute significantly to socioeconomic well-being and are often the most important drivers for development in rural areas.

According to the Agency for Statistics, in 2015, the agriculture, forestry and fishing sector contributed 7.3 per cent of GDP, and around 14.7 per cent of gross value added in the manufacturing sector is produced by wood and the wood products processing industry (including paper and furniture). Of this, 7.1 per cent is contributed by wood and cork products, 4.3 per cent by furniture and 3.3 per cent by paper and paper products.

Table 12.16: Forest exploitation and afforestation in Republika Srpska, 2011–2015

Annual felling (thousand m ³)	2011	2012	2013	2014	2015
Gross felled timber					
Total	2 838	2 853	2 966	3 016	3 274
State-owned forest	2 555	2 558	2 670	2 742	2 913
Private forest	283	296	297	274	362
Broadleaf	1 640	1 585	1 617	1 550	1 763
Conifer	1 198	1 269	1 350	1 466	1 511
Artificial afforestation (ha)					
ordinary (classic)					
Total	1 253	918	672	611	817
State-owned forest	184	110	124	116	162
Private forest	1 069	808	548	495	655
Plantation	..	..	..	..	..

Source: Statistical Yearbook of Republika Srpska, 2016.

Table 12.17: Reforestation and afforestation in Republika Srpska, 2015, ha

Category of forest/forestland	State-owned forest	Private forest	Total
Reforestation within high forests with natural regeneration	224.28	1.95	226.23
Reforestation within high degraded forests	46.02	0.25	46.27
Reforestation within coppice forests	70.09	0.00	70.09
Afforestation of the areas appropriate for afforestation and management	381.27	10.78	392.05
Total	721.66	12.98	734.64

Source: Forestry Cadastre, Public Enterprise "Šume Republike Srpske", 2015.

According to the Forest Law Enforcement, Governance and Trade (FLEGT) Action Report of 2015 (with regard to the overall FLEGT Action Plan Evaluation), the forestry sector of Bosnia and Herzegovina represented 2.3 per cent of GDP in 2011. In terms of exports, Bosnia and Herzegovina is the biggest supplier to the EU-28 among non-EU Balkan countries (based on Eurostat). The EU is also a major destination for Bosnia and Herzegovina exports.

Bosnia and Herzegovina exports 1.5 million m³, which consists of: sawn wood (0.86 million m³), pulpwood (0.45 million m³), paper and paperboard (0.11 million m³), logs (0.036 million m³) and veneer, plywood and particle/fibreboard (0.025 million m³). There are few log exports; this is not due to any restriction (ban) on log exports, but priority is given to the local industry for logs from public forests (with an objective of establishing locally added value through processing). Exports of pellets show a remarkable trend, growing to 150,000 tons in 2013, and putting pressure on pulpwood and firewood, including industry wastes.

Sawmill products and the furniture segment are the most dynamic sectors (i.e. furniture, prefabricated houses and other wood products). Exports of wood, wood products and wood manufactures amount to 1,887 billion KM, accounting for 21 per cent of Bosnia and Herzegovina's total export value (2015). The

highest net balance of payments balance (surplus) is provided by furniture (741 million KM) and cork and wood crude materials (470 million KM). The net positive balance of all these sectors amounts to 3.7 per cent of GDP.

Employment

Federation of Bosnia and Herzegovina

In the forestry sector of the Federation of Bosnia and Herzegovina in 2015, 4,627 workers were employed. Cantonal forest management companies employed 4,126 workers, and the Forestry Administration employed 501 workers. Most employees (2,034 workers or 44 per cent) have secondary education. The 1,753 employees (38 per cent) who hold lower qualifications are employed mainly in production. Higher educational qualifications are held by 630 employees (14 per cent), 58 of whom (1.3 per cent) hold an MSc degree.

Republika Srpska

In 2015, the forestry and wood products processing industries employed 15,159 people, 7.3 per cent of total employment. Among them, 5,719 were employed in forestry and logging (2.8 per cent), 5,864 in the manufacture of wood and wood and cork products (2.8

per cent), 2951 in the manufacture of furniture (1.4 per cent) and 625 in the manufacture of paper and paper products (0.3 per cent).

There are 24 public enterprises involved in forestry activities. Most of their revenues come from selling wood products (about 91 per cent). The price of wood is set by the Government. The current price was fixed in 2013 at low levels, reflecting the concern to support the competitiveness of wood processing industries.

12.2 Pressures from forestry activities

Forests

Irregularities in the exploitation of forests as well as illegal logging affect the state of the forests, but there are no official data on this. Forests have been significantly degraded, due to mismanagement of deciduous forests and uncontrolled logging and clear-cutting across a wide area, especially of beech forests in the pre-war period when trees of higher quality were logged and those of poorer quality were left behind.

Biodiversity and ecosystems

Forestry activities such as logging, overharvesting and reforestation cause negative impacts on biodiversity.

Soil

Soil is a vital resource that is exposed to numerous processes of degradation and rising pressures.

According to the register of torrents and erosion-prone areas in Bosnia and Herzegovina, there are 935 torrential watercourses affected by erosion, covering an area of 12,969 km². The creation of "erosion maps" of areas in Republika Srpska started in 2005. This project is financed by the Sava River District Water Agency with €2 million and implemented by the Institute for Water Management in Bijeljina.

Landscape

The interaction of landscape characteristics and forestry activities is not analysed in policy and strategy documents. Identification of impacts and vulnerability models could be very useful to inform future strategies and management plans, as a way of directing or managing changes in the landscape so that forestry activities will be in line with landscape management.

Non-wood forest products

Bosnia and Herzegovina has over 700 species of medicinal and aromatic plants, of which 200 are

utilized. Various non-wood forest products (NWFPs) are extensively used by the local population and private companies who hire local people in the rural areas to collect mushrooms, medicinal plants, berries, etc. There are no clear statistics on the collection of NWFPs.

It is estimated that around 100,000 people collect various types of NWFPs within companies registered for their collection and processing.

There is no information available on the impact of forestry activities on the state of NWFPs. However, as was noted in the REC report of 2010, owners of private forests are deliberately setting fire to their forests in order to obtain permission for clear logging. Private owners do not have the right to execute clear logging without a special permit that is very difficult to obtain. In addition to damaging the forest itself, intentionally set forest fires damage NWFPs.

Development and well-being of local communities

About 60 per cent of Bosnia and Herzegovina's population live in rural areas and, for them, forests serve as an important source of employment and energy supply. Forests provide the conditions for living in rural areas, such as employment, economic security for private property owners, heat and building materials from wood and NWFPs, and opportunities for recreation and tourism, and create the basis for entrepreneurship and new jobs according to local needs.

12.3 Impact from and adaptation to climate change

Expected climate change could also endanger sensitive forest species. According to climate models, the mean seasonal temperature changes for the period 2001–2030 are expected to range between 0.8°C and 1.0°C above previous average temperatures. The expected climate changes could cause greater damage through forest fires and natural disasters in the coming decades. It is expected that climate change will result in the shifting of certain vegetation zones (forest types), in terms of both latitude and altitude. In some areas, an increased drying of trees may be expected, as a result of stress and attacks of pests and plant diseases, as well as slower natural regeneration.

According to data from the Public Enterprise "Šume Republike Srpske" (2013), significantly increasing populations of gypsy moth (*Lymantria dispar*) were recorded in 2006 and 2012.

In the Federation of Bosnia and Herzegovina, the drought which continued in the period 2011–2013 has resulted in dryness in all areas, including forests. This has led to a high occurrence of forest fires as the forest areas were very susceptible to fire in such conditions.

Climate change could affect forests by altering forest distribution and composition. Some tree species, such as lowland beech forest, are at particular risk due to low rainfall in the northeast of the country. Conifers are prone to pest outbreaks in hot temperatures. Simulations for a 2°C average temperature rise predict significant negative consequences for the distribution of dark coniferous forests. A particular impact may occur due to "multiple stresses", where changes in soil humidity, rainfall, temperature and pathogens all contribute to high levels of tree mortality. Adaptation measures will require an improved information system for forest management to support changes in species planted and management interventions to prevent fire and the spread of pests and disease.

12.4 Legal, policy and institutional framework

Legal framework

Federation of Bosnia and Herzegovina

Based on the Decision of the Constitutional Court of the Federation of Bosnia and Herzegovina of April 14, 2009 (OG FBiH, No. 36/09), the Law on Forests is no longer in force (as of 27 November 2009). This Decision was based on the petition from the Association of Municipalities and Cities in the Federation of Bosnia and Herzegovina to request the Constitutional Court to decide whether the Law on Forests is harmonized with the European Charter of Local Self-Governance to protect the right of local self-governance. According to the Constitution of the Federation of Bosnia and Herzegovina, the Federation is responsible for land use policy on the level of the Federation, while the cantons are responsible for policy on the protection of the environment and use of natural resources.

The Court identified serious discrepancies and inconsistencies between the Law on Forests and Law on Principles of Local Self-Government and ordered necessary alignments in terms of respecting the rights and interests of local communities. Since such alignments were not realized within the set time limit, the Law on Forests was proclaimed invalid.

Currently, in July 2017, the Government of the Federation of Bosnia and Herzegovina has adopted the proposed law on forests and it has been forwarded to the parliament for a second hearing. The main change

proposed in the draft law will be to delegate competences to the cantonal forest enterprises for the economic functions related to forest management, while the administrative and regulatory functions will be retained by the entity and cantonal ministries.

As a preliminary solution pending the adoption of a new law on forests, the Government of the Federation of Bosnia and Herzegovina adopted the Regulation on Forests. According to the Decision of the Constitutional Court of the Federation of Bosnia and Herzegovina No. U-28/10 of March 23, 2011 (OG FBiH, No. 34/11), the Regulation on Forests should have been in force by 6 December 2011. However, since it was not, and as the new law on forests has not yet been adopted, the forestry sector is unregulated at the level of the Federation of Bosnia and Herzegovina. A set of temporary regulations has been applied to date to complement the 2002 Law on Forests.

Under the 2002 Law on Forests, state forests in the Federation of Bosnia and Herzegovina are the property of the Federation and the responsible ministry, and the Directorate of Forests manages forest resources. However, at the cantonal level, the cantonal ministries and cantonal forest enterprises manage forests. Thus, the management function is separated from the ownership. Such relationships between the governments of the Federation and the cantons do not support vertical coordination between these two levels with regard to competences and responsibilities, and hence does inhibit effective implementation of consistent forest policy.

Meanwhile, nine cantons adopted their own forestry regulations. The adoption of cantonal regulations contradicts the constitutional provisions, in particular, the question of ownership and spending of funds for the use, protection and maintenance of forests.

The 2002 Law on Forests provides the definition of protective forests:

- Forests whose main objective is to preserve soils on steep slopes, and soils endangered by erosion and torrents, landslides and harsh climatic conditions, which endanger the very existence of the forests;
- Forests whose main objective is protection of inhabited areas, industrial and other installations, such as roads, telecommunications and energy infrastructure, water springs and waterbeds, banks of water accumulations, as well as forests established as protection belts or whose purpose is protection against natural disasters and calamitous effects of human interventions.

The Law further defines the special purpose forests that possess cultural, historical, natural and ecological significance; national parks; natural and hunting reserves; and forests of importance for biodiversity, science and education and recreational purposes.

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, during the period 2012–2015, repeatedly urged the Government of the Federation of Bosnia and Herzegovina to discuss the first draft law on forests, which this Ministry drafted and submitted to the Government of the Federation of Bosnia and Herzegovina in November 2011 for consideration.

In June 2015, the Government of the Federation of Bosnia and Herzegovina established a working group in order to provide technical assistance to the Ministry of Agriculture, Water Management and Forestry in preparing the text of the draft law on forests. Furthermore, it entrusted the Ministry to prepare the draft in cooperation with the cantonal ministries in charge of forestry and the cities and municipalities of the Federation of Bosnia and Herzegovina, forest enterprises, scientific and other relevant institutions. In the course of drafting the law, numerous meetings were held at the cantonal level and comments and suggestions presented at public hearings have been integrated into the draft and submitted for government consideration. Most of the written comments received during the consultation process were focused on eradicating existing inconsistencies in the constitutional/legal framework that regulate the ownership, operation and management of forest resources at the different administrative levels.

In May 2016, the Government (Cabinet) has the draft law on forests and it has been forwarded to parliament. After the first reading, the draft was returned for further revision and clarification. In July 2017, the Government of the Federation of Bosnia and Herzegovina adopted the proposed law on forests and it has been forwarded to parliament for its second reading.

With regard to the written comments submitted during the public debate, the decision regarding the ownership, operation and management of forest resources should be consistent with the existing constitutional and legal framework, while ensuring the support of key actors in the formulation of forest policy. In this context, it is proposed to align positions and it is suggested that a special expert or another level of expertise be provided.

Given that currently there is no law on forests, fire protection is regulated by:

- Law on Protection and Rescue of People and Material Goods from Natural and Other Disasters (OG FBiH, No. 39/03 and 22/06);
- Risk Assessment of the Federation of Bosnia and Herzegovina of Natural or Other Disasters (OG FBiH, No. 41/05);
- Plan of Protection and Rescue of the Federation of Bosnia and Herzegovina from Natural or Other Disasters (OG FBiH, No. 40/08);
- Law on Fire Protection and the Fire Service (OG FBiH, No. 64/09).

These regulations set out the obligations for the forest management companies that manage forests owned by the state, and private forest owners, to take and implement measures to protect forests from fire. In terms of forest protection, special significance is given to the implementation of preventive measures.

Republika Srpska

The basic legislation of Republika Srpska related to the forestry sector is:

- Law on Forests;
- Law on Amendments to the Law on Forests (OG RS, No. 60/13)
- Law on Forest Reproductive Material;
- Law on Hunting;
- Law on Plant Health Protection (OG RS, No. 25/09);
- Law on Nature Protection – Consolidated text (OG RS, No. 113/08);
- Law on Environmental Protection – Consolidated text (OG RS, No. 28/07, 41/08 and 29/10);
- Law on National Parks.

The Law on Forests states that protective forests are those forests that serve primarily for the protection of land, waters, settlements, economic or other facilities from natural disasters, and the forests raised as protection belts and forests on the upper boundary of vegetation.

The definition of non-wood forest products (NWFPs) is provided in Article 8 of the Law on Forests of Republika Srpska, which lists NWFPs as products of:

- Plant origin: medicinal, edible, aromatic and industrial forest plants, fruits and seeds, forest litter, peat, resin, reeds, phloem, cones, horticultural shrubs, mushrooms, tree sap, various parts of plants (roots, bark, leaves, fruit, etc.) which can be used in the leather industry (tannin), forest pasture, meadow grass;
- Animal origin: bees and their products, snails, leeches, worms, game, snakes (their poison, skin,

meat) and inorganic nature products such as humus.

According to Article 12 of the Law on Amendments to the Law on Forests, Article 77 of the Law on Forests is amended as follows:

- NWFPs are used in accordance with directions from the forest management plan and plan for usage of NTFPs, as well as regulations that refer to this activity;
- The user of forests and forestlands owned by Republika Srpska has the right to use NWFPs for 3 per cent of the selling price. This compensation has to be paid into a special account owned by Republika Srpska and is intended for revitalization of NWFPs at the location where they have been collected;
- For forest management units in which the user of forests and forestlands owned by Republika Srpska is not using NWFPs, a public tender for them should be announced;
- Legal bodies and entrepreneurs (commercial collectors) must pay 5 per cent of the selling price for collecting NWFPs. Again, this compensation is intended for the revitalization of NWFPs at the location where they have been collected;
- The Minister prescribes the terms for usage and collection of NWFPs.

The Law on Forests was revised in 2013. The main change refers to jurisdictions that were assigned under the Law to the Forest Agency. Now they are assigned to the Public Enterprise "Šume RS" and the Ministry. There are also changes regarding NWFPs, fees for the use of state forests and fees for multiple-benefit forest functions. Beside the laws, the legal framework of forestry consists of many documents, including 32 implementing regulations relating to timber sales and technical norms of forest management and around 38 rulebooks (as of 2013).

Policy framework

Federation of Bosnia and Herzegovina

The draft forestry programme of the Federation of Bosnia and Herzegovina is in its final stage. Its goal is to define forest policy and strategy in the Federation of Bosnia and Herzegovina. It aims also to harmonize forestry policy of the Federation of Bosnia and Herzegovina with other national sector policies and international obligations as well as with the EU *acquis communautaire*. As expected, the programme will provide precise definition of the competences of certain levels of government regarding ownership and

management of forests and facilitate access to various source of funding.

Republika Srpska

Since 2011, Republika Srpska has succeeded in developing and adopting many strategic documents including the Forestry Development Strategy of Republika Srpska for the period 2011–2021, the 2013 Programme of Forest Genetic Resources Conservation, the 2013 FSC recertification of all public forests, the Anticorruption Strategy 2013–2017 (the document defines the forestry sector as a highly risky area for development of corruption and proposes three strategic goals preventing corruption), and 2015 measures related to the forest service and the public enterprise.

The Forestry Development Strategy for the period 2011–2021 provides the basic presumptions for the sustainable development of forestry, with the main goal of maintaining and improving all forest functions. The Strategy strengthens the interaction between the forestry sector and other sectors on various issues, including strategic planning. Besides the Forestry Development Strategy, Republika Srpska has adopted strategies on rural development, development of agriculture and environmental protection. The Strategy recognizes the importance of soil protection for economic, social and cultural functions. It specifies measures for the prevention of erosion, pollutant contamination, reduction of the content of organic matter and desertification processes. The Strategic Plan for Rural Development of Republika Srpska (2010–2015) defines the principles and goals of the development of the forestry sector in rural areas.

Some of the measures to improve the quality of life in rural forest areas prescribed by the Strategic Plan are to:

- Use the socioeconomic functions of forests in rural areas;
- Construct and use infrastructure in forests in rural areas;
- Employ the population by stimulating activities related to forestry;
- Develop more efficient cooperation and better understanding of the needs of the local population for the use of private forest resources;
- Encourage the settlement of rural areas near the forest;
- Provide assistance to forest owners when establishing companies that promote the recreational and tourist functions of forest areas.

Forest planning and the principles of sustainable forest management are included in the Spatial Plan for 2008–2015.

Sustainable Development Goals and targets relevant to this chapter

Bosnia and Herzegovina's current position vis-à-vis Targets 15.1, 15.2 and 15.b is described in box 12.2.

Institutional framework

State level

The Ministry of Foreign Trade and Economic Relations is responsible for tasks and duties at the state level, including defining policies and basic principles, coordinating activities and consolidating entity plans in the areas of use of natural resources such as forests. The sector for Agriculture, Food, Forestry and Rural Development of the Ministry of Foreign Trade and Economic Relations is in charge of forestry issues, but its activity is limited to coordinating activities. The direct competences in the forests and forestry sector are held at the entity level.

Federation of Bosnia and Herzegovina

In the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Water Management and Forestry, through its Forestry Department, is responsible for developing the forest policy and implementing the forest legislation at the Federation level (figure 12.1). Within the Forestry Department, the Sector for Forestry and Hunting is responsible for all legal matters, including forestry law. The Forest Office is responsible for forest silviculture and protection, forest utilization, subsidies and support payments for forestry and monitoring. At the cantonal level, forest management competences are delegated to the cantonal governments. Each canton is responsible for the management of the forest resources within its administrative boundaries.

The Inspectorate of Forestry Inspection of the Federal Administration for Inspection Issues of the Federation of Bosnia and Herzegovina is responsible for overall inspection services and the implementation of all actions related to the Law on Forests. It operates under the Law on Inspection. At the cantonal level, the cantonal forest offices control and oversee the activities of the cantonal forest management companies and provide advice and support to private forest owners. The cantonal forest offices prepare forest management plans for all private forest owners.

In parallel with political, economic and social changes in Bosnia and Herzegovina in the recent period, the

organization and institutional framework for the implementation of sustainable forest management in the Federation of Bosnia and Herzegovina have suffered changes. The importance of the forestry sector is not sufficiently recognized by the actors in forest policy and the public in general (i.e. the draft forestry programme). This is reflected in the frequent discussions concerning competence between the various administrative and political levels (municipality, canton, Federation), especially with regard to the ownership, control and management of forest resources.

This situation culminated in the declaration that the 2002 Law on Forests was unconstitutional and many years of inability to create a new legal framework at the level of the Federation, which would create the key prerequisites for improving the situation in the forestry sector. The consequences are numerous and negative, from uncontrolled change of use of forestland and illegal activities through lack of intersectoral coordination to the neglect of private forests. In such circumstances, and with the lack of a clear political and legal framework for the forestry sector, the current institutional set-up cannot provide efficient and effective management of forest resources, adequate supervision and preservation of forests in the Federation of Bosnia and Herzegovina.

Republika Srpska

The Department of Forestry and Hunting of the Ministry of Agriculture, Forestry and Water Management is responsible for forests, including forest biodiversity and forestry. Forestry production and management have been organized through the Public Enterprise "Šume RS", the joint stock company, which consists of 24 forest estates, the Centre for Seed and Nursery Production, the Research Development and Design Centre, and the Karst Management Centre (figure 12.2). The Ministry publishes the Forest Cadastre, the annual statistical information on the state of forests and forestry.

The Public Enterprise "Šume RS" is a legal entity that maintains the general interests of the forestry sector. Its activities are the permanent management of forests as a public good, forest protection and utilization of forests. In order to preserve genetic resources, it implements genetic fund conservation measures through conservation of natural populations or by raising specialized crops. It publishes the Forest Cadastre annually, as well as updates of plan documents. The Public Enterprise "Šume RS" has 4,568 employees, 27 of whom are in organizational roles. In 2015, its total income was 196 million KM and its total gross profit was 9,964,055 KM.



Box 12.2: Targets 15.1, 15.2 and 15.b of the 2030 Agenda for Sustainable Development

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
Indicator 15.2.1: Progress towards sustainable forest management

Forest certification is an important tool for sustainable forest management, as it verifies that forest products the consumers use derive from forests that are well managed and legally harvested. The objectives of forest certification in the Federation of Bosnia and Herzegovina are:

- Stopping possible negative impacts that would lead to a decrease in forest area;
- Improving the quality of forest management;
- Better accessing world markets;
- Improving the environment while providing better economic and social development.

In the Federation of Bosnia and Herzegovina, 22.9 per cent of forest areas is FSC certified, and 42.7 per cent is going through the preparatory process for certification.

In Republika Srpska, the Public Enterprise "Šume RS" is the bearer of a group certificate for the total area of 982,203 ha. The certificate is valid from 10 March 2013 to 9 March 2018 and is subject to annual inspection. The current version was finalized on 15 April 2016. One forest management unit that is not yet included in the certification is the Centre for Karst Region Management – Trebinje. This area has the main goals of fire protection and soil protection. The certification document reports that the key objectives of the Public Enterprise "Šume RS" are:

- Forming such a forest composition and structure that will continuously offer equal yield in quantity and quality;
- Achieving maximal forest yield, such that it will be in a compliance with the needs of the society in segments of tree species, and assortments of main forest products;
- Conservation and improvement of general-use forest functions and conservation of biodiversity;
- Conducting an adequate management system that will offer better conditions for achievement of higher work productivity;
- Achieving better financial work results through application of modern methods and tools.

Target 15.b: Mobilize resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation

In the Federation of Bosnia and Herzegovina, the budget for silviculture works, including afforestation, support to natural regeneration and melioration of degraded forests, has been increased. In 2015, in the Federation of Bosnia and Herzegovina 6,521,073 KM was spent for the above works. It is planned to increase this amount to 9,495,392 KM in 2019.

Indicator 15.b.1: Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems

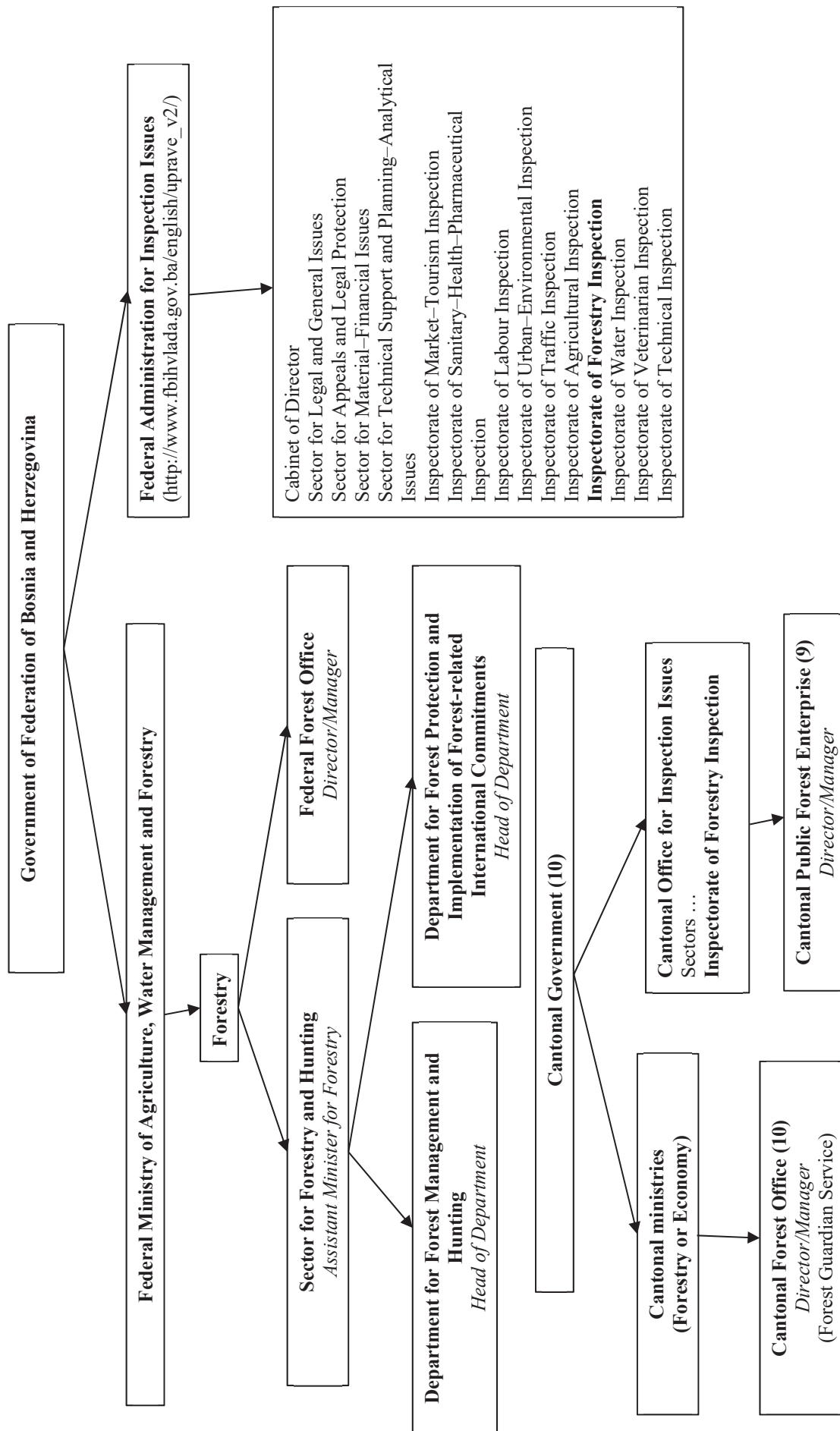
International projects:

In the Federation of Bosnia and Herzegovina, the GEF project for Sustainable Management of Forests and Landscapes is being implemented. The project will continue between 2014 and 2019 with overall funding of US\$5.5 million. The project aims to ensure sustainable management of forests and landscapes essential for economic development. The project specifically treats sensitive landscapes vulnerable in terms of their current degradation or negative effects of climate change to impacts such as the risk of fire.

Many international projects are implemented in Republika Srpska. The World Bank implemented the Forestry Development and Conservation Project, which has now ended. A USAID–SIDA project helped to develop an action plan for the implementation of EU Directive 2005/15/EC on the wood processing sector.

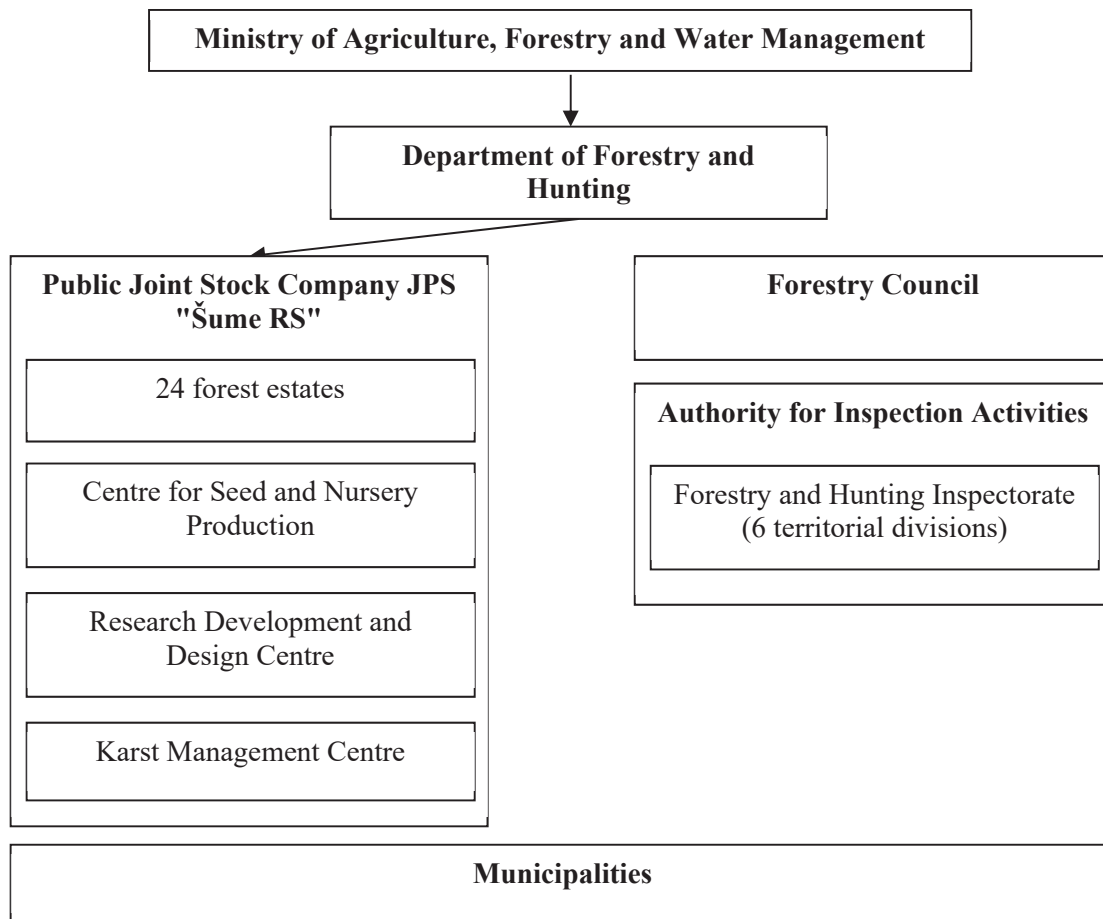
The EU-funded project Preparation of Instrument for Pre-accession Assistance for Rural Development (IPARD) for Forest and Fisheries Sector Reviews was completed. The forest sector was analysed in terms of forest production, wood processing industry and forestry-related value chains. The next activities under the EU's IPARD 2014–2020 programme will focus on afforestation and agroforestry, fire prevention and restoration after fire, and improving the resilience and environmental value of forest ecosystems.

Figure 12.1: Institutional framework of the forestry sector in the Federation of Bosnia and Herzegovina



Source: Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, 2017.

Figure 12.2: Organization of the institutional framework for forestry in Republika Srpska



Source: Second EPR report 2011, updated.

Forest and forestland management in the area of East Herzegovina Karst (Trebinje, Bileća, Ljubinje, Berkovići and parts of Gacko and Nevesinje municipalities) was entrusted to the Karst Management Centre, the organizational part of the Public Enterprise "Šume RS" a.d. Sokolac.

Due to the specific natural conditions, karst, forests and forestland management differs and is organized in particular parts of the Public Enterprise. The Law on Forests of Republika Srpska states that the priority tasks are the protection of forests and silviculture. Forest exploitation activities have been reduced and the priority is to preserve high forests, which account for only 2 per cent of the total forest area.

The Centre for Seed and Nursery Production, Doboj, consists of five working units/nurseries: "Stanovi" Doboj, "Petkovača" Brčko, "Bišina" Šekovići, "Stupine" Nevesinje and "Gornja Puharska" Prijedor. The total area of all nurseries is 140 ha.

The basic task of the Centre is the production of plants for the needs of Public Enterprise "Šume RS". The

priority is the production of plants that will be used in reforestation and afforestation activities.

Besides the main forest species (spruce, fir, black and white pine, oak species, mountain maple, white ash, beech), the Centre has a wide range of wild fruit trees that are introduced into forest complexes for the enrichment of the forest plant stock, as well as Euro-American clones of poplar and cloned willows and other planting material used in forest plantation.

The Research and Development and Project Centre in Banja Luka was founded in 1972 as a part of "Incel", under the name Bureau for Design in Forestry. Today, it is one of the organizational parts of the Public Enterprise "Šume RS". The basic activity of the Centre is development of forest management plans for state and private forests, game management plans, projects for civil engineering and building construction, development of investment-technical documentation, and other projects and programmes. In addition to the main activity, the development of forest management plans, the Centre produces design projects for about 40–50 km of forestry truck roads annually. The Centre

is also contracted to collect taxation data for the second NFI of Bosnia and Herzegovina.

According to the website of the Public Enterprise "Šume RS", there are 26 rather than 24 forest estates.¹¹

Forests are managed based on 10-year plans and corresponding annual plans. Each forest management unit was created by a decree of the Government of Republika Srpska. Forest management units (corresponding to areas) are formed for the purpose of rational management of forests and forestland. They are formed according to natural, habitat, ecological, biological, geographical, economic and other conditions.

According to the Law on Forests of Republika Srpska, the Government decides on the establishment of forest management areas on the proposal of the Ministry of Agriculture, Forestry and Water Resources on the basis of economic and technical documentation.

There are two national parks (Kozara and Sutjeska) and two virgin forests (Lom and Janj), which are managed by individual public enterprises. The management of forests that belong to national parks is carried out by the Public Enterprise "Šume RS".

The Forestry Council is the advisory body dealing with forestry issues and developments. The Council brings together representatives of the Ministry (Deputy Minister), the Forest and Hunting Inspectorate, the municipalities and the Public Enterprise "Šume RS". Forest control at the entity level is provided by the independent Administration for Inspection Activities of Republika Srpska, which includes forestry and hunting inspection. Municipalities are responsible for the development and approval of management plans for all private forests on their territory.

The main change in the organizational structure of the forestry sector since 2011 was that, under the 2013 Law on Amendments to the Law on Forests, the Forestry Agency, which was established in 2008, was abolished and forest management has been handed over to Public Enterprise "Šume RS". In fact, the Agency was never established. It was considered that it would not be practical to create it and that the more rational option was to change the law.

Regulatory, economic, fiscal and information measures

The second NFI of Bosnia and Herzegovina was carried out between 2006 and 2009. The objective of the inventory was to determine the state of forests and forestlands and create a database that will serve as a basis for:

- Developing a long-term policy and strategy for forestry;
- Tracking (monitoring) the condition of forestland;
- Setting priorities for research and development in forestry.

Work was completed on data collection and processing and interpretation of results for the territory of Bosnia and Herzegovina, and the production of publications is in the final stage, to be followed by a public presentation of the results of the inventory of forests over large areas.

Federation of Bosnia and Herzegovina

Information measures

In the Federation of Bosnia and Herzegovina, the Integrated Information System for forest management is being developed. Its objectives are to:

- Standardize data on the type and scope of forests;
- Increase the level of processing to reduce the discrepancy between the characteristics of the available equipment and active processing;
- Accelerate the exchange of information within and between forestry institutions responsible for forest management.

Activities were started on the development and establishment of a single information system to ensure it is operational to ensure comprehensive monitoring and changes in forestry.

Republika Srpska

In establishing and maintaining a mechanism for the efficient collection, storage, analysis and efficient exchange of information within the forestry sector and with other sectors, and raising public awareness about the importance of forests and forestry for society as a whole, with the active participation of all stakeholders, basic weaknesses have been identified:

¹¹ <http://sumerepublikesrpske.org/index.php/strana-1/rg-niz-ci>

- Institutional and material prerequisites for establishing a system of information exchange and efficient communication within the forestry sector and with other sectors in Republika Srpska and on an international basis are not provided;
- There is no public relations plan for the forestry sector that would satisfy all stakeholders;
- There is no programme of cooperation with institutions responsible for environmental protection at national, regional and local levels, to inform the public during the implementation of policy goals and improvement of environmental conditions, as well as to raise environmental awareness.

Economic measures

Republika Srpska

The user of the forest and forestland owned by Republika Srpska is obliged to pay a fee for the use of forests and forestland in the amount of 10 per cent of the financial assets realized through the sale of forest timber assortments. The collected funds from the lease of forestland should be used for maintenance and improvement of state forests as well as for raising new forests.

12.5 Participation in international agreements and processes

Bosnia and Herzegovina is a signatory country to the Forest for Europe process. In addition, Bosnia and Herzegovina reports periodically under FAO Forest Resource Assessment, by the designated national representatives.

The last FAO report on the forestry sector in Bosnia and Herzegovina was produced in 2015.

Table 12.18: Forest certification in the Federation of Bosnia and Herzegovina, ha

Canton	Certified	Preparation	Not certified	Total	Notice
Canton 10	284 277	..	..	284 277	
Una-Sana	..	179 410	..	179 410	GEF project (SFLMP) – recertification in progress
Podrinje	..	24 903	..	24 903	GEF project (SFLMP) 1 – certification in progress
Tuzla	..	73 124	..	73 124	GEF project (SFLMP) 1 – certification in progress
Zenica-Doboj	..	185 085	..	185 085	GEF project (SFLMP) 1 – certification in progress
Sarajevo	..	68 750	..	68 750	Enterprise “Sarajevo šume” self-financing – certification in progress
Posavina	..	..	458	458	
Central Bosnia	..	..	182 853	182 853	
Herzegovina-Neretva	..	..	193 988	193 988	
West Herzegovina	..	..	50 151	50 151	
Total (ha)	284 277	531 271	427 450	1 242 997	
Total (per cent)	23	43	34	100	

Source: Forest Office of the Federation of Bosnia and Herzegovina, 2017.

Table 12.19: Application of charges for illegal cutting, 2015

Canton	Charges			Damage charges KM	Adjudicated charges			Penalty charges KM	Collected penalties KM	Damage to wood	
	Misdemeanour No.	Criminal No.	Total No.		Misdemeanour No.	Criminal No.	Total No.			Amount m ³	Value KM
Una-Sana	0	0	0	0	0	0	0	0	0	0	0
Posavina	6	0	6	1 240	0	0	0	0	0	18	1 240
Tuzla	391	87	478	94 402	196	36	232	46 699	7 400	1 019	103 608
Zenica-Doboj	1 846	295	2 141	427 879	1 344	242	1 586	209 210	9 214	18 957	1 281 067
Podrinje	33	12	45	5 300	24	2	26	16 800	1 900	106	5 300
Central Bosnia	990	412	1 402	550 984	0	0	0	0	0	13 673	908 421
Herzegovina-Neretva	0	68	68	56 193	0	59	59	7 459	0	567	64 383
West Herzegovina		2	2	1 400	0	0	0	0	0	19	1 320
Sarajevo	440	28	468	131 668	288	4	292	62 831	0	1 946	147 896
Canton 10	56	52	108	63 608	4	1	5	650	0	592	47 360
Total	3 762	956	4 718	1 332 674	1 856	344	2 200	343 649	18 514	36 897	2 560 595

Source: Ministry of Agriculture, Water Management and Forestry, 2017.

12.6 Assessment, conclusions and recommendations

Assessment

In the Federation of Bosnia and Herzegovina, the absence of forestry legislation and the insufficient number of forestry inspectors led to a series of negative phenomena, such as illegal clearing of private forests, usurpation of state forests and forestland, change of use of the original function of forests, and others. This situation was exacerbated by the unresolved issue of the delimitation of forest and agricultural land, the lack of structured cadastre and land registry records, the lack of registry records and seed facilities and a large number of pending applications for charging the perpetrators of damage to forests (Forest Management Plan 2015–2016).

Conclusions and recommendations

Forest certification

Although there are 700,600 ha of private forests in Bosnia and Herzegovina, no private forests have yet been certified. If the framework and requirements of the Forest Stewardship Council (FSC) are not suitable for privately managed forests, an alternative certification system should be sought. It is important for private forests to be included in the certification process because of increasing demand from the EU market for certified products and an increase in the share of products derived from private forests.

Recommendation 12.1:

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Forestry and Water Resources of Republika Srpska and the Government of Brčko District should:

- (a) *Facilitate a certification process for private forests;*
- (b) *Provide institutional support, such as establishment of advisory services for private forest owners, and financial support for the development of private forests;*
- (c) *Improve silviculture of low forests and shrubs in private forests.*

Law and policy on forests

The forestry sector contributes 2.3 per cent of GDP and represents an important sector for export, import

and employment. However, the sector is not sufficiently recognized in the public policy agenda.

Recommendation 12.2:

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina should:

- (a) *Promote the adoption of the draft law on forests as a matter of priority and subsequent adoption of a forestry strategy;*
- (b) *Undertake activities to raise awareness of the importance and potential of forests for decision makers and the public;*
- (c) *Strengthen the participation of academia, non-governmental organizations, the media and civil society in the formulation of forest policy documents.*

Data processing and reporting

Due to different methodologies of data processing, data on the forests of Republika Srpska presented in various documents are not consistent. To support sustainable forest management and planning, data processing and methodology should take into account the wide scope of information on forest resources, such as the area under forests, volume by tree species and forest types, age, increment and productive possibilities of forests, habitat conditions, possibilities of multi-functional utilization, biodiversity potential and stability of forest ecosystems. Therefore, the central database on forests and its regular updating as per individual inventory cycles will help the forestry and other governmental sectors, professional expert associations, individuals and NGOs to use the data for multiple purposes.

Recommendation 12.3:

The Ministry of Agriculture, Forestry and Water Resources of Republika Srpska should consider harmonization of data processing and improve and maintain the forest database system.

Recommendation 12.4:

The Ministry of Agriculture, Water Management and Forestry of the Federation of Bosnia and Herzegovina, the Ministry of Agriculture, Forestry and Water Resources of Republika Srpska and the Government of Brčko District should harmonize methodologies of data reporting with the current practice of international processes on forests and forest management.

ANNEXES

Annex I: Implementation of the recommendations in the second Environmental Performance Review

Annex II: Participation of Bosnia and Herzegovina in multilateral environmental agreements

Annex III: List of major environment-related legislation

Annex I

IMPLEMENTATION OF THE RECOMMENDATIONS IN THE SECOND ENVIRONMENTAL PERFORMANCE REVIEW¹²

Chapter 1: Policymaking framework for environmental protection and sustainable development

Recommendation 1.1:

The State Ministry of Foreign Trade and Economic Relations should take the following steps to strengthen the environmental mandate, authority and capacity at the State level:

- (a) *Elevate the current Department for Environmental Protection into a new Sector;*
- (b) *Expedite the adoption of the State law on environmental protection and all relevant secondary legislation. Specifically, the State law should ensure:*
 - (i) *A clear allocation of competences to various administrative levels;*
 - (ii) *That further provisions are made for the implementation of an obligatory reporting and coordination system for legislative drafting in order to avoid duplication;*
 - (iii) *Principles and mechanisms are put in place for integrating environmental concerns into other sectors.*

(a) Partially implemented. In 2011, environmental matters were dealt with by the Sector of Natural Resources, Energy and Environment of the Ministry of Foreign Trade and Economic Relations. In 2017, they are dealt with by the Sector of Water Resources, Tourism and Environmental Protection of the Ministry. While separation of competences on environmental protection from those on energy is a positive step, this reorganization is no more than a cosmetic improvement. The number of staff dealing with environmental issues did not increase. The role of the Ministry in coordinating and facilitating harmonization of environmental policy and legislation is limited.

(b) Not implemented.

Recommendation 1.2:

The State Ministry of Foreign Trade and Economic Relations in cooperation with the relevant authorities in the Federation of Bosnia and Herzegovina and Republika Srpska, and with broad participation from all stakeholders, should:

- (a) *Develop the legal basis for a sustainable development strategy;*
- (b) *Prepare and propose for adoption a draft a strategy for sustainable development, and specify the policy instruments and indicators to monitor and track progress, and the economic instruments that will be required to ensure its full implementation;*
- (c) *Elaborate an action plan for the implementation of the strategy. The action plan should be fully integrated into the budget process to ensure that it is allocated the financial resources needed to achieve its objectives.*
- (d) *Set up a national commission on sustainable development, to include members of major groups, which would be entrusted with strategic guidance of sustainable development efforts.*

Not implemented.

Recommendation 1.3:

The Federal Ministry of Environment and Tourism and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should expedite the adoption of secondary legislation and approximation of the EU environmental acquis. Specifically they should:

¹² The second review of Bosnia and Herzegovina was carried out in 2010.

- (a) *Strengthen legal capacity within the ministries to develop and implement environmental laws and policies;*
- (b) *Monitor evolving EU requirements and new EU legislation to which approximation efforts must be aligned.*

See also recommendation 5.1(a).

Partially implemented. The pace of the adoption of secondary legislation and approximation of the EU environmental acquis in Bosnia and Herzegovina is visibly slower than in other countries. Both the Federation of Bosnia and Herzegovina and Republika Srpska are at an early stage in their efforts to transpose the EU environmental acquis into their legislation.

Recommendation 1.4:

The entities Government should:

- (a) *Assess the extent of institutional weakness of environmental institutions affecting environmental policy, regulatory functions, and funding;*
- (b) *Where relevant, redress institutional fragmentation through improved reorganization of roles and responsibilities within the respective ministries.*

Not implemented.

Recommendation 1.5:

The Federal Ministry of Environment and Tourism and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should strengthen their overall capacity for environmental management by:

- (a) *Strengthening institutions by implementing capacity-building and training programmes;*
- (b) *Encouraging other sectors to integrate environmental concerns into their policy and legislative frameworks.*

(a) Not implemented. There is no systematic training and professional development of civil servants on environmental and sustainable development issues. In both entities, training and professional development of staff of the institutions responsible for environmental issues takes place sporadically as part of international projects and during workshops organized in the framework of conventions.

(b) Partially implemented. The integration of environmental considerations into sectoral policies and legislation is at the early stages in the energy, mining, transport, agriculture, forestry and health sectors, and is yet to start in the tourism and education sectors. Such a low level of integration is partially explained by the weak legal framework for strategic environmental assessment and the limited use of this tool.

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Parts of the conclusions and recommendations from the first EPR of Bosnia and Herzegovina are still valid and are listed below.

EPR I – Recommendation 1.1:

The Council of Ministers should establish an environment agency, which should:

- (a) *Provide advisory services to the authorities and institutions on both State and entity level in creation of strategy of sustainable development, environmental policy and management and protection of environment, natural resources and natural heritage;*
- (b) *Collect environmental monitoring data and report, as appropriate, to international bodies, convention-governing bodies and the European Environment Agency;*
- (c) *Manage, supervise and coordinate the implementation of the entities' plans for management and protection of waters, air, land, forests, as well as management of waste and chemicals (POPs, ODS, transboundary pollutants and dangerous pesticides);*
- (d) *Develop methodologies to facilitate a common approach to environmental management; and*

(e) *Provide training, capacity building and awareness-raising.*

The environment agency should rely on and assist the inter-entity bodies.

Not implemented.

EPR I – Recommendation 1.2:

Pursuant to the decision of the Council of Ministers, the Ministry of Foreign Trade and Economic Relations should begin as soon as possible to draft:

- (a) A new State law on environmental protection and all relevant secondary legislation; and*
- (b) A strategy for environmental protection and sustainable development, in cooperation with the relevant Environment Ministries in the Federation of Bosnia and Herzegovina and Republika Srpska, and with broad participation from all stakeholders.*

The strategy should aim at:

- *Strengthening the institutional capacity for designing and implementing environmental policy at all levels;*
- *Developing and institutionalizing communication among sectors and ministries within and among the State, the entities and Brčko District;*
- *Establishing procedures for communication between officials and stakeholders in decision-making for sustainable development; and*
- *Improving the knowledge of the general public about the significance of environmental protection and encouraging the preparation of awareness-raising programmes.*

Not implemented.

EPR I – Recommendation 1.3:

The Federation's Ministry of Physical Planning and Environment and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should be strengthened, as a matter of priority, so that they are able to:

- (a) Prepare all secondary legislation required by the new Laws on Environmental Protection, Air Protection, Water Protection, Waste Management, Nature Protection and the Environmental Fund;*
- (b) Organize and implement effectively environmental permitting, inspection and control; and*
- (c) Implement all the tasks incumbent upon them as ministries.*

Both Ministries may be strengthened either by increasing the number of permanent staff or by hiring external experts ad hoc.

Partially implemented. Some increase in the number of staff working on environmental issues in the Department for Environmental Protection of the Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska was observed. However, practical implementation of this recommendation needs to be seen in the context of the current ban on the expansion of public administration in the country in line with the conditions imposed by the IMF.

Chapter 2: Compliance and enforcement mechanisms

Recommendation 2.1:

- (a) At all levels of Government, adequate formal and informal coordination of environmental matters (planning, permits, inspections and enforcement) is essential;*
- (b) The State's Ministry of Foreign Trade and Economic Relations should make a precise estimate of the staff required for environmental tasks and ensure that vacancies are properly filled;*
- (c) The main environmental authorities at entity level should provide regular education and training on the job, on a non-commercial basis, to ensure that staff who are responsible for issuing permits and for*

inspections, at the entity level, as well as at the cantonal and municipal levels, adapt their skills accordingly.

See also recommendation 7.2 in this report.

- (a) and (b) Partially implemented. Coordination is in place, but understaffed.
- (c) Partially implemented. Joint training of sectoral inspectorates is needed.

Recommendation 2.2:

The Federal Administration of Inspection Services and Republika Srpska's Administration for Inspection Activities should ensure that operators of enterprises and installations file an environmental application, by preparing and publicizing a list of operators who should apply for environmental permit, accompanied by a schedule for mandatory application.

Partially implemented. The environmental permits are listed on the web, but there is a need to link them with the EIA reports and environmental requirements set in the permits.

Recommendation 2.3:

The Federal Ministry of Environment and Tourism and Administration of Inspection Services, and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology, and the Administration for Inspection Activities must keep each other informed about the content of permits (in outline at least), and the results of inspections, through an institutionalized procedure.

Partially implemented. The two entities' bodies responsible for inspection implement inspections independently.

Recommendation 2.4:

The Federal Administration of Inspection Services and Republika Srpska's Administration for Inspection Activities should exchange experiences on planning of inspection activities on the basis of risk assessment; This could also be usefully undertaken at other relevant governmental institutions.

Not implemented. The two entities' bodies responsible for inspection implement inspections, including planning, independently.

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Parts of the conclusions and recommendations from the first EPR of Bosnia and Herzegovina are still valid and are listed below.

EPR I - Recommendation 1.4:

The Federation's Ministry of Physical Planning and Environment and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should develop the necessary secondary legislation for the implementation of the new framework Law on Environmental Protection and other specialized environmental laws as soon as possible. The most urgent issues are:

- (a) *Establishment of a detailed to environmental impact assessment (EIA) procedure with all the necessary steps: preparation of the list of activities that are subject to EIA, early notification, screening and scoping, public participation at all levels, access to information and decision-making;*
 - (b) *Establishment of a detailed SEA procedure for plans and programmes;*
 - (c) *Development of a permitting system under the Law on Environmental Protection, including integrated (IPPC) permits; and*
 - (d) *Updating of their industrial plant inventories and establishment of new registers of polluters.*
- (a) Implemented. The EIA procedure is established by the law.
 - (b) Implemented. The SEA procedure is established by the law.
 - (c) Partially implemented. The regulatory framework has been established, but implementation is slow.
 - (d) Implemented. The register is established.

Chapter 3: Monitoring, information, public participation and education

Recommendation 3.1:

Based on the Memorandum of Understanding on National Environmental Information Systems, the State Ministry of Foreign Trade and Economic Relations, in cooperation with the Inter-entity Steering Committee for the Environment, the Inter-entity Commission for Water and relevant entity institutions and the DB should take steps to create an integrated monitoring system in BiH.

See also recommendation 9.1 in this review.

Not implemented.

Recommendation 3.2:

The State Ministry of Foreign Trade and Economic Relations, the Federal Ministry of Environment and Tourism, and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should complete the development of specific modalities for sharing, processing and integration of environmental data, publishing indicator-based environmental assessment reports for BiH, and their circulation and uploading on the Internet to make them available to the general public.

Not implemented.

Recommendation 3.3:

The Federal Ministry of Environment and Tourism, and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should ensure that existing environmental advisory councils work on the principles of the Aarhus Convention.

Not implemented.

Recommendation 3.4:

The State Agency for Education, in close cooperation with the State Ministry of Foreign Trade and Economic Relations and entities' education and environment ministries, media representatives and other stakeholders, should establish a national commission on education for sustainable development (ESD). The commission should be entrusted with the preparation of the national strategy for ESD, as a priority.

Not implemented.

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Parts of the conclusions and recommendations from the first EPR of Bosnia and Herzegovina are still valid and are listed below.

EPR I – Recommendation 3.1:

The Ministry of Physical Planning and Environment of the Federation of Bosnia and Herzegovina and the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska should issue, without delay, regulations to specify, in particular:

- *New procedures for setting or revising environmental quality standards harmonized with European standards;*
- *Measurements, monitoring and reporting requirements for operators;*
- *Criteria for the qualification of experts for self-monitoring by polluting enterprises; and*
- *Modalities for the registers of installations and of pollution taking into account the requirements of the UNECE Protocol on PRTRs.*

Not implemented.

EPR I - Recommendation 3.3:

When the State Ministry of Foreign Trade and Economic Relations prepares the environmental law for Bosnia and Herzegovina it should cover, among other things, the specific modalities for setting up, financing and operating a national environmental information system. The law should specify the responsibilities of the entities and the State's institutions (including the national agency to be established) regarding:

- (a) The collection of environmental data and information, their storage, evaluation and dissemination;*
- (b) The development, on the basis of international experience, of environmental indicators for data collection in the entities and the State and reporting to them;*
- (c) The publication of state-of-the-environment reports for consideration by the Parliamentary Assembly and the Council of Ministers of Bosnia and Herzegovina, their circulation among interested institutions at various levels and uploading on the Internet to make them available to the general public;*
- (d) Transmission of environmental data and reports, on behalf of Bosnia and Herzegovina, to governing bodies of applicable international conventions;*
- (e) Participation in EIONET, including the designation of a national focal point, national reference centres and expert institutions, and in other international programmes on environmental monitoring and assessment; and*
- (f) Training of experts in monitoring and information management.*

Not implemented.

Chapter 4: Implementation of international agreements and commitments

Recommendation 4.1:

The State Ministry of Foreign Trade and Economic Relations should:

- (a) Strengthen the practical implementation and enforcement of the global and regional multilateral environmental agreements that have been ratified;*
- (b) Ensure the appointment of national focal points for all MEAs;*
- (c) When necessary and/or envisaged by obligations under the MEAs, ensure establishment of the necessary institutional setting and adoption of the relevant programmes and plans including their adequate financing.*

- (a) Not implemented. In general, practical implementation and enforcement has not been strengthened. Although there were significant improvements in the implementation and enforcement of specific agreements, such as the Vienna Convention and the Montreal Protocol, the Rotterdam Convention and the Convention on Persistent Organic Pollutants, implementation has been below what is expected with regard to the CBD, UNCCD, UNFCCC and Kyoto Protocol in 2007, and the Basel and Aarhus Conventions, and has been very limited with respect to CITES, the Cartagena Protocol, the Convention on Long-range Transboundary Air Pollution, the Convention on the Transboundary Effects of Industrial Accidents and the Convention on Environmental Impact Assessment in a Transboundary Context.*
- (b) Not implemented. Bosnia and Herzegovina continues not to ensure the appointment of the required national focal points for all MEAs.*
- (c) Partially implemented. Bosnia and Herzegovina does not have in place mechanisms and rules to ensure coordination of the implementation of international environmental agreements. The establishment of mechanisms and rules that regulate the role and responsibilities of each of the actors, the actions to be taken and the inherent decision processes has not been put in place in Bosnia and Herzegovina except for a few agreements, namely on ozone, climate change and biodiversity. Some programmes and plans have been adopted in recent years (Action Programme aligned to the UNCCD 10-Year Strategy and Reporting Process under UNCCD, Strategy and Action Plan for Protection of Biodiversity for the period 2015–2020; National Implementation Plan for Reduction and Disposal of Persistent Organic Pollutants); however, they do not fulfil the mosaic of plans and programmes that are required under the MEAs the country has acceded to.*

Recommendation 4.2:

As soon as appropriate capacities for implementation are available, the Government of Bosnia and Herzegovina should accede to the following conventions and protocols:

- *Convention on the Transboundary Effects of Industrial Accidents;*

- *Convention on the Conservation of Migratory Species of Wild Animals;*
- *The relevant Protocols to the Convention on Long-range Transboundary Air Pollution;*
- *The relevant protocols to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean;*
- *Protocol on Pollutant Release and Transfer Registers to the Aarhus Convention;*
- *Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes*
- *Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes and to the 1992 Convention on the Transboundary Effects of Industrial Accidents;*
- *Protocol on Strategic Environmental Assessment to the Espoo Convention.*

Partially implemented. Bosnia and Herzegovina has become a party to the following agreements included in the recommendation: the Convention on the Transboundary Effects of Industrial Accidents; the Protocol on Pollutant Release and Transfer Registers to the Aarhus Convention; the Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes; and the Protocol on Strategic Environmental Assessment to the Espoo Convention.

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Parts of the conclusions and recommendations from the first EPR of Bosnia and Herzegovina are still valid and are listed below.

EPR I - Recommendation 4.1:

The State Ministry of Foreign Trade and Economic Relations, working closely with the Federation's Ministries of Physical Planning and Environment and of Agriculture, Water Management and Forestry, Republika Srpska's Ministries of Physical Planning, Civil Engineering and Ecology of Agriculture, Forestry and Water Management and the appropriate authorities in Brčko District, should develop a national strategy and action plan for international environmental cooperation consistent with the Strategy for environmental protection and sustainable development proposed in recommendation 1.2. The strategy should address the role in international cooperation of all relevant actors, including non-governmental.

Not implemented. Bosnia and Herzegovina does not have a national strategy and action plan for international environmental cooperation. With the recent approval of the Environmental Approximation Strategy, which will provide the country and overall environment with a compass for action and taking into account the persistent fragilities pointed out with regard to the accession, implementation and enforcement of environmental multilateral and regional agreements, the country could benefit from developing and adopting the recommended international cooperation strategy.

Chapter 5: Economic instruments and expenditure for environmental protection

Recommendation 5.1:

The entity Governments should:

- (a) *Introduce the secondary legislation which is still missing into all entity-level environmental legislation. This secondary legislation should have an unambiguous fee structure;*
- (b) *Strengthen compliance with the "consumer pays" and "polluter pays" principles through adequate penalties and enforcement in cases of non-compliance;*
- (c) *Start to collect all fees and charges instituted by the new secondary legislation [in order to ensure full-cost recovery];*
- (d) *In case it has not been politically possible to make environmental fees high enough for them to have an effect on the environment, increase or adjust the level of fees and charges at a later date.*

Partially implemented. Secondary legislation, including a clear indication of fee structures, has been introduced in many cases. However, the legislation is usually not fully compliant with the consumer pays, polluter pays and cost recovery principles, for several reasons, including the level of fees being too low with respect to the costs of providing the respective services and of restoring environmental resources. In addition, enforcement measures

are not adequate in many cases. The affordability issue and the inefficiencies and underprofitability in environmental resources management are still key challenges for the implementation of effective economic instruments for environmental protection in Bosnia and Herzegovina.

Recommendation 5.2:

The Council of Ministers of BiH should strengthen the role of the State Agency for Statistics in:

- (a) *Collection, analysis and dissemination of environmental accounting data;*
- (b) *Conducting analysis on the efficiency of environmental taxes and fees and cost-benefit analysis of them.*

Partially implemented. Progress has been made in collection and dissemination of environmental data, but further progress is needed, in particular regarding collection of homogeneous financial and technical data, organized information about the implementation of economic instruments for environmental protection at all levels of government, the elaboration of significant performance indicators and analysis of the efficiency and effectiveness of taxes and fees, incentives and expenditures for environmental protection.

Recommendation 5.3:

The entity Governments should:

- (a) *Strengthen the organizational structure of the environmental funds, and*
- (b) *Increase their sources of funding, in accordance with relevant secondary legislation.*

Partially implemented. Secondary legislation has introduced sources for funding the Environmental Protection Funds of the Federation of Bosnia and Herzegovina and Republika Srpska, while, in Brčko District, there is no fund for environmental protection.

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Parts of the conclusions and recommendations from the first EPR of Bosnia and Herzegovina are still valid and are listed below.

EPR I – Recommendation 2.1:

- (a) *The Ministry of Physical Planning and Environment of the Federation of Bosnia and Herzegovina and the Ministry of Physical Planning, Civil Engineering and Ecology of Republika Srpska in cooperation with the State Ministry of Foreign Trade and Economic Relations, should draw up by-laws and regulations to introduce the economic instruments stipulated in the environmental laws and ensuring the consistency with the State environmental policy.*
- (b) *When developing the secondary legislation, they need to propose adequate levels of charges, fees, taxes and penalties. If it is not feasible to introduce instruments at the desired levels (for example, user fees at the level of full cost recovery for the service provided), the charges may be reduced at first, but should increase incrementally with a clear time frame until they reach the desired levels.*

Partially implemented. Secondary legislation, including a clear indication of fee structures, has been introduced in many cases. However, this legislation is usually not fully compliant with the consumer pays, polluter pays and cost recovery principles, for several reasons, including the level of fees being too low with respect to the costs of providing the respective services and of restoring environmental resources. In addition, enforcement measures are not adequate in many cases. The affordability issue and the inefficiencies and underprofitability in environmental resources management are still key challenges for the implementation of effective economic instruments for environmental protection in Bosnia and Herzegovina.

EPR I - Recommendation 2.2:

The Federation's Ministry of Physical Planning and Environment and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should establish a regularly updated and readily accessible database of economic instruments for the environment. This would enable all levels of government, businesses and the general public to have a clear understanding of the instruments that exist, their main purpose, the recipients of the revenues (and the amounts) and whether the revenues are used for environmental purposes. The changes in rates, when necessary, and the reasons for such changes would also become transparent. These databases should be made available to the State for policy-making.

Partially implemented. Progress has been made in collection and dissemination of environmental data, but further progress should be made, in particular regarding collection of homogeneous financial and technical data, organized information about the implementation of economic instruments for environmental protection at all levels of government, the elaboration of significant performance indicators and analysis of the efficiency and effectiveness of taxes and fees, incentives and expenditures for environmental protection.

EPR I – Recommendation 2.3:

The Federation's Ministry of Physical Planning and Environment and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology, in cooperation with environmental NGOs, the media and other stakeholders, should organize a public awareness campaign with the aim of increasing collection rates for services related to the use of natural resources as well as for waste management. Such a campaign should inform the public of the importance and the positive impact of economic instruments on the environment.

Partially implemented. Public campaigns to raise citizens' awareness of the importance of environmental protection should be reinforced.

EPR I – Recommendation 2.5:

(a) The Federation's Agency for Privatization and Republika Srpska's Directorate for Privatization should strengthen their cooperation respectively with the Federation's Ministry of Physical Planning and Environment and Republika Srpska's Ministry of Physical Planning, Civil Engineering. In particular, they should involve them in the decision-making in the privatization process to promote environmental investments by the new owners by:

- Developing and introducing clauses on past environmental liabilities into the privatization agreements;*
- Requiring enterprises and industries put up for privatization to carry out environmental audits; and*
- Including compliance plans, prepared by the new owner, in the privatization agreement. These plans should specify the measures that enterprises and industries have to take to comply with environmental standards and regulations.*

(b) The Agency and the Directorate should have one or more environmental specialists on their staff.

Partially implemented. The promotion of environmental investments in the privatization process has been made by introducing clauses on past liabilities and requirements on environmental compliance plans, as recommended. However, there is still a large presence of an often unprofitable and inefficient public sector, which is involved in a wide range of activities, discouraging private capital flows.

Chapter 6: Climate change and environment

Recommendation 6.1:

The State Government of BiH, in cooperation with the Governments of entities and Brčko District, should:

- (a) Establish mechanisms and administrative structures for regular development of emissions inventories and emissions projections in accordance with international methodologies and for reporting;*
- (b) Speed up preparation of the second National Communication under UNFCCC;*
- (c) Finalize legal and institutional preparations for implementation of CDM projects.*

(a) Partially implemented. There are no legally prescribed procedures for the Bosnia and Herzegovina inventory and no institutions are mandated to carry out the GHG inventory at the state level, the level of the Federation of Bosnia and Herzegovina and Brčko District level. However, during the preparation of the Second and Third National Communications under the UNFCCC, the ad hoc GHG inventory compliance team was established and inventories were carried out. The GHG inventory in the Second National Communication covered a 10-year period, 1991–2001. In the framework of the Third National Communication, the GHG inventory was compiled for the years between 2002 and 2009, and for 2012 and 2013.

(b) Implemented. The Second National Communication under the UNFCCC was submitted in 2013.

(c) Implemented. The Council of Ministers has adopted the Decision on Establishment of an Authorized Body for the Implementation of the Clean Development Mechanism (CDM) of the Kyoto Protocol of the

UNFCCC in Bosnia and Herzegovina. In accordance with the Decision, the Designated National Authority (DNA) has been established and necessary documentation for the smooth operation of this body was prepared. The DNA commenced work at the beginning of 2012.

Recommendation 6.2:

The State Government of BiH, in cooperation with the Governments of the entities and Brčko District, should:

- (a) *Develop a national climate change mitigation strategy and related action plan;*
- (b) *Develop, within the framework of subregional activities, a national climate change adaptation strategy and related action plan.*

Implemented. The Climate Change Adaptation and Low-Emission Development Strategy was adopted by the Council of Ministers of Bosnia and Herzegovina in October 2013. The Strategy clearly defines the results and activities, as well as the funds necessary for their implementation. The adaptation component of the Strategy is focused on seven priority sectors.

Recommendation 6.3:

The State Government of BiH, as well as the Governments of the entities, should continue in their efforts to develop and/or update and implement energy strategies and strategic plans with the aim of:

- (a) *Improving energy efficiency in both production and consumption;*
- (b) *Supporting energy saving in the public sector;*
- (c) *Supporting the wider introduction of renewable energy, while respecting air and water protection and nature conservation;*
- (d) *Encouraging the development of carbon off-set forestry projects;*
- (e) *Coordinating activities relating to climate change mitigation with those for reduction of air pollutant emissions to make use of the "one measure, two effects approach" as per recommendation 5.4 from the first EPR (ratification of CLRTAP protocols).*

- (a) Implemented. The low emission development component of the Climate Change Adaptation and Low-Emission Development Strategy aims at creating a low-carbon and resource-efficient economy through increasing levels of energy efficiency, greater renewable energy use, and improved energy and transport infrastructure and services.
- (b) Implemented. In the Federation of Bosnia and Herzegovina, the 2017 Law on Energy Efficiency envisages the establishment of the agency for energy efficiency to perform activities that improve conditions and measures for rational use and savings of energy in all consumption sectors.
- (c) Implemented. In 2013, the Federation of Bosnia and Herzegovina adopted the Law on the Use of Renewable Energy Sources and Efficient Cogeneration, which transposed in the legislation of the Federation of Bosnia and Herzegovina provisions of Directives 2009/28/EC on the promotion of the use of energy from renewable sources and 2004/08/EC on the promotion of cogeneration. In Republika Srpska, the 2013 Law on the Use of Renewable Energy Sources and Efficient Cogeneration transposed in the legislation of Republika Srpska requirements of the same two EU Directives.
- (d) Not implemented. There is no information on the carbon offset forestry projects developed and implemented in Bosnia and Herzegovina.
- (e) Implemented. The Climate Change Adaptation and Low-Emission Development Strategy lists some measures that fall under the "one measure, two effects approach", for example, to improve the efficiency of energy generation in all coal-fired power plants to at least 40 per cent by 2025.

Chapter 7: Sustainable management of water resources

Recommendation 7.1:

- (a) *The Government of Bosnia and Herzegovina should streamline existing State-level authority over water-related issues so that there is one water resources management department in MoFTER.*
- (b) *The Federation's Government should streamline existing entity-level authority over water-related issues so that there is one water resources management department in the Federal Ministry of Agriculture, Water Management and Forestry.*

- (c) *Republika Srpska's Government should streamline existing entity-level authority over water-related issues so that there is one water resources management department in Republika Srpska's Ministry of Agriculture, Forestry, and Water Resources.*
- (d) *At the commune level, concentrate all water-related issues in one ministry with clearly defined responsibilities. The institutional organization of the cantons for water-related issues should be harmonized. Public water management companies should be organized in line with technical principles and be totally politically independent (especially the management). In RS, the public water management companies for flood management should be reorganized: an administrative and coordinative body should be implemented in the water management agencies for execution of complex works (such as operating and maintaining pumping stations) and simpler practical works should be privatized. This was also foreseen in the draft of the new RS water law and has been successfully implemented in the Federation.*

Not implemented. Some key steps towards better water governance in Bosnia and Herzegovina were taken. Indeed, river basin organizations are sounder and river basin management plans were prepared under their coordination. Both are of the utmost importance in promoting integrated water management. The priority is to increase communication among river basin organizations, including data sharing, criteria harmonization and process integration, and to foster international cooperation with similar organizations. River basin organizations should be empowered further in monitoring and flood protection, with a stronger interplay among the Federation of Bosnia and Herzegovina and Republika Srpska, as well as with Brčko District.

Recommendation 7.2:

The entity Governments should clearly define the responsibilities of water inspectorates to avoid overlapping duties. The competent authorities for inspection should be determined on the basis of the complexity of the inspection. Simple inspections should be performed at the cantonal (Federation) or municipal (Republika Srpska) level, whereas complex inspections should be performed at the entity level. The criteria for determining the complexity of inspections should be simple and transparent.

Not implemented.

Recommendation 7.3:

- (a) *The Government of Bosnia and Herzegovina should develop a State-level water law, taking into account the existing entity water laws and clearly identifying and allocating responsibilities in terms of shared water resources and countrywide water management issues. The Federal Government should also develop a national water management strategy and action plans which concretize the corresponding work at the national level.*
- (b) *The Governments of the Federation and Republika Srpska should accelerate the implementation of existing sub-laws and standards and harmonize the existing secondary legislation, including guidelines and standards. The Government of Republika Srpska should develop and adopt a water management strategy with corresponding action plans, as prescribed in the entity law on water protection.*
- (c) *Where the existing water laws are not in line with the new entity water laws, the cantonal authorities in the Federation and municipal authorities in Republika Srpska should accelerate the adoption and implementation of new communal water laws that are in line with the entity-level legislation. In terms of corresponding sub-laws in the different cantons and/or municipalities, special attention should be paid to uniform compliance, especially in the fields of water supply and wastewater management.*

Partially implemented. The implementation of this recommendation is making good progress, largely because of the EU pre-adhesion process in Bosnia and Herzegovina. A significant effort regarding the legal framework is being pursued at all institutional levels.

Recommendation 7.4:

The entity Governments should establish a sustainable, efficient and transparent water funding system with uniform and comparable financial conditions and compliance. The following two goals should be considered:

- (a) *A comprehensive and reliable sector finance study should be carried out, taking into account urban and rural areas.*
- (b) *The pricing of water supply services should be adjusted to ensure that the cost of services, reinvestment and maintenance is covered, while adequate provisions for vulnerable social groups are made.*

Not implemented.

Recommendation 7.5:

The entity Governments should renovate existing, or build new, water infrastructure with an emphasis on water and groundwater protection according to a priority list of relevant water projects.

Not implemented.

Recommendation 7.6:

The entity Governments, should also take into consideration the following additional recommendations, while implementing recommendations 7.3, 7.4 and 7.5 of the first EPR:

- (a) *Emphasize the significance of drinking water quality control and treatment of drinking water, wastewater collection and treatment.*
- (b) *For wastewater treatment and water supply systems in small cities, focus on alternative low-cost facilities that are easy to maintain, extend and upgrade and have low energy consumption. Conventional facilities and outdated technology are often expensive to maintain as, due to the lack of local production, no spare parts are available on the local market.*
- (c) *Speed up the process of rebuilding the treatment plant in Sarajevo (for 600,000 inhabitants), which used to be an efficient plant before the war. Located on the upper part of the Bosna River, it would significantly improve the water quality situation in the densely populated area along the river.*

Partially implemented. Some water treatment and wastewater treatment plants are under construction/rehabilitation in Bosnia and Herzegovina. Several others are in tender processes or seeking funding in the next few years. The effort is massive and will be accomplished only if financial support from the EU and/or multilateral financing institutions is arranged. Therefore, these recommendations from the first EPR are still valid, – except (c), which was achieved in 2017. Recommendation (b) deserves continuous attention because the application of *appropriate technologies* is always the preferred approach.

* * * * *

Parts of the conclusions and recommendations from the first EPR of Bosnia and Herzegovina are still valid and are listed below.

EPR I – Recommendation 7.2:

- (a) *The Government of the State of Bosnia and Herzegovina, in cooperation with the Government of the Federation of Bosnia and Herzegovina and the Government of Republika Srpska, should develop a new water policy pursuant to the Memorandum of Understanding with the European Communities and taking into account the Millennium Development Goal to halve by 2015 the proportion of people without access to safe drinking water.*
- (b) *The Federation's Ministry of Physical Planning and Environment and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology, in cooperation with their Ministries of Agriculture, Forestry and Water Management, should start now to:*
 - (i) *Ensure that drinking water is safe by properly treating abstracted water;*
 - (ii) *Develop water protection strategies consistent with the new State policy and the Millennium Development Goals;*
 - (iii) *Establish standards and norms for water quality which are consistent with international ones; and*
 - (iv) *Reduce the leaks from the distribution systems by repairing and replacing old and damaged pipelines.*

The number of households with access to public water-supply systems should be substantially increased.
- (c) *As soon as they are established, the river authorities should develop plans for river basin management.*

(a) and (b) Not implemented.

(c) Implemented, despite the fact that planning is a circular process.

EPR I – Recommendation 7.3:

The entities' Ministries of Agriculture, Forestry and Water Management in cooperation with the entities' Ministries of environment and with the help of the public enterprises for water management, should assist and require the municipalities to reduce the negative impact of wastewater discharges by:

- (a) Reducing the leaks from public sewerage systems and by building new sewerage systems to substantially increase the number of household connections;*
- (b) Building municipal waste-water treatment plants of environmentally high standards and with sufficient treatment capacity in all the big cities; and*
- (c) Ensuring that sewage sludge from municipal treatment plants and septic tanks is sufficiently treated for use as fertilizer in agriculture or disposal in sanitary landfills.*

Not implemented.

EPR I – Recommendation 7.4:

The Federation's Ministry of Physical Planning and Environment and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology, in cooperation with the other ministries involved, should take appropriate action to reduce the negative environmental impact of wastewater discharges from industry and seepage water from mining and manufacturing by:

- (a) Ensuring that water treatment plants are reconstructed and brought on stream again;*
- (b) Drawing up a survey of the most polluting mining, manufacturing and other industries; and*
- (c) Instructing mining, manufacturing and other industries to take immediate and appropriate action to stop or reduce the discharges where drinking-water resources are seriously threatened.*

Not implemented.

EPR I – Recommendation 7.5:

The proposed environment agency, with the Federation's Ministry of Agriculture, Water Management and Forestry and Republika Srpska's Ministry of Agriculture, Forestry and Water Management, should work in close cooperation with the new river authorities on an urgent basis to reduce the impacts of floods. Steps to be taken include:

- (a) Improving and repairing, in cooperation with the regional and local authorities, existing flood protection systems and building new ones in exposed areas that do not have them, and taking non-structural measures for flood protection, in particular the conservation or rehabilitation of natural wetlands and retention areas; and*
- (b) Drawing up a comprehensive national flood disaster strategy, which includes preparedness, mitigation, recovery and reconstruction.*

Not implemented.

Chapter 8: Waste management

Recommendation 8.1:

The Agency for Statistics, the Federal Ministry of Environment and Tourism, Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology, the Brčko District Government and the cantonal authorities should improve their data and information collection on all types of waste, in order to provide the basic information needed for the development of sound waste management mechanisms, ensuring the efficiency of waste data collection and consolidation, as well as consistency [and correspondance to actual waste flows].

Partially implemented. There is significant improvement in data collection related to municipal solid waste since 2011, and also related to waste generated in production activities (i.e. industrial, mining, construction and demolition) and hazardous waste on the state level. However, the range of collected data in the two entities and on the state level is not harmonized; in addition, separate waste-related data for Brčko District is not available. There are waste types and streams that are not covered by data collection at all in any of the territorial units, such as agricultural, medicinal, radioactive waste and POPs, and selected waste streams that might be subject to separate collection and extended producer responsibility. Due to the significant inconsistency among the data at

the state and entity levels for most data types, and the lack of appropriate waste-related data for Brčko District, this recommendation should be considered as still valid.

Recommendation 8.2:

- (a) *The entity Governments and municipalities should accelerate the construction of regional sanitary landfills and the establishment of financially, socially and environmentally sound municipal waste management systems, and close open dumpsites which are currently being used;*
 - (b) *The entity and cantonal governments should make further efforts to close illegal/uncontrolled dumpsites whose locations are threatening health and the environment.*
- (a) Not implemented. Despite the willingness of international donors to financially support the construction of regional sanitary landfills, the envisaged plan to cover the whole country with regional landfills had not been completed by the end of 2016, mainly due to problems with the process of obtaining the required permits for urban planning/location, environment and construction being significantly longer than anticipated, and delays in obtaining intermunicipal agreements for the establishment of the regional landfills.
 - (b) Not implemented. There was some progress with the closure of illegal dumpsites, which was connected to regional landfill construction; however, with the lack of a comprehensive dumpsite inventory on either the state or entity level, it is hard to give a realistic estimation of the number of dumpsites to be closed.

Recommendation 8.3:

The FBiH and RS Ministries of Health, in cooperation with the other relevant ministries - the Federal Ministry of the Environment and Tourism, Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology, and the Brčko District Government - should adopt international best practices in order to improve their hazardous medical waste management.

Not implemented.

Recommendation 8.4:

The Federal Ministry of the Environment and Tourism, Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology, the Brčko District Government and the cantonal authorities, in collaboration with various partners, should:

- (a) *Raise public understanding and awareness of sustainable waste management to facilitate further progress on the development of regional landfills, prohibition of illegal dumping of waste, separation of waste, and minimizing the generation of waste in households;*
- (b) *Make efforts to distribute information widely on waste generation and management, relevant policy documents, and the development and establishment of legislation.*

Not implemented. Despite the awareness-raising campaigns and several actions in both entities to promote sustainable waste management, this issue mostly remains of low importance in public opinion and it becomes the focus of public debate only when serious pollution or a landfill malfunction occurs.

Recommendation 8.5:

The Federal Ministry of the Environment and Tourism, Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology and the Brčko District Government should scale up and promote materials and energy recovery from waste through separate collections, reuse and recycling, and foster business development based on waste.

Partially implemented. With the introduction of the system of operators for packaging waste (and for WEEE in the Federation of Bosnia and Herzegovina), both entities took a significant step towards promoting the separate collection, reuse and recycling of waste, with ambitious targets. The system should be further adjusted, improved and extended to other waste streams.

Parts of the conclusions and recommendations from the first EPR of Bosnia and Herzegovina are still valid and are listed below.

EPR I – Recommendation 6.1:

The Federation’s Ministry of Physical Planning and Environment and Republika Srpska’s Ministry of Physical Planning, Civil Engineering and Ecology, in cooperation with municipalities, should implement the Solid Waste Strategy. To strengthen its implementation, they should:

- (a) Raise awareness and organize training in separation, recycling and reuse; and*
 - (b) Undertake feasibility studies for organizing the separate collection of municipal waste and constructing facilities for its recycling and reuse. The studies should also examine economic aspects including the potential market for such recycled or reused goods.*
- (a) Partially implemented. Awareness-raising campaigns and actions aiming at promotion of separate collection are organized on an ad hoc basis in both entities; however, given the fact that facilities for separation of MSW are not available to residents in most parts of the country, these events should be further organized in parallel with the installation of such facilities in settlements, as part of the introduction of separate collection of MSW services in municipalities. Training and workshops for residents on recycling and reuse should be organized.
 - (b) Partially implemented. Feasibility studies for regional MSW landfills usually covered the aspects of separate collection of such waste; however, the implementation of the measures for separate collection in municipalities is mainly lagging behind, thus hindering the establishment of a viable market for recycled and reused goods in Bosnia and Herzegovina.

EPR I – Recommendation 6.5:

The Federation’s Ministry of Physical Planning and Environment in cooperation with its Ministry of Energy, Mining and Industry and Republika Srpska’s Ministry of Physical Planning, Civil Engineering and Ecology in cooperation with its Ministry of Economy, Energy and Development should:

- (a) Conduct feasibility studies on the introduction of environmentally sound processes for the use of some categories of waste or its components as secondary raw material; and*
 - (b) Prepare relevant legal acts on recycling and processing secondary raw material.*
- (a) Partially implemented. By the introduction of the system of operators for packaging waste (and also for WEEE in the Federation of Bosnia and Herzegovina), both entities took a significant step in this field, and the share of separated waste collected by the operators must be increased from year to year under the current regulations. However, the system should be extended to other waste streams and further measures are needed to enhance the use, and profitability of the use, of recycled (secondary) raw materials by manufacturers in Bosnia and Herzegovina.
 - (b) Not implemented. The current legal background for recycling and processing secondary raw materials is not sufficiently incentivizing for industry. Better regulation and incentives for manufacturers are needed, in order to increase the demand for secondary raw materials. This would also stimulate the separate collection of waste in the country.

Chapter 9: Forestry, biodiversity and protected areas

Recommendation 9.1:

- (a) The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, the Federal Ministry of Environment and Tourism, Republika Srpska’s Ministry of Physical Planning, Civil Engineering and Ecology and the Logistics Unit of Brčko District should promote the adoption of the draft national biodiversity strategy and action plan;*
- (b) Once adopted, the relevant governmental bodies at the State, entity and intra-entity levels should ensure that regulations and institutional mechanisms for implementation of the strategy are in place, including through the establishment of a formal process for intersectoral and inter-entity coordination, and the integration of relevant provisions in other sectoral strategies and planning documentation;*
- (c) The Council of Ministers should identify a body that will be responsible for coordination of data collection, data exchange, information flows, and monitoring, as they relate to full and effective implementation of the strategy.*

- (a) Implemented. The first NBSAP was finally adopted in 2011.
- (b) Partially implemented. Some inter-entity coordination efforts were made effective by the establishment of the Inter-Entity Coordination Body for the Environment. Intersectoral coordination is improved in Republika Srpska while the Federation of Bosnia and Herzegovina lacks better coordination mechanisms between the entity and the cantonal levels.
- (c) Partially implemented. Apart from the efforts of the National Focal Points for the CBD, no further bodies were appointed to support biodiversity-related data and monitoring.

Recommendation 9.2:

The Federal Ministry of Environment and Tourism and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology, in collaboration with their respective forestry departments, should:

- (a) *Develop and promote the adoption of RDB regulations at entity level or, if more appropriate, make the necessary amendments to existing RDB regulations;*
- (b) *Establish entity working groups with relevant stakeholders on preparation of entity RDBs based on existing information;*
- (c) *In cooperation with relevant stakeholders, develop educational and public awareness programmes and campaigns on RDB legal provisions and importance for conservation.*

Not implemented.

Recommendation 9.3:

To strengthen implementation of CITES, the Council of Ministers should:

- (a) *Nominate as the management authority for CITES the State's Ministry of Foreign Trade and Economic Relations and as additional management authorities the Federal Ministry of Environment and Tourism and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology. Once nominated, the additional management authorities should designate scientific authorities and strengthen capacity by applying to the CITES secretariat for training and capacity-building for CITES implementation, and by requesting expert support and capacity-building from the wildlife trade monitoring network TRAFFIC;*
- (b) *Establish a joint group on CITES implementation consisting of management and scientific authorities, representatives of customs and of the inspectorates and border police;*
- (c) *Initiate preparation and adoption of the necessary regulations for CITES implementation with expert support from the CITES secretariat.*

Not implemented.

Recommendation 9.4:

To improve the regulatory and implementation framework for hunting, the Federal Ministry of Environment and Tourism and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should:

- (a) *Conduct an inventory on the status of species that are hunted for all hunting areas and coordinate this work in order to produce a national inventory;*
- (b) *Complete delineation of all hunting areas and ensure the development of appropriate management plans;*
- (c) *Coordinate with the Ministry of Foreign Trade and Economic Relations activities related to CITES implementation in respect of species that are hunted and non-timber forest products;*
- (d) *Introduce new economic instruments into the organization of hunting.*

Not implemented.

Recommendation 9.5:

- (a) *The Federal Government should adopt as a matter of priority the new law on forests and provide for timely and full revision of existing regulations and the development and adoption of new ones necessary for full and effective implementation of the new law;*
- (b) *Republika Srpska's Ministry of Agriculture, Forestry and Water Resources should initiate the process of revision of the existing forest plans of JPS Šume RS, Sokolac to incorporate all the provisions of Forest Stewardship Council certification;*

- (c) *The Federal Ministry of Agriculture, Water Management and Forestry, Republika Srpska's Ministry of Agriculture, Forestry and Water Resources, and the Brčko District Department of Agriculture and Forestry, in cooperation with the respective entity ministries of environment, should:*
- (i) *Develop forestry strategies for their respective entities, ensuring sustainable forest management and forest conservation, including use of non-timber forest products;*
 - (ii) *Provide for forestry education, training and capacity-building, incorporating the relevant provisions of the Ministerial Conference on the Protection of Forests in Europe (MCPFE) and forest law enforcement and governance (FLEG) processes;*
 - (iii) *Complete preparation of action plans and forest programmes on the basis of the forest inventory and subsequent strategies;*
 - (iv) *Establish coordination mechanisms to provide for inter-entity dialogue and, where appropriate, joint actions to achieve sustainable forest management and forest protection;*
- (d) *The State's Ministry of Foreign Trade and Economic Relations should provide guidance on European and global forest processes to the Federal Ministry of Agriculture, Water Management and Forestry and Republika Srpska's Ministry of Agriculture, Forestry and Water Resources.*
- (a) Partially implemented. The draft law has been adopted by the Government (July 2017) and is now with the parliament for adoption..
- (b) Implemented. The Public Enterprise "Šume RS" has an FSC certificate. The certification process for Republika Srpska is completed.
- (c) (i) Implemented in Republika Srpska. The Strategy for the Development of Forestry for 2011–2021 was adopted in 2012.
Partially implemented in the Federation of Bosnia and Herzegovina. The forestry programme is developed and has been accepted by the Federal Government. It was subsequently sent to the Federal Parliament for adoption, but is not yet formally adopted since there is no law on forests, which would provide the legal basis for this. The draft programme encompasses 22 areas of sustainable forest management, including use of non-timber forest products.
- (ii) Not implemented.
 - (iii) Not implemented.
 - (iv) Not implemented.
- (d) Not implemented.

Recommendation 9.6:

- (a) *The Federal Ministry of Environment and Tourism and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should:*
- (i) *Provide for an assessment of the representativeness of the system of protected areas in order to adjust physical plans, including incorporation of new legal provisions for categories of protected areas compatible with IUCN categories and in accordance entities laws;*
 - (ii) *Substantially enlarge the system of protected areas based on physical plans and using existing feasibility studies provided for a number of protected areas in both entities;*
 - (iii) *Provide official protection status to designated Ramsar sites with special urgency and attention regarding Hutovo Blato;*
 - (iv) *Develop an action plan for applying the EU Habitat Directive and the Natura 2000 network. In so doing, it is recommended that the results of the project "Europe's Living Heart" be fully utilized;*
 - (v) *The Federal Ministry of Environment and Tourism and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should establish entity cadastres of all protected areas and the State's Ministry of Foreign Trade and Economic Relations should collate this data and report to international organizations on the current status of protected areas.*
- (a) (i) Implemented. The entities' Laws on Nature Protection were revised and protected area categories adjusted to the IUCN methodology.
- (ii) Partially implemented. While there were new protected areas designated since the second EPR, the overall territory of Bosnia and Herzegovina under protected areas is still the lowest in Europe.
- (iii) Partially implemented. Hutovo Blato has been designated a nature park (category V). The other two Ramsar Sites in the country still do not have a national designation.

- (iv) Partially implemented. There is a developed list of potential Natura 2000 sites in Europe. Significant further efforts are needed to fully utilize the other recommendations of the "Europe's Living Heart" project.
- (b) Partially implemented. There is a register of protected areas in Republika Srpska, while it is still lacking in the Federation of Bosnia and Herzegovina. The Ministry of Foreign Trade and Economic Relations has had no role in coordinating and reporting on protected areas data so far.

* * * * *

Parts of the conclusions and recommendations from the first EPR of Bosnia and Herzegovina are still valid and are listed below.

EPR I – Recommendation 8.2:

Republika Srpska's Ministry of Agriculture, Forestry and Water Management, the Federation's Ministry of Agriculture, Water Management and Forestry and Brčko District's Department of Agriculture and Forestry, in cooperation with the respective entities' ministries of environment, should:

- (a) *As soon as possible, develop a national forestry strategy (including forest use and timber industry) applying Strategic Environmental Assessment. The Strategy should ensure the gradual recovery of the forests and sustainable forest management, and include the development of a programme for forest certification as a first step toward sustainable forest use and management.*
- (b) *Draw up action plans on the basis of the strategy.*

Not implemented.

EPR I – Recommendation 8.3:

(a) *The Federation's Ministry of Physical Planning and Environment and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology should:*

- *Finalize and adopt red data books for plant and animal species according to the IUCN classification; and*
- *Accelerate the development of the by-laws for the respective Laws on Nature Protection.*

(b) *Republika Srpska's Ministry of Agriculture, Forestry and Water Management and the Federation's Ministry of Agriculture, Water Management and Forestry should similarly accelerate the development of by-laws for the respective new Laws on Forests.*

(c) *In developing these two sets of by-laws, it is essential for the Federation's Ministry of Physical Planning and Environment and Ministry of Agriculture, Water Management and Forestry and Republika Srpska's Ministry of Physical Planning, Civil Engineering and Ecology and Ministry of Agriculture, Forestry and Water Management to work together in order to define clearly the institutional responsibilities for nature reserves, protected areas and national parks.*

- (a) Implemented. Republika Srpska adopted its Red List in 2012 and the Federation of Bosnia and Herzegovina adopted its own in 2014. While the compilation of the two Red Lists is a welcome development, they have not been harmonized and there is no single/harmonized Red List at the state level. Harmonization of the existing Lists would pose a major issue since, for instance, the List of Republika Srpska does not contain the conservation status of listed species and the methodologies used for compiling the Lists are not mutually synchronized and, for the most part, do not follow the internationally recognized IUCN Red List Methodology.
- (b) Not implemented.
- (c) Implemented. The entities' Laws on Nature Protection were readopted in 2013–2014 and now clearly define institutional competences for protected areas.

Annex II

PARTICIPATION OF BOSNIA AND HERZEGOVINA IN MULTILATERAL ENVIRONMENTAL AGREEMENTS

Worldwide agreements		BiH	
Year		Year	Status
1958	(GENEVA) Convention on the Continental Shelf	1994	Su
1958	(GENEVA) Convention on Fishing and Conservation of the Living Resources of the High Seas	1994	Su
1958	(GENEVA) Convention on the Territorial Sea and the Contiguous Zone	1993	Su
1958	(GENEVA) Convention on the High Seas	1993	Su
1960	(GENEVA) Convention concerning the Protection of Workers against Ionising Radiations (ILO 115)		
1961	(PARIS) International Convention for the Protection of New Varieties of Plants		
1963	(VIENNA) Convention on Civil Liability for Nuclear Damage	1998	Su
	1997 (VIENNA) Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage	2013	Ac
1968	(LONDON, MOSCOW, WASHINGTON) Treaty on the Non-Proliferation of Nuclear Weapons (NPT)	1994	Su
1969	(BRUSSELS) Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties		
1971	(RAMSAR) Convention on Wetlands of International Importance Especially as Waterfowl Habitat	2001	Su
1971	(GENEVA) Convention on Protection against Hazards from Benzene (ILO 136)	1993	Ra
1971	(BRUSSELS) Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage		
	1992 Fund Protocol		
1971	(LONDON, MOSCOW, WASHINGTON) Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-bed and the Ocean Floor and in the Subsoil thereof	1994	Su
1972	(PARIS) Convention concerning the Protection of the World Cultural and Natural Heritage	1993	Su
1972	(LONDON) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter		
	1996 (LONDON) Protocol		
1972	(LONDON, MOSCOW, WASHINGTON) Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, and on their Destruction	1994	Su
1972	(LONDON) International Convention on the International Regulations for Preventing Collisions at Sea		
1972	(GENEVA) International Convention for Safe Containers		
1973	(WASHINGTON) Convention on International Trade in Endangered Species of Wild Fauna and Flora	2009	Ac
	1979 (BONN) Amendment	2009	At
	1983 (GABORONE) Amendment		
1973	(LONDON) Convention for the Prevention of Pollution from Ships (MARPOL)		
	1978 (LONDON) Annex I on Prevention of Pollution by Oil		
	1978 (LONDON) Annex II on Control of Pollution by Noxious Liquid Substances in Bulk		
	1978 (LONDON) Annex III on Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form		
	1978 (LONDON) Annex IV on Prevention of Pollution by Sewage from Ships		
	1978 (LONDON) Annex V on Prevention of Pollution by Garbage from Ships		
	1997 (LONDON) Annex VI on Prevention of Air Pollution from Ships		
1974	(GENEVA) Convention concerning Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents (ILO 139)	1993	Ra
1977	(GENEVA) Convention on Protection of Workers against Occupational Hazards from Air Pollution, Noise and Vibration (ILO 148)	1993	Ra
1979	(BONN) Convention on the Conservation of Migratory Species of Wild Animals		
	1991 (LONDON) Agreement on the Conservation of Populations of European Bats		
	1992 (NEW YORK) Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)		
	1995 (THE HAGUE) Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)		
	1996 (MONACO) Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)		
1980	(NEW YORK, VIENNA) Convention on the Physical Protection of Nuclear Material	1998	Su
1981	(GENEVA) Convention Concerning Occupational Safety and Health and the Working Environment (ILO 155)	1993	Ra

1982	(MONTEGO BAY) Convention on the Law of the Sea	1994	Su
	1994 (NEW YORK) Agreement related to the Implementation of Part XI of the Convention		
	1995 (NEW YORK) Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks		
1985	(GENEVA) Convention Concerning Occupational Health Services (ILO 161)	1993	Ra
1985	(VIENNA) Convention for the Protection of the Ozone Layer	1993	Su
	1987 (MONTREAL) Protocol on Substances that Deplete the Ozone Layer	1993	Su
	1990 (LONDON) Amendment to Protocol	2003	Ac
	1992 (COPENHAGEN) Amendment to Protocol	2003	Ac
	1997 (MONTREAL) Amendment to Protocol	2003	Ac
	1999 (BEIJING) Amendment to Protocol	2011	Ac
	2016 (KIGALI) Amendment to Protocol		
1986	(GENEVA) Convention Concerning Safety in the Use of Asbestos (ILO 162)	1993	Ra
1986	(VIENNA) Convention on Early Notification of a Nuclear Accident	1998	Su
1986	(VIENNA) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1998	Su
1989	(BASEL) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	2001	Ac
	1995 Ban Amendment		
	1999 (BASEL) Protocol on Liability and Compensation		
1990	(GENEVA) Convention concerning Safety in the use of Chemicals at Work (ILO 170)		
1990	(LONDON) Convention on Oil Pollution Preparedness, Response and Cooperation		
1992	(RIO DE JANEIRO) Convention on Biological Diversity	2002	Ac
	2000 (MONTREAL) Cartagena Protocol on Biosafety	2009	Ac
	2010 (NAGOYA) Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization		
	2010 (NAGOYA - KUALA LUMPUR) Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety		
1992	(NEW YORK) United Nations Framework Convention on Climate Change	2000	Ac
	1997 (KYOTO) Protocol	2007	Ac
	2012 (DOHA) Doha Amendment to the Kyoto Protocol		
	2015 (PARIS) Paris Agreement	2016	Si
1993	(ROME) Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas		
1993	(PARIS) Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction	1997	Ra
1994	(VIENNA) Convention on Nuclear Safety	2010	Ac
1994	(PARIS) United Nations Convention to Combat Desertification	2002	Ac
1997	(VIENNA) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2012	Ac
1997	(NEW YORK) Convention on the Law of Non-navigational Uses of International Watercourses		
1997	(VIENNA) Convention on Supplementary Compensation for Nuclear Damage		
1998	(ROTTERDAM) Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2007	Ac
2001	(STOCKHOLM) Convention on Persistent Organic Pollutants	2010	Ra
2001	(LONDON) Convention on Civil Liability for Bunker Oil Pollution Damage		
2003	(GENEVA) WHO Framework Convention on Tobacco Control	2009	Ac
2004	(LONDON) Convention for the Control and Management of Ships' Ballast Water and Sediments		
2013	(KUMAMOTO) Minamata Convention on Mercury		

Ac = Accession; Ad = Adherence; Ap = Approval; At = Acceptance; De = Denounced; Si = Signature; Su = Succession; Ra = Ratification.

Regional and subregional agreements		BiH	
Year		Year	Status
1957	(GENEVA) European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)	1993	Su
1958	(GENEVA) Agreement - Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts	1994	Su
1968	(PARIS) European Convention - Protection of Animals during International Transport (revised in 2003)		
	1979 (STRASBOURG) Additional Protocol		
1969	(LONDON) European Convention on the Protection of the Archaeological Heritage (revised in 1992)	2010	Ra
1976	(STRASBOURG) European Convention for the Protection of Animals Kept for Farming Purposes	1994	Su

1976	(BARCELONA) Convention for the Protection of the Mediterranean Sea against Pollution	1994	Su
	1976 (BARCELONA) Protocol for the prevention of pollution of the Mediterranean Sea by dumping from ships and aircraft (Dumping Protocol)	1994	Su
	1995 amendments to the 1976 Protocol for the prevention of pollution of the Mediterranean Sea by dumping from ships and aircraft (Dumping Protocol)		
	1976 Protocol concerning cooperation in combating pollution of the Mediterranean Sea by oil and other harmful substances in cases of emergency (Emergency Protocol)	1994	Su
	2002 (MALTA) Protocol concerning cooperation in preventing pollution from ships and, in cases of emergency combating pollution of the Mediterranean Sea (replacing the 1976 Emergency Protocol)		
	1980 Protocol for the protection of the Mediterranean Sea against pollution from land-based sources (Land-based Sources Protocol)	1994	Su
	1996 (SYRACUSE) Protocol for the protection of the Mediterranean Sea against pollution from land-based sources (replacing the 1980 Land-based Sources Protocol)		
	1994 (MADRID) Protocol concerning cooperation in preventing pollution from ships and, in cases of emergency, combating pollution of the Mediterranean Sea (Offshore Protocol)		
	1982 Specially Protected Areas Protocol	1994	Su
	1995 (BARCELONA) Protocol concerning specially protected areas and biological diversity in the Mediterranean (replacing the 1982 Specially Protected Areas Protocol)		
	1996 (IZMIR) Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal (Hazardous Wastes Protocol)		
	2008 (MADRID) Protocol on Integrated Coastal Zone Management in the Mediterranean (ICZM Protocol)		
1979	(BERN) Convention on the Conservation of European Wildlife and Natural Habitats	2008	Ra
1979	(GENEVA) Convention on Long-range Trans-boundary Air Pollution	1993	Su
	1984 (GENEVA) Protocol - Financing of Co-operative Programme (EMEP)	1993	Su
	1985 (HELSINKI) Protocol - Reduction of Sulphur Emissions by 30%		
	1988 (SOFIA) Protocol - Control of Emissions of Nitrogen Oxides		
	1991 (GENEVA) Protocol - Volatile Organic Compounds		
	1994 (OSLO) Protocol - Further Reduction of Sulphur Emissions		
	1998 (AARHUS) Protocol on Heavy Metals		
	1998 (AARHUS) Protocol on Persistent Organic Pollutants		
	1999 (GOTHENBURG) Protocol to Abate Acidification, Eutrophication and Ground-level Ozone		
	2009 (GENEVA) Amendments to the Text and to Annexes I, II, III, IV, VI and VIII to the 1998 Protocol on Persistent Organic Pollutants		
	2009 (GENEVA) Amendments to Annexes I and II to the 1998 Protocol on Persistent Organic Pollutants		
	2012 (GENEVA) Amendment of the text and annexes II to IX to the Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone and the addition of new annexes X and XI		
	2012 (GENEVA) Amendments to the Text of and Annexes Other than III and VII to the 1998 Protocol on Heavy Metals		
1991	(ESPOO) Convention on Environmental Impact Assessment in a Transboundary Context	2009	Ac
	2001 (SOFIA) First Amendment		
	2003 (KIEV) Protocol on Strategic Environmental Assessment	2003	Si
	2004 (CAVTAT) Second Amendment		
1992	(HELSINKI) Convention on the Protection and Use of Transboundary Watercourses and International Lakes	2009	Ac
	1999 (LONDON) Protocol on Water and Health	2011	Ac
	2003 (MADRID) Amendments to Articles 25 and 26	2010	At
1992	(HELSINKI) Convention on the Transboundary Effects of Industrial Accidents	2013	Ac
	2003 (KIEV) Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters	2003	Si
1993	(OSLO and LUGANO) Convention - Civil Liability for Damage from Activities Dangerous for the Environment		
1994	(Sofia) Convention on Cooperation for the Protection and Sustainable Use of the Danube River (Danube River Protection Convention)	2005	Ac
1994	(LISBON) Energy Charter Treaty	2001	Ra
	1994 (LISBON) Protocol on Energy Efficiency and Related Environmental Aspects	2001	Ra
	1998 Amendment to the Trade-Related Provisions of the Energy Charter Treaty		
1998	(AARHUS) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	2008	Ac
	2003 (KIEV) Protocol on Pollutant Release and Transfer Register	2003	Si
	2005 (ALMATY) Amendment on GMOs		
1998	(STRASBOURG) Convention on the Protection of Environment through Criminal Law		
2000	(FLORENCE) Convention on European Landscape	2012	Ra

Ac = Accession; Ad = Adherence; Ap = Approval; At = Acceptance; De = Denounced; Si = Signature; Su = Succession; Ra = Ratification.

*Annex III****LIST OF MAJOR ENVIRONMENT-RELATED
LEGISLATION*****Codes**State level

Criminal Code of Bosnia and Herzegovina

Federation of Bosnia and Herzegovina

Criminal Code of the Federation of Bosnia and Herzegovina (OG FBiH, No. 36/03, 56/06)

Republika Srpska

Criminal Code of Republika Sepska (OG RS, No. 49/03, 37/06)

Brčko District

Criminal Code of Brčko District (OG BD, No. 10/03, 06/05, 21/10, 52/11, 33/13)

LawsState level

Law on Genetically Modified Organisms (OG BiH, No. 23/09)

Law on Electricity Transmission, Regulator and System Operator (OG BiH, No. 7/02, 13/03, 76/09, 1/11)

Law Establishing an Electricity Transmission Company (OG BiH, No. 35/04, 75/09, 1/11)

Law Establishing an Independent System Operator for the Transmission System (OG BiH, No. 35/04)

Law on Public Procurement of Bosnia and Herzegovina

Law on the Procedures for the Conclusion and Implementation of International Agreements of Bosnia and Herzegovina (OG BiH, No. 29/00 and 32/13)

Law on Statistics (OG BiH, No. 26/04)

Law on Accreditation (OG BiH, No. 19/01)

Law on Food

Law on Genetically Modified Organisms

Law on Implementation of Decisions of the Commission to Preserve National Monuments (2002)

Law on the Protection and Use of Cultural, Historical and Natural Heritage of SR Bosnia and Herzegovina (1985)

Law on Radiation and Nuclear Safety, OG BiH, No. 88/07

Federation of Bosnia and Herzegovina

Law on Environmental Protection of the Federation of Bosnia and Herzegovina (OG FBiH, No. 33/03, 38/09)

Law on Nature Protection (OG FBiH, No. 33/03, 38/09, 66/13)

Law on National Park "Una" (OG FBiH, No. 44/08)

Law on Air Protection (OG FBiH, No. 33/03, 4/10)

Law on Waste Management (OG FBiH, No. 33/03, 72/09)

Law on Amendments to the Law on Waste Management (OG FBiH, No. 72/09)

Law on the Transport of Dangerous Goods (OG SFRY, No. 27/90)

Law on the Trade of Poisons (OG SFRY, No. 82/90)

Law on Water (OG FBiH, No. 70/06)

Law on Protection from Noise (OG FBiH, No. 110/12)

Law on Energy Efficiency (2017)

Law on the Use of Renewable Energy Sources and Efficient Cogeneration (OG FBiH, No. 70/13)

Law on the Mining Industry (OG FBiH, No. 26/10)

Law on Organic Farming (OG FBiH, No. 72/16)

Law on Forests (OG FBiH, No. 20/02, 20/03, 37/04)

Law on Hunting (OG FBiH, No. 4/06, 8/10, 81/14)

Law on Tourism (OG FBiH, No. 32/09)
Law on the Hospitality Industry (OG FBiH, No. 32/09)
Law on Health Care (OG FBiH, No. 46/10, 75/13)
Law on Limited Use of Tobacco Products (OG FBiH, No. 6/98, 35/98, 11/99, 50/11)
Law on Occupational Safety and Health (OG FBiH, No. 22/90)
Law on Principles of Local Self-Government in the Federation of Bosnia and Herzegovina (OG FBiH, No. 49/06)
Law on the Environmental Protection Fund of the Federation of Bosnia and Herzegovina (OG FBiH, No. 33/03)
Law on Environmental Flows (OG FBiH, No. 3/14)
Law on Internal and Nautical Navigation of the Federation of Bosnia and Herzegovina (2005)
Law on Protection and Rescue of People and Material Goods from Natural and Other Disasters (OG FBiH, No. 39/03, 22/06)
Law on Fire Protection and the Fire Service (OG FBiH, No. 64/09).
Law on Spatial Planning and Land Use of the Federation of Bosnia and Herzegovina (2006)
Law on Internal and Nautical Navigation of the Federation of Bosnia and Herzegovina
Law on Concessions

Republika Srpska

Law on Environmental Protection of Republika Srpska (OG RS, No. 71/12, 79/15)
Law on Air Protection (OG RS, No. 53/02, 124/11, 46/17)
Law on Nature Protection (OG RS, No. 20/14)
Law on National Park "Sutjeska" (OG RS, No. 121/12)
Law on National Park "Kozara" (OG RS, No. 121/12)
Law on National Park "Drina" (OG RS, No. 63/17)
Law on National Parks (OG RS, No. 21/96, 75/10)
Law on Genetically Modified Organisms (OG RS, No. 103/08)
Law on Waste Management (OG RS, No. 111/13)
Law on Chemicals (OG RS, No. 25/09)
Law on Biocides (OG RS, No. 37/09)
Law on Water (OG RS, No. 50/06, 92/09, 121/12)
Law on Energy Efficiency (OG RS, No. 59/13)
Law on the Use of Renewable Energy Sources and Efficient Cogeneration (OG RS, No. 39/13, 108/13 and 79/15)
Law on Mining (OG RS, No. 59/12)
Law on Organic Production (OG RS, No. 12/13)
Law on Forests (OG RS, No. 75/08, 60/13)
Law on Amendments to the Law on Forests (OG RS, No. 60/13)
Law on Forest Reproductive Material (OG RS, No. 60/09)
Law on Hunting (OG RS, No. 60/09)
Law on Plant Health Protection (OG RS, No. 25/09)
Law on Nature Protection – Consolidated text (OG RS, No. 113/08)
Law on Environmental Protection – Consolidated text (OG RS, No. 28/07, 41/08, 29/10)
Law on Tourism (OG RS, No. 70/11)
Law on Public Ski Resorts (OG RS, No. 15/10)
Law on the Hospitality Industry (OG RS, No. 15/10)
Law on Health Care (OG RS, No. 106/09)
Law on Prohibition of Smoking of Tobacco Products in Public Places (OG RS, No. 46/04, 74/04, 92/09)
Law on Prohibition of Advertising of Tobacco Products (OG RS, No. 46/04, 74/04, 96/05, 92/09)
Law on Local Self-Government (OG RS, No. 101/04)
Law on Plant Protection Products (OG RS, No. 52/10)
Law on Spatial Planning and Construction (OG RS, No. 40/13)
Law on the Fund and Financing of Environmental Protection of Republika Srpska (OG RS, 117/11 and 63/14)
Law on Communal Activities (OG RS, No. 124/11)
Law on Concessions (OG RS, No. 59/13)
Law on Electricity (OG RS, No. 8/08 – revised text, 34/09, 92/09 and 01/11)
Law on Energy (OG RS, No. 49/09)

Brčko District

Law on Environmental Protection of Brčko District of Bosnia and Herzegovina (OG BD, No. 24/04, 1/05, 19/07, 9/09)

Law on Air Protection (OG BD, No. 25/04, 1/05, 19/07, 9/09)

Law on Nature Protection (OG BD, No. 24/04, 1/05, 19/07, 9/09)

Law on the Transport of Dangerous Goods (OG SFRY, No. 27/90)

Law on Transport of Hazardous Materials (OG SFRY, No. 27/90)

Law on Water Protection (OG BD, No. 24/04, 1/05, 19/07)

Law on Waste Disposal Management (OG BD, No. 25/04, 1/05, 19/07, 2/08, 9/09)

Law on Forests (OG BD, No. 14/10)

Law on Tourist Activities (OG BD, No. /05)

Law on Hunting (OG BD, No. 47/15)

Sarajevo Canton

Law on Protection from Noise (OG Sarajevo Canton, No. 23/16)

Law on Forests of Sarajevo Canton (OG Sarajevo Canton, No. 05/13)

RegulationsState level

Regulation on inspection monitoring in the field of radiation and nuclear safety (OG BiH, No. 65/10)

Regulation on Maximum Residue Levels of Pesticides in or on Food and Feed of Plant and Animal Origin (OG BiH, No. 89/12).

Federation of Bosnia and Herzegovina

Regulation on Limit Values of Air Emissions from Combustion Plants (OG FBiH, No. 03/13)

Regulation on Forests (OG FBiH, No. 83/09, 26/10, 33/10, 38/10)

Regulation on Natura 2000 (OG FBiH, No. 43/11)

Regulation on Registers of Installations and Polluters (OG FBiH, No. 82/07)

Regulation on Requirements for Wastewater Discharge into Natural Receptors and Public Sanitation Systems (OG FBiH, No. 101/15, 1/16)

Regulation on the Method of Monitoring Air Quality and Defining Types of Pollutants, Limit Values and Other Air Quality Standards (OG FBiH, No. 1/12)

Regulation on Plants and Installations (OG FBiH, No. 19/04)

Red List of Endangered Wild Species and Subspecies of Plants, Animals and Fungi (OG FBiH, No. 7/14)

Republika Srpska

Regulation on the Conditions for Restriction and Prohibition of the Production, Circulation and Use of Chemicals (OG RS, No. 100/10, 63/13)

Regulation on the Methodology and Manner of Maintenance of the Register of Installations and Polluters (OG RS, No. 92/07)

Regulation on Permitted Limits of Noise (OG SRBiH, No. 46/89)

Regulation on the Elements and Content of Forest Management Plans for State and Private Forests (OG RS, No. 25/94, 52/09, 43/11)

Regulation on Types, Contents, Quality, and Share of Biofuels in Transport (Official Gazette of Republika Srpska, issue no. 8/16)

DecisionsState level

Decision on the Procedure of the Mid-Term Planning, Monitoring and Reporting in the Institutions of Bosnia and Herzegovina (OG BiH, No. 62/14)

Decision on the Annual Planning and Manner of Monitoring and Reporting in the Institutions of Bosnia and Herzegovina (OG BiH, No. 94/14)

Decision on the conditions and procedures of the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora in Bosnia and Herzegovina

Decision on the Establishment of the National Commission of Bosnia and Herzegovina for cooperation with the United Nations Educational, Scientific and Cultural Organization (UNESCO) (OG No. 77/09)

Decision on Establishment of an Authorized Body for the Implementation of the Clean Development Mechanism (CDM) of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) in Bosnia and Herzegovina

Decision on Amendments to the Decision establishing the Designated National Authority (DNA) for the implementation of Clean Development Mechanism (CDM) Projects

Decision on the implementation of Directive 2009/28/EU on the promotion of the use of energy from renewable sources

Federation of Bosnia and Herzegovina

Decision on the List of Poisonous Substances that can be Placed on the Market in the Federation of Bosnia and Herzegovina (OG FBiH, No. 50/08)

Decision on the Prohibition or Restriction of the Import, Manufacture and Use of Certain Hazardous Industrial Chemicals in the Federation of Bosnia and Herzegovina (OG FBiH, No. 52/16).

Republika Srpska

Decision on the Amount of Purchase Price and Premiums for Electric Power Produced from Renewable Sources or in Efficient Cogeneration (OG RS, No. 116/13, 88/14 and 14/16)

Decision on the Amount of the Incentive for Production of Energy from Renewable Sources in Efficient Cogeneration (OG RS, No. 116/13, 4/15 and 14/16)

Decrees

Federation of Bosnia and Herzegovina

Decree on Fees for Air Polluters (OG FBiH, No. 66/11)

Decree on Special Environmental Fees (OG FBiH, No. 14/11)

Decree on Unique Methodology for Preparation of Spatial Planning Documents (OG FBiH, No. 63/04, 50/07)

Decree on Levies on Plastic Bags (OG FBiH, No. 9/14)

Republika Srpska

Decree on Fees for Environmental Packaging Waste Burden (OG RS, No. 101/12)

Decree on Management of Packaging Waste (OG RS, No. 36/15)

Decree on Emission Limit Values of Polluting Substances into the Air

Rulebooks, guidelines and instructions

State level

Rulebook on radioactive waste management, OG BiH, No. 68/15).

Federation of Bosnia and Herzegovina

Rulebook on the management of packaging and packaging waste (OG FBiH, No. 88/11, 28/13)

Rulebook on the management of waste from electrical and electronic products (OG FBiH, No. 87/12)

Rulebook on medical waste management (OG FBiH, No. 77/08)

Rulebook on drinking water safety (OG FBiH, No. 40/10, 30/12)

Rulebook on requirements for determination of sanitary protection zones and protection measures for water sources used for public water supply (OG FBiH, No. 88/12)

Rulebook on eco-labels and the management system for eco-labelling (OG FBiH, No. 92/07)

Rulebook on the method of payment of public revenues to the budget and extrabudgetary funds of the Federation of Bosnia and Herzegovina (OG FBiH, No. 33/16)

Rulebook on establishing a system of deliberate keeping and killing of protected animals (OG FBiH, No. 46/05)

Rulebook on establishing and managing an information system for protecting nature and monitoring (OG FBiH, No. 46/05)

Rulebook on the contents and manner of drafting protected area management plans (OG FBiH, No. 65/06);

Rulebook on new measures for research and preservation for the purpose of preventing significant negative impact on animal species either by capture or killing (OG FBiH, No. 65/06)

Rulebook on the contents and manner of maintaining registries of protected areas (OG FBiH, No. 15/06)

Rulebook on the requirements for accessing protected areas (OG FBiH, No. 15/06)
Guideline on the forest conversion fee (OG FBiH, 44/10)
Rulebook on energy certification
Rulebook on registers of plants and pollution

Republika Srpska

Rulebook on measures for preventing and reducing air pollution and improving air quality (OG RS, No. 3/15, 51/15, 47/16)
Rulebook on the management of waste tyres (OG RS, No. 20/12)
Rulebook on eco-labelling and the management system for eco-labelling (OG RS, No. 22/08)
Rulebook on establishing a monitoring system for deliberate keeping and killing of protected animals (OG RS, No. 85/05)
Rulebook on establishing and managing an information system for protecting nature and monitoring (OG RS No. 85/05)
Regulation on the Red List of Endangered Species of Flora and Fauna of Republika Srpska (OG RS, No. 124/12)
Rulebook on the criteria for deciding on the need to carry out strategic environmental assessment (OG RS, No. 28/13)
Rulebook on the contents of the SEA report (OG RS, No. 28/13)
Rulebook on the conditions for limitation and ban on production, placing on market and usage of chemicals (OG RS, No. 100/10, 63/13, 33/17);
Rulebook on the procedure for preliminary notification and procedure of issuance of approval based on preliminary notification of export and import of certain chemicals and products (OG RS, No. 33/13);
Rulebook on the list of active substances allowed in biocide products (OG RS, No. 32/10, 72/11, 85/12, 14/15, 24/16);
Rulebook on the list of active substances that are not allowed in biocide products (OG RS, No. 32/10, 74/11, 85/12, 13/15)
Rulebook on air quality limit values (OG RS, No. 124/12)
Rulebook on limit values of emissions from biomass combustion plants
Rulebook on the emission of vaporizing organic compounds
Rulebook for Pollution Release and Transfer Register (OG RS, No. 92/07)
Rulebook on official uniform, authorization and use of service weapon by the Surveillance Service in national parks (OG RS, No. 83/11)
Rulebook on interior ordinance in national parks (OG RS, No. 83/11)
Rulebook on the Register of Protected Natural Resources (OG RS, No. 55/15)
Rulebook on the contents, establishment and enforcement of the management measures in protected areas (OG RS, No. 83/15)
Rulebook on the nature protection label, procedures and conditions for its use (OG RS, No. 50/16)
Rulebook on special technical-technological solutions to enable undisturbed movement and safe communication of wild animals (OG RS, No. 66/17)
Rulebook on Incentives for Production of Power from Renewable Sources and in Efficient Cogeneration (OG RS, No. 114/13 and 88/14)
Rulebook on Issuing of Certificates for Production Plants Producing Electric Energy from Renewable Sources and in Efficient Cogeneration (OG RS, No. 114/13 and 112/13)
Rulebook on Issuing Warranties on the Origin of Electric Energy (OG RS, No. 1/14)
Instruction on Keeping Register of Projects in Renewable Energy Sources and in Efficient Cogeneration (OG RS, No. 76/13)

Brčko District

Rulebook on air quality monitoring

Resolutions

Republika Srpska

Resolution on conditional acceptance of the Environmental Approximation Strategy of Bosnia and Herzegovina (No. 04/1-012-2-1354/17 dated 08.06.2017)

Strategic documents

State level

Environmental Approximation Strategy of Bosnia and Herzegovina
 National Environmental Action Plan
 Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and Herzegovina
 Strategy for Radioactive Waste Management adopted by the Council of Ministers of Bosnia and Herzegovina in 2013 (OG BiH, No. 01/14)
 Spatial Plan of Bosnia and Herzegovina for the period 1981–2000
 Spatial Plan of Bosnia and Herzegovina for the period 2008–2028
 Action Programme to Combat Land Degradation and Mitigate the Effects of Drought in Bosnia and Herzegovina
 Strategy of Bosnia and Herzegovina and the Action Plan for the Protection of Biological and Landscape Diversity 2008–2015
 Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina 2015–2020
 National Renewable Action Plan
 Action Plan for Flood Protection and River Management for Bosnia and Herzegovina for the period 2014–2017
 Framework Transport Policy of Bosnia and Herzegovina for the period 2015–2030
 Framework Transport Strategy of Bosnia and Herzegovina for the period 2016–2030
 Action Plan for Flood Protection and River Basin Management in Bosnia and Herzegovina 2014–2017
 Strategic Plan for Harmonization of Agriculture, Food and Rural Development for the period 2008–2011
 National Emission Reduction Plan for Large Combustion Plants
 Framework Transport Strategy of Bosnia and Herzegovina
 Management Plan on the Phase-out of Hydrochlorofluorocarbons
 Reform Agenda 2015–2018 of Bosnia and Herzegovina
 Economic Reform Programme for the period 2017–2019

Federation of Bosnia and Herzegovina

Environmental Approximation Programme of the Federation of Bosnia and Herzegovina
 Environmental Protection Strategy of the Federation of Bosnia and Herzegovina for the period 2008–2018
 Waste Management Strategy for the period 2008–2018
 Water Management Strategy for the period 2010–2022
 Waste Management Plan for the period 2012–2017
 Operational Flood Protection Plan (OG FBiH, No. 07/11)
 Renewable Energy Action Plan of the Federation of Bosnia and Herzegovina (OG FBiH, No. 48/14)
 Spatial Plan of the Federation of Bosnia and Herzegovina for the period 1981–2000
 Programme of Measures to Protect Health from Adverse Environmental Factors (OG FBiH, No. 27/14)
 Risk Assessment of the Federation of Bosnia and Herzegovina of Natural or Other Disasters (OG FBiH, No. 41/05),
 Plan of Protection and Rescue of the Federation of Bosnia and Herzegovina from Natural or Other Disasters (OG FBiH, No. 40/08)
 Action Plan for implementation of the project Development of Industrial Policy in the Federation of Bosnia and Herzegovina in 2016–2019 (OG FBiH, No. 4/16)
 Spatial Plan (2008–2028)
 Development Strategy for the period 2010–2020
 Medium Term Agricultural Sector Strategy for the Federation of Bosnia and Herzegovina (2015–2019)

Republika Srpska

Environmental Approximation Programme of Republika Srpska
 Strategy of Nature Protection of Republika Srpska (OG RS, No. 65/11)
 Chemical Safety Strategy of Republika Srpska for the period 2012–2016 (OG RS, No. 49/12)
 Air Protection Strategy of Republika Srpska (OG RS, No. 37/11)
 Strategy for Integrated Water Management of Republika Srpska for the period 2015–2024 (OG RS, No. 04/16)
 Energy Efficiency Action Plan until 2018 (OG RS, No. 1/14)
 National Environmental Health Action Plan (OG RS, No. 1/02)
 Forestry Development Strategy of Republika Srpska for the period 2011–2021

Spatial Plan for 2008–2015
Spatial Plan of Republika Srpska until 2025 (Decision on Adoption of the Proposed Amendments to the Spatial Plan of Republika Srpska until 2025 (OG RS, No. 15/15)
Operational Plan to Improve Energy Efficiency in Public Administration Bodies
Renewable Energy Action Plan (OG RS, No. 45/14, 111/15)
Strategy and Policy for Industry Development for the period 2016–2020 of Republika Srpska
Programme for Conservation of Forest Genetic Resources of Republika Srpska 2013–2025
Action Plan for the Implementation of the Sector Development Strategies 2009–2013
Energy Development Strategy until 2030
Strategic Plan for Rural Development of Republika Srpska (2016–2020)
Strategy on Waste Management for the period 2017–2026
Programme of Forest Genetic Resources Conservation
Anticorruption Strategy 2013–2017
Strategic Plan for Rural Development of Republika Srpska (2010–2015)
Nature Protection Strategy
Development Strategy of the Republic of Srpska until 2015

Brčko District

Environmental Approximation Programme of Brčko District
Development Strategy of Brčko District for the period 2008–2017
Environmental Protection Strategy of Brčko District in Bosnia and Herzegovina for the period 2016–2026
Spatial Plan of Brčko District for the period 2007–2017 (OG BD No. 6/17)
Sustainable Energy Action Plan

Court decisions

Decision of the Constitutional Court of the Federation of Bosnia and Herzegovina No. U-28/10 of March 23, 2011 (OG FBiH, No. 34/11)

Decision of the Constitutional Court of the Federation of Bosnia and Herzegovina of April 14, 2009 (OG FBiH, No. 36/09)

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