

Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina (2015 - 2020)



Ministry of Foreign Trade and Economic
Relations of Bosnia and Herzegovina



**STRATEGY AND ACTION PLAN FOR PROTECTION OF
BIOLOGICAL DIVERSITY IN BOSNIA AND HERZEGOVINA
(2015-2020)**

IMPRESSUM

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FOREWORD

Bosnia and Herzegovina is characterized by a uniquely wide range of biological and landscape diversity resulting from the specific geomorphic structure, in terms of permeation among the climate regions of continental, Alpine and Mediterranean climates and the geographical position in the area of the northern plains along the Sava River, across the massif of the Dinaric Arc, down to the Adriatic Sea in the south. With responsible and sustainable management, its biological and physical-geographical diversity in their interaction provide Bosnia and Herzegovina with a good basis for human life and prosperity.

The Convention on Biological Diversity (CBD) is the first international treaty that in an integrated way strives to solve the problems related to the protection and sustainable use of biological diversity of ranging from global, through regional, to national and local levels. As a basic international principle in nature protection, biological diversity conservation constitutes the most important strategic task in the protection and sustainable use of natural resources, and collective and individual care and responsibility of all countries.

In accordance with the basic goals of the CBD, the 10th meeting of the Conference of Parties (COP), held in 2010 in Nagoya, Decision X/2 adopted the Strategic Plan for Biological Diversity 2011-2020, including 20 Aichi Targets developed in five key strategic goals. Accordingly, all parties to the CBD are invited to establish their own national targets within a given flexible framework, taking into account their national specificities, needs and priorities, and having in mind the achievement of global goals.

Bosnia and Herzegovina, as a fully-fledged party to the CBD since 2002, has been following global trends of conservation and sustainable use of biological diversity, and to this end it has mobilized its available institutions and experts to meet its international commitments, in particular to ensure that protection and sustainable use of biological diversity be an unavoidable area in the preparation of relevant sectoral policies and strategies at all levels of government in the state.

Bosnia and Herzegovina has completed its first Strategy and Action Plan for Protection of Biological Diversity of Bosnia and Herzegovina for the period 2008-2015. Development of the Strategy and Action Plan for Protection of Biological Diversity of Bosnia and Herzegovina for the period 2015-2020 is a continuation of global strategic planning and reporting to the CBD, which Bosnia and Herzegovina has been involved in from the very beginning, and a testament to the commitment of Bosnia and Herzegovina in terms of fulfilling its obligations at the international level, as well as within its European integration process.

The national targets for protection of biological diversity of Bosnia and Herzegovina are based on its priorities and specificities, and have been identified through a participatory planning process that included a series of consultation meetings with stakeholders, a multidisciplinary approach and efficient inter-sectoral coordination. The set national targets are ambitious, however, with the active commitment and involvement of all institutions in the process at all levels of government in the country, they are realistic and feasible.

The Strategy and Action Plan for Protection of Biological Diversity of Bosnia and Herzegovina for the period 2015-2020 is a key document for action on all issues of biological diversity, ranging from management of species and ecosystems through research and protection of biological diversity, biosafety, to just and fair distribution of the benefits of ecosystem services and use of genetic resources. This strategic document provides appropriate guidance for the entities in Bosnia and Herzegovina responsible for development planning and decision-making, establishing indicators for monitoring progress of implementation, along with the process of strengthening and democratization of public and environmental awareness.

The Federal Ministry of Environment and Tourism, as the designated State Institution of Bosnia and Herzegovina (*National Focal Point* - NFP) for the CBD, carries a special responsibility for the overall achievement of the set targets, in cooperation with other relevant institutions in Bosnia and Herzegovina listed in the Action Plan of this document.

We hereby invite all interested parties – ranging from the state, entity and cantonal governments, municipalities and local communities, scientific and educational institutions and non-governmental organizations - to participate actively in the planning, implementation and evaluation of activities for the conservation and sustainable management of our biological resources, so that together, as partners, we may reach the important targets set out in this document.

We are convinced that the future and prosperity of Bosnia and Herzegovina are closely related to the sustainable use and preservation of its overall natural resources. The bulk of these resources is contained in the exceptional authentic natural beauty, diversity of wildlife, whose importance is much higher than locally. Therefore, we believe in the full contribution of this document not only in the field of protection and sustainable use of biological diversity, but also in improving the overall environmental matrix of sustainable development in Bosnia and Herzegovina, as well as at regional and global levels.

Mehmed Cero, NFP for CBD
Federal Ministry of Environment and Tourism

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ACRONYMS AND ABBREVIATIONS

ANUBiH – Academy of Sciences and Arts of Bosnia and Herzegovina
ASCI – Areas of Special Importance to Protection of Nature
BD – Brčko District
BiH – Bosnia and Herzegovina
BIP - Biodiversity Indicators Partnership
CBD - Convention on Biological Diversity
CEPA - Communication, Education and Public Awareness
CEPRES – Center for Ecology and Natural Resources
CGAP - Consultative Group to Assist the Poor
CHM - Clearing House Mechanism – Portal of BiH with the biological diversity data exchange mechanism
CLC - Corine Land Cover (state of and changes in land cover)
COP - Conference of Parties
COST - European Cooperation in Science and Technology
CR - Critically Endangered
DAC - Development Assistance Committee
DCF - Donor Coordination Forum
DD -- Data Deficient
DMR - Donor Mapping Report
DNA - Deoxyribonucleic acid
EBRD - European Bank for Reconstruction and Development
EC - European Commission
EEA - European Environment Agency
EEC – European Economic Community
EF FBiH - Environmental Fund of Federation of Bosnia and Herzegovina
EPEEF RS - Environmental Protection and Energy Efficiency Fund of Republika Srpska
EIB - European Investment Bank
EIONET - European Environment Information and Observation Network
EN - Endangered
EnCT - Energy Community Treaty
EU – European Union
EUREKA - Europe-Wide Network for Market-Oriented Research and Development
EX - Extinct
FAO - Food and Agriculture Organization of the United Nations
FAOSTAT - FAO Corporate Statistical Database
FBiH – Federation of Bosnia and Herzegovina
FMET – Federal Ministry of Environment and Tourism
FMAWMF – Federal Ministry of Agriculture, Water Management and Forestry
FP – Framework Program
FSC – Forest Stewardship Council
HCVF – High Conservation Values Forests

GBO - Global Biodiversity Outlook
GDP – Gross Domestic Product
GEF - Global Environment Facility
GIS - Geographic Information System
IBAs – Important Bird and Biodiversity Areas
IBRD - International Bank for Reconstruction and Development
IDA – International Development Association
IFC - International Finance Corporation
IPCC - Intergovernmental Panel on Climate Change
I-PRSP – Interim Poverty Reduction Strategy Paper
IT - Information Technology
IUCN - International Union for Conservation of Nature
JICA - Japan International Cooperation Agency
JP – Public Enterprise
KEAP – Cantonal Environmental Action Plan
KM – Convertible Mark
LC - Less Critical
LEAP - Local Environmental Action Plan
MAVA - (**French - *Fondation pour la nature***) – Foundation for Nature Protection
MIGA - Multilateral Investment Guarantee Agency
MoFTER – Ministry of Foreign Trade and Economic Relations
MAFW RS – Ministry of Agriculture, Forestry and Waters of the Republika Srpska
MPPCEE RS – Ministry of Physical Planning, Civil Engineering and Ecology of the Republika Srpska
NAPEE - National Action Plan for Energy Efficiency
NBSAP - National Biodiversity Strategy and Action Plan
NCSA - National Capacity Self-Assessment
NEAP - National Environmental Action Plan
NERDA - Northeast Regional Development Association of Bosnia and Herzegovina
NFP - National Focal Point
NGO – Non-Governmental Organization
NP – National Park
NT - Near Threatened
ODA - Official Development Assistance
OECD - Organization for Economic Co-operation and Development
POPs - Persistent Organic Pollutants
PP – Nature Park
REC - Regional Environmental Center for Central and Eastern Europe
ROE - Regional Office for Europe
RS – Republika Srpska
SAC - Special Areas of Conservation
SIDA - Swedish International Development Cooperation Agency
SPA - Special Protection Areas
TAIEX - Technical Assistance and Information Exchange
TEEB - The Economics of Ecosystems and Biodiversity
UN - United Nations

UNCCD - United Nations Convention to Combat Desertification
UNCED - United Nations Conference on Environment and Development
UNDP - United Nations Development Program
UNECE - United Nations Economic Commission for Europe
UNEP - United Nations Environment Program
UNFCCC - United Nations Framework Convention on Climate Change
USAID – United States Agency for International Development
VU - Vulnerable
WCMC - World Conservation Monitoring Centre
WWF MedPO - World Wide Fund for Nature – Mediterranean Program Office

1. INTRODUCTION

The project "Support to Bosnia and Herzegovina (BiH) for Revision of the National Biodiversity Strategies and Action Plans (NBSAPs; hereinafter referred to as: the Project) and development of the Fifth National Report to the Convention on Biological Diversity (CBD)" has been funded by the Global Environment Facility (GEF) and implemented by the United Nations Environment Program (UNEP). The main partners of the Project are: Ministry of Foreign Trade and Economic Relations (MoFTER), Ministry of Physical Planning, Civil Engineering and Ecology of the Republika Srpska (MPPCEE RS), and the Federal Ministry of Environment and Tourism (FMET). The implementation of Project activities has been assigned to the local coordination body - Centre for Energy, Environment and Resources (CENER 21) and a team of experts (Expert Team).

The goal of the Project is to develop the Strategy and Action Plan for Protection of Biological Diversity of BiH (NBSAP BiH 2015-2020) and the Fifth National Report to the CBD, as well as the adoption and delivery of NBSAP BiH (2015-2020) to the CBD Secretariat.

1.1. Definitions of Biological Diversity

Biological diversity is the variety of genes, species and communities of species, ecosystems and, more broadly, the diversity of the Earth as an integrated ecosystem. It also includes all living beings, from the simplest viruses to higher plants and animals, and underlines the existence and importance of diversity (Slavica and Trontel, 2010).

For the purpose of simpler and proper understanding of this field and of the given document, below provided are the key terms with explanations, as taken from Article 2 of the CBD:

- *Biological diversity* is the totality of all living organisms that are constituent parts of terrestrial, marine and other aquatic ecosystems and ecological complexes, and includes diversity within species, among species and diversity among ecosystems,
- *Biological sources* include genetic sources, organisms or parts of organisms, populations or any other biotic components of ecosystems with actual or potential use or value for humanity;
- *Biotechnology* is any technology that uses biological systems, living organisms, or their parts, to make or modify products or processes for specific use;
- *Country of origin* of genetic sources is a country that possesses those genetic resources under *in situ* conditions;
- *A supplier country* of genetic sources is the country that provides genetic resources collected from *in situ* sources, including populations of both wild and domesticated species, or those taken from *ex situ* sources, which may or may not originate from that country;
- *Domesticated or cultivated species* are species in which the evolutionary process has been influenced by humans to meet their needs;
- *An ecosystem* is a dynamic complex of plants, animals and micro-organisms and their non-living environment interacting as a functional unit;

- *Ex situ* conservation is the conservation of biological diversity components outside of their natural habitats;
- *Genetic material* is plant, animal, microbial and other materials containing functional units of inheritance;
- *Genetic resources* are genetic materials of actual or potential value;
- *A habitat* is an area or place where an organism or population naturally occurs;
- *In situ* conditions are the conditions where genetic sources exist within ecosystems and natural habitats, and in the case of domesticated or cultivated species, the environment in which they have developed their distinctive properties;
- *In situ conservation* is the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural environment, and in the case of domesticated or cultivated species, the environment where they have developed their distinctive properties;
- *A protected area* is a geographically defined area which is intended or regulated and managed in a way to achieve specific protection targets;
- *Sustainable use* is the use of biological diversity components in a way and at a rate that does not lead to decay of biological diversity, in a manner that maintains its potential to meet the needs and aspirations of present and future generations.

The other terms with explanations mentioned in this document are given in Annex 2.

1.2. Convention on Biological Diversity (CBD)

The CBD entered into force on 29 December 1993, 90 days after its 30th ratification. With the entry into force of the CBD, *biological diversity* has become a broad term in the social, economic and political terms. Today, the CBD is globally accepted document that establishes the conservation of biological diversity as a fundamental international principle of nature protection, and is considered to be a shared concern and obligation of the society.

BiH ratified the CBD on 4 October 2002, through the Decision on the Ratification of the CBD (Article V.3.d of the BiH Constitution, 152nd Session) issued by the Presidency of BiH. The text of the CBD was published in the Official Bulletin no. 13/02.

The basic goals of the CBD are as follows:

- Protection of biological and landscape diversity;
- Sustainable use of biological diversity components;
- Fair distribution of benefits arising from the utilization of genetic sources.

According to Article 6 of the CBD, the Parties to the Convention are required to develop and adopt national strategies, plans or programs for the conservation and sustainable use of biological diversity and to integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programs and policies. Other obligations contained in the text of the CBD which can be supported through national strategies and plans are the following:

- Identify and monitor the state of biological diversity;

- Establish *in situ* and *ex situ* conservation;
- Ensure sustainable use of biological diversity components in the sectors of spatial planning, forestry, agriculture, hunting, fishing, water management, etc.;
- Conduct scientific research of biological diversity, to develop programs of education and public awareness on biological diversity;
- Identify impacts and reduce adverse impacts on biological diversity;
- Provide access to genetic sources;
- Provide access to and transfer of technology, including biotechnology, connected to biological diversity;
- Provide information exchange and technical and scientific cooperation;
- Provide financial resources to achieve the goals of the CBD;
- Develop national progress reports in order to preserve biological diversity;
- Develop thematic reports relating to invasive species, genetic sources, forest and mountain ecosystems, protected areas, technology and scientific cooperation, etc.

1.2.1. Strategic Plan for Biological Diversity 2011-2020

The Global Biodiversity Outlook 3 (GBO 3), prepared by the CBD Secretariat based on national reports, has shown that the international community has failed to achieve the goal set by the CBD Parties in 2005 to reduce the loss in biological diversity by 2010, while all biological diversity indicators have shown increased pressures on nature. According to the Decision X/2, dated 18 and 19 October 2010 in Nagoya, Japan, at the 10th Conference of the Parties (COP) of the CBD, a revised, ten-year Strategic Plan for Biological Diversity 2011-2020 was adopted (hereinafter: the Strategic Plan 2011-2020), which is the basic document to guide the international and national activities aimed at conserving biological diversity and achieving the three goals of the CBD.

The CBD Parties have pledged that they would integrate the Strategic Plan 2011-2020 into their national strategies and action plans for biological diversity by 2015 and that they would increase the financial resources for the implementation of the CBD.

The Vision of the Strategic Plan 2011-2020 states as follows: *By 2050, biological diversity has been valued, conserved, restored and wisely used, maintaining the ecosystem services, supporting a healthy planet and delivering benefits essential for all people.*

The Mission of the Strategic Plan 2011-2020 is to undertake effective and urgent action to halt the loss of biological diversity, in order to ensure that by 2020 the ecosystems are resistant and continue to provide basic services, thus ensuring the diversity of life on the planet and contributing to human well-being and poverty eradication. In order to ensure this, pressures on biological diversity should be reduced, ecosystems should be restored, biological resources should be used in a sustainable way, the benefits arising from the utilization of genetic resources should be shared in a fair and equitable manner, adequate funding should be provided, capacity should be improved, biological diversity values and issues should be integrated, adequate policies should be effectively implemented, and decision-making should be based on scientific grounds and a precautionary approach.

The Strategic Plan 2011-2020 has identified five key strategic goals (A, B, C, D and E) (Table 1), each strategic goal covering a number of Aichi Targets. Each of the 20 Aichi Targets has a defined thematic area, as shown in Annex 1.

Table 1: List of Strategic Goals and Aichi Targets According to the Strategic Plan 2011-2020

Strategic goal	Aichi Target
A: Address the underlying causes of biological diversity loss by mainstreaming biological diversity across government and society	1, 2, 3 and 4
B: Reduce the direct pressures on biological diversity and promote sustainable use	5, 6, 7, 8, 9 and 10
C: To improve the state of biological diversity by safeguarding ecosystems, species and genetic diversity	11, 12 and 13
D: Enhance the benefits to all from biological diversity and ecosystem services	14, 15 and 16
E: Enhance implementation through participatory planning, knowledge management and capacity building	17, 18, 19 and 20

According to the Strategic Plan 2011-2020, each CBD signatory country should:

1. Review the NBSAP and develop the state national targets by 2020 that are in compliance with Aichi Targets;
2. Propose and establish indicators for systemic monitoring of the status (monitoring) of biological diversity and national targets of the state by 2020;
3. Prepare the Fifth National Report to the CBD in which the state will report on progress achieved in the field of biological diversity, prior to the COP 12 session (6-17 October 2014, in the Republic of Korea).

So far, BiH has drafted its first NBSAP BiH (2008-2015), which was adopted in mid-2011 by the BiH Council of Ministers. The NBSAP BiH (2008-2015) for the first time included the entire state of biological diversity and planned for the activities in the field of nature protection. In the period of 2005-2010, BiH completed the First, Second, Third and the Fourth National Reports to the CBD. The Fifth National Report was submitted to the CBD Secretariat on April, 2014, wherein BiH reached the level of reporting to the CBD and gave its contribution to global assessments and analyzes of the state of biological diversity, which were used to prepare the GBO4.

1.3. Development Process of NBSAP BiH (2015-2020)

For the purposes of the NBSAP, the CBD Secretariat has developed a methodology¹ through a set of modules that contain guidelines and instructions for coordinators, experts, decision-makers and other relevant stakeholders in the planning and implementation of NBSAP. This methodology has been used for development of the NBSAP BiH (2015-2020) as part of the Project implemented by UNEP. The main participants of the Project are:

1. The Steering Committee, which consists of several members: UNEP in BiH, MoFTER, FMET and MPPCEE RS. The responsibility of the Steering Committee is to plan and monitor the implementation of Project activities, to approve the Fifth National Report to the CBD, and the NBSAP BiH (2015-2020), to take part and provide consultations at stakeholder meetings;

¹ The set of modules for capacity strengthening for NBSAP development is available on the official CBD website (www.cbd.int/nbsap/training/default.shtml)

2. The Expert Team, which consists of experts in the field of biological diversity, nominated by MPPCEE RS and FMET. The Expert Team has a professional and advisory role in the process of NBSAP BiH (2015-2020) in collaboration with stakeholders from different sectors, and is responsible for the delivery of parts of the document to CENER 21 and for participation at stakeholder meetings;
3. CENER 21, a local coordinating body responsible for coordination of Project activities on a daily basis (preparation and sending questionnaires to seek information related to biological diversity, organization and facilitation of the Steering Committee, Expert Team and stakeholder meetings, the review of the parts of documents submitted by Expert Team and the preparation of progress reports for the Project to UNEP), and the final formation of the NBSAP BiH (2015-2020).

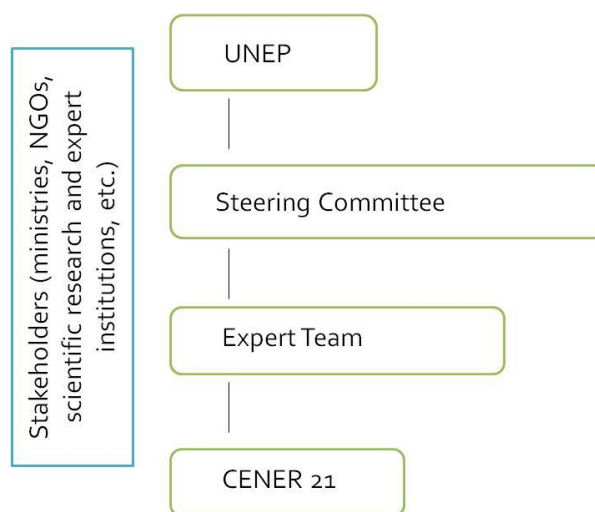


Figure 1: Organizational Structure of the Project

The process of developing NBSAP in BiH was carried out through a series of working and consultation meetings, along with the preparation of appropriate materials. The total number of sessions held during the document development was:

- seven meetings of the Expert Team, which were held every two to three months, with regular communication via e-mail;
- five stakeholder meetings (relevant ministries and sectors/departments for environmental protection, agriculture, water, forestry, finance, mining, industry, energy, spatial planning, statistics, education, culture, scientific research and professional institutions/agencies, NGOs and the wider public at the state, entity, cantonal and municipal levels) held in Sarajevo, at Vlačić, in Tešanj, Konjic and Neum;
- two intersectoral meetings (sectors/departments for environmental protection, agriculture, water, forestry, finance, mining, industry, energy, spatial planning, statistics, education and culture at the state, entity, cantonal and municipal levels) were held in Sarajevo;
- two regional meetings of the countries in the region – the Republic of Macedonia (2 October 2013, Skopje) and the Republic of Serbia (15 May 2014, Belgrade);
- seven meetings of the Steering Committee (representatives of UNEP, MoFTER, MPPCEE RS, FMET and CENER 21), six in Sarajevo and one in Banja Luka;

- two training sessions for development of biological diversity indicators, held from 19 to 22 March 2013 in Konjic, BiH, and from 10 to 12 September 2013 in Kolašin, Montenegro. The training sessions were funded by the European Commission (EC) and implemented by the Biodiversity Indicators Partnership (BIP) in cooperation with UNEP's Regional Office for Europe (ROE) and UNEP's World Conservation Monitoring Centre (WCMC).

The NBSAP BiH (2015-2020) development process was held in five principal stages:

1. **Analysis of the biological diversity status** - This phase included a review of all relevant documents (strategies, plans and reports) and policy in the field of biological diversity; data collection and analysis (data collection included the sending out official requests for information to various authorities in BiH - a total of 100 questionnaires were sent out, of which 35 responses were received); an assessment of deficiencies and barriers; assessment of the causes and consequences of biological diversity loss, highlighting the value of biological diversity and ecosystem services for human well-being. This phase lasted from February to June 2013;
2. **Development of national targets, principles and priorities** - This phase included the development of national targets according to SMART methodology (discussed in Chapter 3), prioritizing national targets and proposal/creation of indicators according to the BIP methodological framework (discussed in Chapter 3), which will monitor each individual goal. This phase lasted from July to November 2013;
3. **Development of the Action Plan** - After the identification of national targets, this phase included the development of an Action Plan containing measures to achieve the national targets by 2020. The Action Plan was agreed through discussion and consultation with all stakeholders. This phase lasted from December 2013 to July 2014;
4. **Preparation of Implementation Plans** - This phase involved the development of four principal plans which should facilitate the implementation of the NBSAP BiH (2015-2020): a) The Communication Plan; b) The Capacity Development Plan; c) The Scientific Technology Development Plan; and d) The Resource Mobilization Plan. This phase lasted from May to August 2014;
5. **Monitoring, reporting and data exchange** - This is the last phase, which follows after the adoption of the NBSAP BiH (2015-2020), and includes the establishment and/or strengthening of institutional capacities, formation of the final list of indicators proposed in the NBSAP-BIH (2015-2020), monitoring of biological diversity status and the state of implementation of the NBSAP BiH (2015-2020) according to the adopted list of indicators, and reporting to the CBD Secretariat.

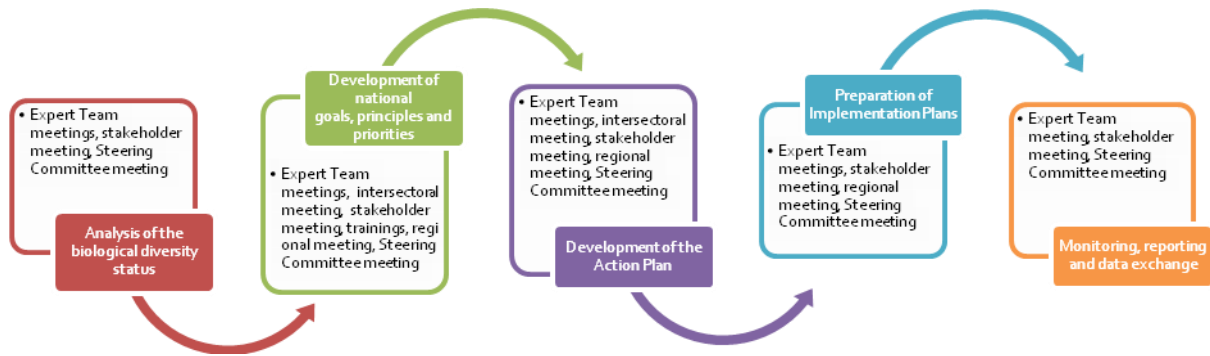


Figure 2: Development Process for the NBSAP BiH (2015-2020)

During the preparation of NBSAP BiH (2015-2020), the visual identity was also designed, which was used on all promotional and working materials during the consultative stakeholder meetings. The visual identity contains four different colors, which represent the five elements: air, flora, fauna, soil and water.



Figure 3: Visual Identity of the NBSAP BiH (2015-2020)

1.4. Contents of the NBSAP BiH (2015-2020)

The NBSAP BiH (2015-2020) represents the basic document for nature protection in BiH, which provides a detailed overview of biological diversity status by 2014 and is the basis for the assessment of the situation in the coming period. The national targets of biological diversity conservation in the NBSAP BiH (2015-2020) were set based on the priorities and specificities of BiH and were to the fullest extent compliant, with the Strategic Plan 2011-2020, taking into account the overall economic, social and cultural development of the country. The document also proposes indicators for each of the national targets, an Action Plan with measures to be implemented over the next five years, as well as implementation plans that serve as a tool for successful and facilitated implementation of the NBSAP BiH (2015-2020).

This document provides guidance to entities in the process of planning and decision-making for tracking changes and for development in the process of strengthening and democratization of public and environmental awareness.

The NBSAP BiH (2015-2020) consists of five main chapters:

Chapter 1 is an introductory part with information on biological diversity and the CBD, and on the development process of NBSAP BiH (2015-2020).

Chapter 2 is a sectional view of the current biological diversity status in BiH in accordance with the 20 thematic Aichi Targets (Annex 1) that are grouped into five global strategic goals. The analysis of the current biological diversity status in BiH was done on the basis of all available, accessible and valid qualitative and quantitative data, which have been analyzed and presented graphically.

Chapter 3 covers the national targets and proposed indicators to monitor the progress of a given goal for reporting purposes. The national targets and indicators have been defined on the basis of the current situation and the need to preserve biological diversity in BiH, and have been motivated / driven by Aichi Targets.

Chapter 4 includes an Action Plan detailing the measures/activities (institutional, technical, legal, or economic in nature) which will provide the conditions and incentives necessary to achieve the national targets.

Chapter 5 contains four plans that serve as tools for successful implementation of the NBSAP BiH (2015-2020).

Chapter 6 pertains to the conclusions of the previously explored and defined chapters, as well as to future needs and steps for improving the biological diversity status and protection in BiH.

2. THE STATE OF BIOLOGICAL DIVERSITY IN BiH

Bosnia and Herzegovina (BiH) is a country in the south-eastern part of Europe, situated in the west of the Balkan Peninsula. It borders the Republic of Croatia (931 km) in the north, northwest and south, and the Republic of Serbia (375 km) and Republic of Montenegro (249 km) in the east. The size of the territory of BiH is 51,209.2 km², 51,197 km² of which is covered by land, and 12.2 km² by sea. The capital of BiH is Sarajevo.

BiH is a mountainous country covered by forests. Of the entire land territory, 42 % is made up of mountains, 24 % of hills, 29 % of karst areas and 5 % of lowlands. The average altitude is 500 m, and the highest point is Mt. Maglić (2,387 m). By its hydrological features, BiH belongs to the Black Sea Basin (75 %) and the Adriatic Sea Basin (25 %). The longest river is Drina (346 km), while other important rivers are: Una, Vrbas, Bosna, Sava, Neretva, and Trebišnjica. The largest lake is Buško Lake (55.8 km²). BiH is also rich in river lakes (on Pliva and Una Rivers) and mountain lakes (in the Dinaric area), as well as in resources of terminal and geothermal subterranean waters. Thanks to the country's topography, diverse flora and geographic position, three kinds of climate are dominant in BiH: moderate continental, mountain continental, and Mediterranean climates.

According to the preliminary results of the 2013 Census of Population, Households and Dwellings, carried out by the Agency for Statistics of BiH, BiH has the population of 3,791,662 residents.

The country of BiH has been established by the Dayton Agreement, signed on 14 December 1995. BiH consists of three administrative units: the Federation of Bosnia and Herzegovina (FBiH), the

Republika Srpska (RS), and the Brčko District (BD). The FBiH is made up of 10 cantons, which are divided into municipalities. In the FBiH there are 79 municipalities altogether, while in the RS there are 62 municipalities. The City of Brčko is a separate administrative unit – a district.



Figure 4: Administrative Organization of BiH

In accordance with the NBSAP development process, as recommended by the CBD Secretariat, the state of biological diversity in BiH has been analyzed and illustrated through 20 thematic Aichi Targets from the Strategic Plan 2011-2020. Each Aichi Target is described in detail in Annex 1. The state of biological diversity in BiH has been analyzed on the basis of publicly available and officially obtained qualitative and quantitative data and information from relevant institutions and organizations, covering the period from 2008, i.e. the year when the NBSAP BiH (2008-2015) was finalized, up to 2014.

2.1. AICHI TARGET 1: Public Awareness about the Values on Biological Diversity

The CBD recognizes the importance of education, media and public awareness regarding the conservation and sustainable use of biological diversity (Article 13). Various projects and programs initiated by the public tend to reduce losses and improve the state of biological diversity and increase public awareness. The main focus of Aichi Target 1 is the public awareness of the value of

biological diversity, and this is what the Program for Communication, Education and Public Awareness – CEPA; (hereinafter referred to as: the CEPA Program) has been based on. The Program represents a tool for achieving this goal, as well as for providing support in the development and implementation of the CEPA Strategy and Communication Plan (the Communication Plan for the needs of the NBSAP BiH 2015-2020 is given in Chapter 5).

In BiH, the values of biological diversity are under-represented in the government and in society. Public awareness of environmental protection, including biological diversity, is at a very low level, which was recognized in several documents (National Environmental Action Plan BiH – NEAP, 2003; Second Environmental Performance Reviews of BiH, 2011; State of Environment Report in BiH, 2012; Fifth National Report of BiH to the CBD, 2014; NBSAP 2008-2015 etc.). Low public awareness of the importance of biological diversity conservation represents one of the issues faced by developing countries and countries with economy in transition, including BiH.

2.1.1. Education

In BiH, topics from the domain of environmental protection have been included in pre-school and school curricula in accordance with the provisions of the following laws and strategies: Framework Law on Primary and Secondary Education in BiH (BiH Official Gazette, no. 18/03), Framework Law on Preschool Upbringing and Education in BiH (BiH Official Gazette, no. 88/07), Framework Law on Vocational Education and Training in BiH (BiH Official Gazette, no. 63/08), and Strategic Directions for Development of Education in BiH (2008-2015), Strategy for the Development of Vocational Education and Training in BiH (2007-2013), and Strategic Directions for Development of Preschool Upbringing and Education in BiH, 2004.

The curricula and activities related to environmental protection, including biological diversity, are harmonized between the entities of the FBiH and the RS, the BD, and the cantons and municipalities.

Primary Schools

In primary schools, the initial environmental protection topics, including the values of biological diversity, are dealt within the school subject My Environment, and later in other subjects (e.g. nature studies /nature and society/, biology, chemistry, geography, etc.), where concepts like ecosystems, genetic resources, protected areas, endangered species, aquaculture, forestry, invasive species and the like are addressed.

Depending on schools, extracurricular activities take place in the form of environmental clubs. Environmental clubs carry out their activities through various forms of work (e.g. observation of ecology days, creation of thematic papers, trips and visits to museums, work on the creation of biological collections and collecting botanical and zoological materials, participation in the afforestation of barren areas, cultivation of plants at school premises, etc.).

Secondary Schools

The curricula and activities related to environmental protection, including biological diversity, depend on the area of activity of secondary schools (e.g. general grammar schools, schools for electrical engineering, economics, medicine, transport, geodesy and construction, catering and tourism, forestry, agriculture, etc.). According to the data published by the Federal Ministry of Education and Science and the Republic Pedagogical Institute of the RS, the total number of secondary schools in BiH is 292, 61 of which are general grammar schools, and 231 are vocational schools. The topics related to the concept of biological diversity are prevalent in subjects such as biology, geography and chemistry.

Similar to primary schools, depending on schools, the extracurricular activities take place within environmental clubs, which aim to increase public awareness and form proper attitudes among students as to the importance and protection of environment, including biological diversity.

Higher Education Institutions

Programs which are directly or indirectly linked to the values of biological diversity are represented at the following higher education institutions in BiH:

- Sarajevo – Faculty of Sciences (Department of Biology – Program for Ecology, Program for Genetics; Department of Geography – Program for Tourism and Environmental Protection); Faculty of Mechanical Engineering (Department of Energy, Process Engineering and Environmental Engineering – Program for Environmental Engineering); Faculty of Forestry (Department of Forestry – Program for Sustainable Forest Management; Department of Horticulture - Program for Horticulture, Program for Landscape Architecture);
- Banja Luka – Faculty of Sciences (Program for Biology; Program for Environmental Protection); combination of Faculty of Sciences and Faculty of Agriculture (Master Program for Sustainable Use and Conservation of Genetic Resources), Faculty of Forestry (Master Program for Genetic Resources, Master Program for Forest Management on Natural Foundations); Faculty of Technology (Program for Ecological Engineering); University of Business Studies (Faculty of Ecology); Independent University (Faculty of Ecology);
- Mostar – Faculty of Sciences (study group - Natural-Mathematical Sciences – Environmental Science); Agri-Mediterranean Faculty of the University "Džemal Bijedić" (Post-graduate studies, study group – Ecology and Environmental Management);
- Tuzla – Faculty of Sciences (Department of Biology – Program for Biosystematics and Ecology); Faculty of Technology (Department of Environmental Protection Engineering);
- Travnik – Faculty of Ecology of the International University;
- Zvornik – Faculty of Technology (Program for Ecological Engineering);
- Konjic – College of Tourism and Management (Program for Geotourism).

2.1.2. Media

The media are important tools for education and rising of public awareness, and can have a major role in the creation of certain attitudes and public opinions with regard to environmental protection, including biological diversity. In BiH there are no studies or monitoring of media in terms of

representation and ways of interpreting of the values of biological diversity. According to available and research study data, below is an overview of print and electronic media which make an active effort to publish texts covering environmental protection topics, including biological diversity.

Print Media (Journals, Magazines, and Newspapers)

Journals and magazines which directly address environmental protection issues, as well as biological diversity ones, are as follows: *Fondeko svijet*, *Turizam BiH*, *Putokaz*, *Priroda – Okoliš*, and *Geografski list*. Other newspapers (e.g. *Oslobođenje*, *Dnevni avaz*, *Nezavisne novine*, *Glas Srpske*, *Dnevni list*, *Dani*, *Slobodna Bosna*, *Novi reporter* etc.), occasionally publish texts related to environmental protection, but there are no studies which would give data on how often texts on current topics are published.

Electronic Media (Radio, TV Stations and the Internet)

State, entity, cantonal and local radio and TV stations broadcast documentaries (e.g. *Živjeti s prirodom* (RTVFBiH, BHT₁), *Učinimo moguće* (RTRS), *Prijatelji zdravlja* (BHT₁), *Njeno veličanstvo – voda* (BHT₁), *Zelena panorama* (RTVFBiH, BHT₁), *Baština BiH* (RTVUSK), *Upoznajmo BiH* (BDCTV), *Vikend Vidikovac* (BHR₁), *Ekologika* (BHT₁), *Turizam plus* (TV₁, RTVFBiH), *Darovi prirode* (TVSA), *Eko-kviz* (RTVUSK), *Seoski turizam u BiH* (BHR₁), *Leksikon zdravlja* (TVTK), *Riznica znanja* (RTRS), etc.), which directly or indirectly deal with issues of biological diversity. However, there is no data on how often radio and TV stations broadcast this content.

The websites that deal solely with the theme of promoting environmental protection, as well as biological diversity, are as follows: *Turizam plus*, *Zeleni – Neretva*, *Ekotim*, *Eko akcija*, *Bistro BiH*, etc. Internet portals (e.g. *DEPO*, *Klix*, *BHRT*, *Buka*, *Face TV i dr.*) publish content with similar themes occasionally, but there is no data on how often content related to environmental protection and biological diversity is published.

The content directly or indirectly related to biological diversity is occasionally published on the websites of relevant institutions, such as: FMET, MPPCEE RS, the Federal Ministry of Agriculture, Water Management and Forestry (FMAWMF), Ministry of Agriculture, Forestry and Waters of RS (MAFW RS), Environmental Fund of FBiH (EF FBiH), Environmental Protection and Energy Efficiency Fund of RS (EPEEF RS), cantonal ministries, municipal offices/environmental protection offices, Republic Institute for Protection of Cultural, Historical and Natural Heritage of the Republika Srpska, Genetic Resources Institute of the University of Banja Luka, Institute for Genetic Engineering and Biotechnology, water agencies, faculties and other, but it is not known how often they are published on mentioned websites.

The BiH internet portal with the mechanism for exchange of information on biological diversity (en. *Clearing House Mechanism – CHM*; further in text: CHM BiH), was established in 2013. The goal of the CHM is to provide comprehensive information on biological diversity through effective information services not only for the general public, but also for all stakeholders, and to allow technical and scientific cooperation, exchange of knowledge and information flow which helps all decision-makers and all stakeholders in meeting their obligations defined by the CBD. The CHM BiH currently offers

information about the values and state of biological diversity in BiH, as well as events (e.g. workshops, conferences, meetings, etc.) related to the Project „Support to BiH for Revision of the NBSAP and Development of the Fifth National Report of BiH to the CBD“. The CHM BiH contains general information about the CHM, CBD, including the Strategic Plan 2011-2020, about the biological diversity in BiH (the latest information on diversity at the level of genes, taxa, and landscapes), relevant documents in the field of biological diversity, cooperation in terms of cross-border projects, institutional and legal framework for the nature protection, calendar with important dates for nature protection, frequently asked questions, useful links, gallery, contacts, etc.



Figure 5: CHM² BiH Website

2.1.3. Public Awareness

The document "Second Environmental Performance Review of BiH" of the United Nations Economic Commission for Europe (UNECE, 2011) points out that authorities responsible for environmental protection at the state, entity and cantonal levels must take measures to raise public awareness of environmental problems and the right of citizens to protect the environment. One of the positive examples is the adoption of the program to observe the important dates related to human rights in BiH through which in 2010 a series of promotional materials in respect to the World Water Day, Earth Day, Environment Protection Day, World Environment Day, and Ozone Layer Protection Day was published. Also, the Plant Day (Plant Diversity Day) was observed on May 18, 2012, as organized by the Genetic Resources Institute in Banja Luka, on the occasion of proclamation of the "Univerzitetski grad (University City)" protected area, and a number of promotional activities were organized on this occasion. On May 22, 2014 the World Day of Biological Diversity should have been observed, but this was cancelled due to adverse conditions (floods) which have affected BiH.

The NGO sector has a major role when it comes to communication, raising public awareness, and education on environmental protection, including biological diversity in BiH. There are numerous non-governmental organizations (NGOs) that deal with this issue, and are recognized as citizens' organizations or associations of professionals/experts. The Environmental Protection and Energy Efficiency Fund of the RS has provided financial support to several NGO projects since 2008 through public tenders in terms of public awareness of environmental protection (Second Environmental

² Link: www.bih-chm-cbd.ba (accessed on May 3, 2013)

Performance Review of BiH, 2011). On the other hand, in the period of 2008-2014, the Environmental Fund of the FBiH also financed some NGO projects related to raising public awareness of the need for protection of environment and biological diversity, as shown in Annex 2 of the Fifth National Report of BiH to the CBD (2014).

According to recent data provided by the Aarhus Centre of BiH, there are 141 registered NGOs in BiH whose work programs and activities include environmental issues, including the values of biological diversity, with an emphasis on raising public awareness and education³.

The reasons for the lack of a clear picture of the level of public awareness in BiH are insufficiently reliable and available data, and under-representation of environmental protection issues, as well as the values of biological diversity, in the media and education. However, according to data provided in Annex 2 of the Fifth National Report of BiH to the CBD (2014), some progress and efforts have been observed over the past five years, and most are carried out through various *ad hoc* projects of certain international and local institutions and non-governmental sectors. One of the positive examples is the „Support for Implementation of the Bird Directive and Directive on Habitats in BiH“ Project (October 2012-2014), which has included a completion of the Communication Strategy, a film, promotional materials, exhibitions and a range of workshops and activities aimed at raising public awareness on the significance in establishment of the Natura 2000, European environmental network.

2.2. AICHI TARGET 2: Integrating the Values of Biological Diversity into National and Local Development Strategies

Each CBD Party is expected to integrate the measures for conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programs and policies (Article 6 of the CBD) and to strengthen coordination among all levels of government. For example, the values of biological diversity such as ecosystem services, protected areas, ecosystems, plant species, animal species, etc., should be included in the spatial planning process for specific areas.

One of the major documents which integrates the values of biological diversity is the *National Environmental Action Plan for BiH* (NEAP) from 2003. The goal of the NEAP is the identification of short-term and long-term priority activities and the creation of a basis for the preparation of a long-term environmental protection strategy in accordance with the economic development of BiH and its socio-political organization. Beside the description of the situation, problems in the field of biological diversity and the proposed objectives and measures for overcoming of the said problems have been identified and analyzed. It is one of the first comprehensive documents on environmental protection in BiH, where the values of biological diversity have been recognized as the fourth priority.

Biological diversity is also integrated in the draft *Development Strategy of BiH (2010)* under the strategic objective “sustainable development”. The priorities found under this strategic objective include the conservation and rational management of natural resources. In order to achieve

³ Link: www.aarhus.ba/baza/nvo-u-bih.html (accessed on May 4, 2013)

sustainable development, as part of this priority, the Development Strategy of BiH also provides support to biological diversity protection measures and sustainable use of genetic resources. The reason for including these measures into this document is a rich genetic pool of varieties and breeds in agricultural production which the authorities should pay attention to. However, according to the official letter issued by the Department of Environmental Protection, Sector for Natural Resources, Energy and Environmental Protection of the MoFTER, it has been emphasized that the Development Strategy of BiH and reports on the development in BiH have not been adopted by the BiH Council of Ministers, and are not official documents.

At the entity level, in accordance with the working version of the *Development Strategy of the FBiH (2010-2020)*, the priorities in the agriculture, food production and rural development sector include the measures for biological diversity protection and sustainable use of genetic resources, and these are: establishment of natural parks and protected areas; financial support for the creation of programs for the protection of indigenous and traditional plant and animal species, and the establishment of bio-indicators. In addition to the above measures, the Development Strategy of the FBiH has emphasized that the management of biological diversity of the FBiH reserves a special place for long-term protection priorities, and these are:

- Biological diversity of endemic relict species, species threatened on a national, European and global level, economically important species and indigenous genetic resources;
- The rich resources of canyons and cliffs serving as development centers for flora, fauna, and vegetation, and a biological diversity refugium from the Tertiary;
- Biological diversity of habitats outside the normal areas of distribution and naturally rare habitats;
- Biological diversity of karst ecosystems as the greatest natural phenomena;
- Biological diversity of high mountain ecosystems – islands of preserved glacial flora and fauna;
- Biological diversity of ecosystems of the province of relict pine forests on different geological substrates.

It is important to emphasize that the Development Strategy of the FBiH has not yet been adopted in the FBiH.

The Development Strategy of the RS (2012-2016) is in the preparatory phase. The *Development Strategy of the BD BiH (2008-2017)* integrates biological diversity under one strategic objective only, even though at the beginning of the document it is emphasized that biological diversity is a particularly valuable natural resource and that the BD is rich in flora and fauna. The strategic objective of economic development tied to agriculture includes objectives involving the consolidation of agricultural holdings. According to the document, the realization of this objective can be achieved by implementing programs that are directly related to biological diversity, and these are:

- development of organic and other environmentally friendly production;
- environmental preservation in agriculture;
- improving the use and conservation of genetic resources in agriculture;
- improving the genetic base in animals.

A positive example of the integration of biological diversity into sectoral planning documents is the proposed *Spatial Plan of the FBiH (2008-2028)*, supported by the House of Representatives, which however has not yet been adopted. The Spatial Plan of the FBiH represents an overarching strategic document on the basis of which the use of space will be defined and development plans will be made to define objects and areas of natural heritage, and objectives of spatial development, protection, use and purpose of land. Within the Spatial Plan, it is inevitable to specify proposals for protection and improvement of the state of the environment in FBiH, and a strategic environmental assessment has therefore been created in this document.

The *Spatial Plan of the RS by 2015* has integrated some specific values of environmental protection only, but it does not directly include the issue of biological diversity. The draft new Spatial Plan of the RS by 2025 dedicates one sub-section to biological diversity, where spatial planning is guided by the values of biological diversity protection, as well as environmental protection.

As many socio-economic activities depend directly on biological diversity and contribute to poverty reduction, it is important to integrate the values of biological diversity into poverty reduction strategies at all levels, in order to be more involved in the conservation and sustainable use of natural resources. In BiH, there exists the *Proposal of Poverty Reduction Strategy (I-PRSP)* from 2001, which has not integrated the values of biological diversity, but it has been stated that, during the preparation of the I-PRSP, it will be necessary to define a number of sectoral strategies, which include agriculture, forestry, and water management, that can indirectly be linked to biological diversity. This document provides an overview of the state of these sectors and states that it is necessary to make new plans for further exploitation of natural resources.

The values of biological diversity are also integrated in the entity strategies for environmental protection. In the *Environmental Protection Strategy of the FBiH (2008-2018)*, with the goal which relates to environmental protection, promotion and encouragement of sustainable use of natural resources through the establishment of an integral management system for nature – biological and geomorphological diversity, operational objectives are defined for the establishment and strengthening of the institutional framework in the FBiH in order to enable protection of biological diversity:

- Establishment of a federal institution – an agency responsible for the protection of biological and geological diversity;
- Inventorying of species of flora, fauna and fungi and identification of habitat types;
- Assessment of the vulnerability of species of flora, fauna, and fungi, and habitats and living communities in accordance with the International Union for Conservation of Nature (IUCN);
- Establishment of a sustainable network of existing and new protected areas;
- Strengthening of legislation;
- Monitoring and control of invasive species;
- Establishment of *ex situ* conservation;
- Monitoring of the state of biological diversity in FBiH;
- Development and strengthening of the CHM BiH;
- Strengthening of information technology (IT) services and providers;
- Strengthening of inter- and intra-entity cooperation;
- Public awareness raising.

The *Nature Protection Strategy of the RS (2011)* establishes a strategic framework and the state in the field of biological diversity protection. The Strategy emphasizes that the entire territory of the RS is considered an area with high-quality natural environment, in which it is possible to ensure and carry out protection and conservation measures for biological diversity resources, as well as the balance of natural processes. In order to preserve, promote and encourage sustainable use of natural resources by establishing an integrated biological diversity planning and management system, four fundamental strategic objectives have been defined:

1. The protection of biological, pedological, and geological diversity of the RS through the establishment and strengthening of the institutional framework for the implementation of effective nature protection measures;
2. Sustainable use of natural resources;
3. Reduction of the pressure on bio- and geodiversity in the RS;
4. The establishment of financial mechanisms for the sustainable management of bio- and geodiversity.

It should be noted that two programs have been adopted in the RS: the *Conservation of Plant Genetic Resources Plan (2008)* and the *Program for Conservation of Forest Genetic Resources (2012)*. These programs provide the basis for conservation and sustainable use of plant genetic resources of RS and the connection of all bodies involved in this issue with relevant institutions in BiH and the region.

The *Environmental Protection Strategy of BD BiH (2013-2023)* is in the adoption procedure. The principles of this Strategy are the guiding principles of the CBD. Based on this document, biological and geomorphological diversity in the BD have great potentials to generate environmentally profitable and sustainable projects for the reduction of the rising poverty, for reconstruction, and improvement of the economy, the development of new biotechnologies based on the indigenous gene pools and following of the European Union (EU) integration paths. Considering the above, the sustainable protection of the environment and promotion of a balanced use of natural resources through the establishment of an integrated system for the management of bio- and geodiversity have been adopted as the general objective of the Environmental Protection Strategy of the BD BiH.

At the cantonal and municipal levels, plans are also in process for environmental protection which integrate the values of biological diversity (as a separate domain in the action plan) under the names of Cantonal Environmental Protection Action Plan (KEAP) and Local Environmental Protection Action Plan (LEAP). Of the total of ten cantons in FBiH, five cantons only have developed or are in adoption phase of these plans: Una-Sana Canton 2014-2019, Tuzla Canton (in adoption phase), Central Bosnia Canton 2015-2025 (a draft exists, but has not been adopted), Herzegovina-Neretva Canton 2011-2016, and Sarajevo Canton 2005-2010 (extended to 2012). According to the United Nations Development Program (UNDP) data, a total of 91 LEAP documents have been developed, while 7 are in the drafting process.

Among the priorities and objectives of the *Strategic Plan for Harmonization of Agriculture, Food, and Rural Development of BiH (2008-2011)* are: conservation of natural biological diversity systems, conservation of indigenous plant and animal species, as well as conservation of traditional products

and products with geographical origin. The same as at a state level, strategies at the entity⁴ level relating to agriculture and rural development also include the values of biological diversity under their objectives. The other relevant strategies which integrate the values of biological diversity are described in Chapter 3 (3.4) of the Fifth National Report of BiH to the CBD (2014).

In BiH there are various sectoral strategies that integrate the values of biological diversity, but due to the fact that entity laws on environmental/nature protection prescribe strategic environment assessment during the creation of plans and other relevant documents, it is necessary to also integrate biological diversity into strategies of the sectors such as energy, mining, industry, and forestry. At the BiH level, as well as at the entity levels, the adoption of this type of strategies is slow, which additionally slows down their implementation. It is necessary to accelerate the process of adoption of the strategies and to include all relevant stakeholders in these strategies and plans, which would provide a more efficient implementation of national targets.

2.3. AICHI TARGET 3: The Elimination of Harmful Incentives

Pursuant to Aichi Target 3, by 2020 it will be necessary to eliminate or, if this is impossible, then reform subsidies and other incentives which harm biological diversity in order to reduce their impacts. In addition to the reduction or abolition of harmful incentives, the CBD Parties must create and enhance existing incentives which positively affect the conservation and sustainable use of biological diversity, provided that such incentives are in accordance with the CBD and other relevant international obligations.

In order to achieve this goal, it is necessary that governments at all levels perform an analysis of existing subsidies and incentives that have negative impacts on biological diversity in BiH. The subsidies and incentives of this type are present in the industry, transport, energy, and agriculture sectors. The same should be done with incentives that have positive effects on biological diversity and are found in the environment, agriculture, forestry, and water management sectors.

As for the energy sector, it is important to mention the separation of subsidies for the use of renewable sources of energy which are regulated by legal acts in both entities: the Law on Renewable Energy Sources and Efficient Accumulation (Official Gazette of RS, no. 39/13 and 108/13) in RS and Law on the Use of Renewable Energy Sources and Efficient Accumulation (Official Gazette of FBiH, no. 70/13 and 05/14) in FBiH.

These laws are important because they serve as an incentive for the construction of small hydropower plants, which can have negative impacts on biological diversity and lead to degradation of existing ecosystems which are habitats of many endemic species. Despite these negative influences, on 2 February 2012, the RS Government adopted the Decision on Approval for the Construction of Small Hydropower Plants (up to 5 MW) (no. 04/1-012-2-204-12) in the Sutjeska National Park (NP) area, and awarded the concessions for the construction of hydropower plants of "Sutjeska 2A", "Sutjeska 2B", "Hrčavka 1", "Hrčavka 2", "Hrčavka 3", and "Jabušnica". The

⁴ *Strategic Plan for Rural Development of RS (2009-2015); Mid-Term Agricultural Sector Development Strategy in FBiH (2006-2010)* to be replaced with the new *Rural Development Strategy at the Level of FBiH* (currently in process).

construction of the aforementioned small hydropower plants could lead to the conversion of existing natural habitats and threaten endemic species present in the Sutjeska NP area.

According to an official letter addressed to the FMAWMF's Department of Agricultural Policy and International Cooperation, in BiH incentives are provided in the agriculture sector and they are regulated by law in both entities. The Law on Agriculture (Official Gazette of RS, no. 70/06, 20/07, 86/07, and 71/09) and the Law on Organic Food Production (Official Gazette of RS, no. 75/04) represent the legal basis in RS, while the Decree on Conditions and Method of Achieving Incentives for Agricultural and Rural Development (Official Gazette of RS, no. 25/11) further regulates specific issues. In the FBiH, incentives in agriculture are implemented based on the Law on Agriculture (Official Gazette of the FBiH, no. 88/07, 4/10, 27/12, and 7/13), Law on Financial Support in Agriculture and Rural Development (Official Gazette of the FBiH, no. 42/10), Law on Agricultural Land (Official Gazette of the FBiH, no. 52/09), as well as based on annual grant fund programs with allocation criteria, and the regulations under the models for each type of incentives, also on an annual basis. This legislation prescribes measures for financial support in agriculture and rural development, models of financial support, sources, selection of priorities, the amounts of funds, the beneficiaries of financial support and implementation methods.

According to the FMAWMF data, in the 2010-2012 period, support measures for conservation of biological diversity were implemented in the FBiH. This involved support for the preservation of the genome of indigenous plants and animals and the certification of organic production. For the first support measure 250,000 KM was allocated for 107 projects in 2010. The support was in relation to the production of indigenous seeds, seedlings, and young trees, construction or adaptation of existing facilities, purchase of necessary mechanization for the growth and maintenance under natural conditions, as well as for affirmation of threatened and declining varieties of agricultural plants and animal breeds, co-financing of programs for the preservation of health and genomes of indigenous plants and animals. In the RS, the support for the implementation of the Program for Conservation of Plant Genetic Resources (2008) is provided through the Ministry of Science and Technology of the RS.

According to data from an official letter submitted by the Department for Agricultural Policy and International Cooperation of FMAWMF as part of the certification of organic production in FBiH, 185,000 KM was allocated in 2010, 258,000 in 2011, and 86,254 in 2012 to boost organic production. This support was in relation to co-financing the costs of certification of organic products, as well as certain raw materials produced in the organic production process. Organic production is an environmental production management system which promotes and emphasizes biological diversity, maintains biological activity of the land and gravitates toward harmony with nature. In the following period the funding for the Program for Conservation of Sustainable Use of Indigenous Plant and Animal Species (species and breeds) has been planned in accordance with the Action Plan of the Medium-Term Development Strategy of the Agriculture Sector of the FBiH (2006-2010).

The Law on Environmental Protection Fund of the FBiH (Official Gazette of FBiH, no. 33/03) and the Law on the Fund and Financing of Environmental Protection of the RS (Official Gazette of RS, no. 117/11 and 63/14), and other by-laws regulate the funds which cover activities in regarding the fund raising, encouraging and funding the preparation, implementation and development of programs,

projects and similar activities in the field of conservation, sustainable use, protection and improvement of the environment, including biological diversity and the use of renewable energy sources.

In conclusion, in BiH there are incentives that have negative impacts on the conservation and sustainable use of biological diversity, as well as those that have positive impacts. The problem is that it is difficult to determine their amounts and the extent to which these incentives harm or benefit biological diversity. It is therefore necessary to establish a system for monitoring of these subsidies and incentives and find a way to reform them, because this is a sector on which the economic development of BiH depends. These types of incentives and subsidies cannot be eliminated, because BiH has not yet acquired that level of industrial and economic development that would allow it to redirect the incentives to biological diversity conservation only. In addition, many types of incentives cannot be eliminated because of poverty reduction programs aimed at economic development of the country.

2.4. AICHI TARGET 4: Sustainable Production and Use of Natural Resources

Pursuant to Aichi Target 4, by 2020 governments at all levels in the CBD parties should take steps for drafting or application of plans for sustainable production and consumption, and they need to keep the effects of the use of natural resources within ecologically safe limits. This goal is important because many parties of the CBD have cited unsustainable use or overexploitation of resources as a threat to biological diversity in their Fourth National Reports.

At the BiH level, sustainable use of natural resources has been integrated in the proposed *Development Strategy of BiH (2010)* under the strategic goal of "sustainable development". This part of the document also lists priorities in the promotion of achieving sustainable development and the measures for its achievement. In addition to measures relating to the achievement of sustainable development, the document also contains measures for sustainable use of natural resources in the sector of ecology and development of energy resources. This Strategy emphasizes the need for development of strategic documents, plans and research programs, as well as tenders for the award of concessions in the field of sustainable use of natural resources and renewable energy sources. This document attaches significance to sustainable consumption and production, but it is yet to be adopted by the Council of Ministers of BiH.

In accordance with the working version of the *Development Strategy of the Federation of BiH (2010-2020)*, which has not yet been adopted in the FBiH, among the individual priority strategic development objectives by sectors, the sector "agriculture, food production and rural development" includes a sub-goal "nature conservation and rational management of natural resources". In addition to the development strategies, sustainable production and consumption can also be found in environment sector strategies and rural and agricultural development strategies. It is also important to emphasize that on 31 July 2014, the FMAWMF finalized the document titled the Rural Development Program of FBiH (2013-2020), which, however, has not yet been adopted.

The *Environmental Protection Strategy of the FBiH (2008-2018)* has determined one of the overarching objectives: "To promote and encourage sustainable use of natural resources by

establishing an integrated system for managing natural-biological and geomorphological diversity", while in the *Nature Protection Strategy of the RS* (2011) an entire sub-chapter is devoted to anthropogenic impacts on biological diversity. The overarching aim of the Nature Protection Strategy of the RS is "the preservation, promotion and encouragement of sustainable use of natural resources by establishing an integrated planning and management system".

Reducing total demand and increasing the efficiency of resource use and energy efficiency contribute to this objective, and may be implemented through government legislation and/or incentives, education and research, as well as through social and corporate responsibility. By signing the *Energy Community Treaty* (EnCT) for South Eastern Europe in 2005, BiH undertook, *inter alia*, the obligation of transposition of the provisions from the EU directives, as part of the *acquis communautaire* (the legal legacy of the EU) relating to energy efficiency, into domestic legislation. Among the provisions of the EU Directive is the development and adoption of *National Energy Efficiency Action Plans* (NEEAP). The Energy Efficiency Action Plan aims to define the baseline of final energy consumption for 2010, set indicative targets to reduce energy consumption by 9 % for the entire planning period, prescribe specific programs and measures in order to achieve the indicative targets, and determine the ways to monitor the plan implementation. The Draft Energy Efficiency Action Plan in BiH was submitted to the EnCT Secretariat in February 2012, and it was forwarded to the entity line ministries to align it with the entity action plans. Up to the preparation of this document, the Action Plan did not receive the necessary consent for adoption from the entity line ministries.

Based on the analysis of the above mentioned sectoral strategies related to sustainable development, agriculture and environmental protection, it may be concluded that BiH has taken certain steps that lead to achieving the Aichi Target 4. However, governments at all levels should develop and implement plans for sustainable production and consumption in other sectors, too, such as forestry, water management, agriculture, energy and manufacturing industry, with the ultimate goal of preserving natural resources within safe ecological limits.

2.5. AICHI TARGET 5: Natural Habitats

The EU legislation on nature protection consists of two regulations: 1) The Birds Directive (79/409/EEC; 2009/147 / EC), and 2) The Habitats Directive (92/43/EEC). Both regulations jointly set an ambitious and high standard for nature conservation by all EU member states and future members, and their implementation primarily takes place by establishing of the Natura 2000 ecological network. Each EU member state contributes to this network by singling out the most important areas for each species and habitat types specified in the relevant Annexes to the Directives. There is no prescription as to the percentage of the territory that the states should include into the network - it comes out at the end of the expert evaluation procedure as a result of spatial overlap of all areas set aside for each species and habitat type. In accordance with the Birds Directive, the states declare Special Protection Areas (SPA) for bird species. The Habitats Directive covers all other European species and habitat types for which the Member States are required to determine the Special Areas of Conservation (SAC) after having undergone verification and obtain the approval from the EC. These two groups of areas together form the Natura 2000 ecological network. It should also be mentioned that the entity-level nature protection laws (FBiH, RS, and BD)

have been based on the principles involving a high level of nature protection, sustainable use, application of measures and requirements aimed at nature protection, cooperation, direct application of international law and the polluter pays principle, and that the laws have seen partial incorporation of the provisions from the Bird Directive (79/409/EEC) and the Directive on Habitats (92/43/EEC).

The Natura 2000 ecological network is a system of interconnected or spatially close ecologically important areas that through their biogeographic balance significantly contribute to the preservation of natural balance and biological diversity. The process of developing the Natura 2000 network of habitats and species is on-going in BiH, with a more detailed review of habitats and species initiated by the World Wildlife Fund's Mediterranean Program Office (WWF MedPo) through the Project "European Heart of Life" in 2006, and it was published in the book *Natura 2000 BiH* in 2011⁵. This publication provides an overview of information on habitats and species from Annex I and II of the Habitats Directive, which are located in BiH. The data overview has been made based on field research and on existing reference data to a greater extent.

The most important result of the Project is the creation of a digital database through the geographic information system (GIS), on the Arc GIS platform⁶. The publication and an interactive map of Natura 2000 in BiH was made, which offer an overview and detailed information on the species and habitats from the Habitats Directive present in BiH. The Project was also aimed at strengthening the national capacities for the identification of habitats and species that exist in BiH, which 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 BiH" (October 2012-2014)⁷ supported the initial steps in the development of the Natura 2000 network across BiH, and of an appropriate strategy for its implementation, and its management plans. The project included six components:

1. Development of proposals for the Natura 2000 area;
2. Development of guidelines for preparation of Natura 2000 management plans;
3. Development of management plans for three selected Natura 2000 localities (Tišina, Orjen, and Vranica);
4. Preparation and approval of draft regulations/decrees to support the establishment of the Natura 2000 network;
5. Establishment of the information system for the Natura 2000 network;
6. Communication support to the Natura 2000 Project and network in BiH.

Under the projects and other activities implemented (workshops, exhibitions), which also involved governmental and nongovernmental sectors, scientific institutions, representatives of international and local communities, three pilot areas of the Natura 2000 network in BiH were established, specifically: Tišina Pond, Mt. Orjen – Bijela Gora, and Mt. Vranica.

⁵ Link: http://awsassets.panda.org/downloads/natura_2000_u_bih_publikacija.pdf (accessed on March 10, 2013)

⁶ Link: <http://croatia.panda.org/?204846/WWF-objavio-interaktivnu-mapu-vrsta-i-stanita-Nature-2000-u-BiH> (accessed on March 20, 2013)

⁷ Link: www.natura2000.ba/bs/ (accessed on March 20, 2013)

The **Emerald Network** is an ecological network made up of the Areas of Special Conservation Interest (ASCI), and the countries that are parties to the Bern Convention (known as the Convention on the Conservation of European Wildlife and Natural Habitats) are required to establish it. The Emerald Network program was launched by the Council of Europe as part of its activities in the implementation of the Bern Convention. In the EU countries, the Emerald Network is identical to the Natura 2000 ecological network. For the countries potential candidates for the EU membership, such as BiH, the Emerald Network Project constitutes the preparations and a direct contribution to the implementation of Natura 2000, however, it has not yet been adopted by the entity ministries.

The Project titled "Establishment of the Emerald Network in BiH" (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 (CEPRES). It was a pilot Project aimed at strengthening of training and of methodology development tools at the national level. The goal of the Project was to establish a team of experts who would work on:

- Identification of habitats in BiH;
- Identification of species and habitat types;
- Formation of a database in the Emerald software.

In the pilot phase of Project implementation, the table of habitat types was developed on the basis of available data (Table 2), as well as the list of animal species, a breakdown of animal species (excluding birds) by biogeographical regions, as well as the list of habitats by biogeographical regions in BiH.

Table 2: Types of Habitats in BiH

Code	Types of Habitats
22.	LENTIC WATERS
22.3	Amphibian communities
!22.351	Panonic communities of low reeds on river banks
22.4	Euhydrophytic vegetation
22.41	Free floating vegetation
22.43	Deeply rooted water vegetation
22.432	Communities floating in shallow waters
24.	WATER FLOWS
!24.2	Pebbly river banks
3.	SHRUBBERY AND GRASSLANDS
31.	Moderate moors and shrubbery
!31.1	European wet moors
!31.2	European dry moors
31.4	Mountainous and boreal moors
31.42	Alpine rose moors (<i>Rhododendron ferrugineum</i>)
34.	PRAIRIES AND DRY CARBONATE GRASSLANDS
34.11	Central European grasslands on shattered rock platforms
!34.5	Mediterranean xerophyte grasslands
35.	DRY SILICEIOUS GRASSLANDS
!35.11	Matgrass grasslands (<i>Nardus</i>)
37.	WET GRASSLANDS AND HIGH GREENERY
37.1	Lowlands high greenery
!37.13	Continental high greenery
!37.2	Eutrophic wet grasslands
!37.3	Oligotrophic wet grasslands

Code	Types of Habitats
37.7	Wet rims of large greenery
37.71	Vegetation of water rimes (water course screens)
!37.711	<i>Angelica archangelica</i> fluvial communities
!38.25	Continental meadows
4.	FORESTS
41.	Broad-leafed deciduous forests
!41.1	Beech forests
!41.2	Oak and hornbeam forests
!41.4	Mixed forests in canyons and large acclivities
!41.5	Acidophilic oak forests
!41.8	Mixed thermophilic forests
42.	Moderate coniferous forests
!42.16	Ordinary Southern Balkans fir forests
!42.245	Mountainous Balkans juniper forests
!42.27	Panic spruce forests (<i>Picea omorika</i>)
42.4	Mountain pine forests (gorse)
!42.41	Forests of mountain pine (gorse) with Alpine rose (<i>Rhododendron ferrugineum</i>)
!42.42	Xerocline forests of mountain pine (gorse)
42.6	Forests of black pine
!42.62	Forests of black pine (<i>Pinus nigra</i>) of the Western Balkans
44.	MODERATE RIVER AND MARSHLAND FORESTS AND SHRUBBERY
!44.1	Floodplain willow formations
!44.3	Central European forests of ash and adler alongside brooks
!44.43	Forests of ash, oak and adler of Suteast Europe
44.91	Marshland adler forests
5.	MIRES AND MARSHLANDS
51.	Raised mires
!52.	Mountain moss mires
!54.2	Sources of hard water
!65.	CAVES AND CAVITIES

The CORINE Project (September 2007 - November 2008) was aimed at updating the CORINE database, as well as identification of changes that occurred in the period between the first inventory (Emerald Network) and 2006. The resulting database for BiH was forwarded to the European Environment Agency (EEA), in charge of the integration of the CORINE database for Europe. The Project was implemented by the Faculty of Agriculture and Food Sciences - University of Sarajevo. With the aim of improved identification of changes, the Project used high quality sets of satellite images from the years 2000, 2005 and 2006 (Landsat 5, SPOT 4, SPOT 5 and IRS P6 images).

Table 3 provides an overview of the CORINE Land Cover (CLC) in BiH, where 31 of the 44 categories of the CORINE nomenclature were established. The analysis showed that 61.07 % of the BiH territory is covered with forests and other natural vegetation, while 36.70 % consists of agricultural land. Lands under the category of artificial areas occupies 1.48 %, while 0.66 % are classified as bodies of water, and 0.10 % as wet areas. The result of this Project shows that in the study period 2000-2006, changes occurred in the area of 47,905.86 ha, or 0.93 % of the total territory of BiH, taking into account the mapped changes larger than 5 ha. Based on the data obtained, it can be pointed out that the greatest changes occurred in artificial areas, while the agricultural areas decreased, as well as forests and other natural areas. Wetlands were also reduced, while the water surfaces increased.

Table 3: Changes in the CORINE Land Cover in BiH (2000-2006) – CLC Level 1

Title of Category	Area CLC 2006 (ha)	Area CLC 2000 (ha)	Change (ha)
Artificial areas	75.752,49	68.858,50	6.893,99
Agricultural lands	1.879.249,39	1.884.767,36	-5.517,97
Forests and other natural lands	3.127.086,16	3.128.202,16	-1.116,00
Wetlands	5.051,18	5.326,51	-275,33
Water surfaces	33.678,51	33.663,21	15,30
Total	5.120.817,73	5.120.817,73	0,00

Source: CORINE Land Cover Mapping – BiH, 2006.

As shown by scientific research and reference indicators, BiH 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, irrigation, affect the fragmentation, alteration and irreversible loss of habitats, 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 and ground water, resulting in the destruction of habitats of plant and animal species in lower river courses, primarily of Rivers Bosna and Drina, and in some parts of the Rivers Sava, Vrbas 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 nowadays are threatened due to the process of urbanization and conversion into construction land. Adoption and implementation of planning documents at all levels in BiH has been slow, leading to uncontrolled urbanization and fragmentation and loss of agricultural, forest, wetland and other habitats.

2.6. AICHI TARGET 6: Sustainable Management of Marine and Freshwater Resources

Overexploitation of certain species of plants and animals stands out as one of the main reasons for the loss of biological diversity in general. Exploitation of freshwater resources in BiH primarily refers to the fishing of economically important fish species. Overexploitation of natural resources in this sense implies both uncontrolled overfishing and the degradation of aquatic habitats themselves, which results in a lower rate of natural reproduction and renewal of populations, as well as potential impoverishment and destabilization of ecosystems.

All freshwaters in BiH gravitate towards two basins: the Black Sea and Adriatic Sea Basins, and it is estimated that a total of 113 species and subspecies of freshwater fish (*Osteichthyes*) and 5 species of *Agnatha* from 70 genera and 27 families inhabit them (Sofradžija, 2009). The richness and diversity of freshwater ichthiofauna in BiH is reflected in the fact that it represents about 20 % of European

freshwater ichtiofauna (Kottelat and Freyhof, 2007). Of the stated number of species, 105 (89 %) are indigenous, and 13 (11 %) represent introduced species, half of which show an invasive character (Sofradžija, 2009). A significant place in the BiH ichtiofauna is held by endemic species, most of which have a very narrow area of distribution. So far 40 endemic species have been recorded, 35 of which are widespread in the Adriatic Basin (Glamuzina *et al.*, 2010).

As for the marine ichtiofauna, BiH is also characterized by high species biological diversity; it is considered that a part of the Neum-Klek Bay is inhabited by 193 fish species from 111 genera and 55 families (Šoljan, 1948). It should be noted that no studies of marine ichtiofauna in BiH have recently been made (there is no data on qualitative-quantitative composition and distribution), and the lack of a law on marine fishing that would regulate exploitation and conservation of this very important natural resource stands out as a special problem.

Of the freshwater species important for commercial and sport-recreational fishing, almost 50 (about 43 % of overall freshwater ichtiofauna) can be singled out, both native and introduced ones, although most of them are attractive for sport fishermen, while the economic importance is featured by a smaller number of species (around 10) (Sofradžija, 2009). The economically most important species in terms of commercial fishing that can be singled out are: carp, catfish, perch, pike, bream, dam, pomfret, and chiton.

Economic (commercial) fishing in BiH is carried out only in the area of the Sava River (RS and BD), while in all other waters, sports, sports-touristic, but also commercial-sports fishing (water concessions) is present.

According to the data from the Sports Fishing Association of BiH, Sports Fishing Association of RS and Sports Fishing Association "Kečiga" Brčko, the number of commercial and sports fishermen has varied over the years. The data for 2012 tell that the number of sports fishermen in BiH was around 20,300, while there were around 11,000 registered sports fishermen in FBiH, around 9,000 in RS and around 300 in BD (the number of those who fish illegally is a lot larger than the official data because it involves poaching by people who do not pay fees and do not respect the rules on the manner of fishing, permitted amounts, etc.). According to the same information source, the number of commercial fishermen is around 20 (the number has varied over the years) and they are mostly situated in Gradiška, Brod, and Bijeljina (RS) and in BD (three registered commercial fishermen), while in the FBiH area commercial fishing is practically nonexistent. It is believed that the number of commercial fishermen in RS and BD is greater than the above mentioned, placing them in the category of illegal fishing. Given that the Law on Fishing (Official Gazette of RS, no. 71/12) has been adopted, in the last two years there exists a problem with the registration of commercial fishermen in RS, who are not satisfied with the conditions and restrictions that the law requires, so negotiations in order to achieve an agreement are ongoing.

The main pressures that can be singled out in terms of diversity of marine and freshwater resources within which fish is primarily exploited are as follows:

- Excessive and uncontrolled fishing;
- Illegal fishing (poaching);
- Use of illegitimate tools for fishing;

- Inadequate ranching;
- Lack and obsolescence of the fishing framework (strategic documents – programs for improvement of fish stock);
- Lack of regular monitoring of fish resources;
- Failure to apply the existing legal provisions in the area of freshwater fishing.

Studies have shown that in freshwater ecosystems of BiH today the most vulnerable are the sturgeon and salmonid fish species (Mrakovčić *et al.*, 2006; Sofradžija, 2009). The dominant factors that adversely affect the first group of fish relate to:

- Damming up of river courses, preventing their reproduction (save in the case of sturgeon, all other species are anadromic and migrate into freshwater to spawn);
- A large pressure by fishers (these are economically highly rated fish species, both for meat and for spawn).

The salmonid species, including a certain number of endemic species in BiH, are especially at risk due to:

- A large pressure by fishers (economically highly rated fish species);
- Distorted quality of habitats (climate change, damming up of water courses, preventing migration into upstream parts of water courses at the time of spawning, pollution of water courses, etc.).

The basic laws and bylaws regulating the exploitation of fish stock in BiH, at the entity and District levels, are shown in the table below.

Table 4: List of Laws and Bylaws in the Field of Fishing

Entity and District	Laws and Bylaws
RS	<ul style="list-style-type: none"> ▪ Law on Fishing (Official Gazette of RS, no. 72/12) ▪ Rulebook on Forms, Manner of Issuance, and Use of Permits for Commercial and Sport Fishing (Official Gazette of RS, no. 29/10) ▪ Rulebook on the Manner of Marking the Boundaries of a Fishing Area, or Part of a Fishing Area (Official Gazette of RS, no. 43/11)
FBiH	<ul style="list-style-type: none"> ▪ Law on Freshwater Fishing (Official Gazette of FBiH, no. 64/04) ▪ Rulebook on the Form and Content of the License Form for Sport and Recreational Fishing (Official Gazette of FBiH, no. 71/05) ▪ Rulebook on the Program and Method for Taking a Fishing Exam, Form and Method for Issuing of a Certificate of the Passed Fishing Exam (Official Gazette of FBiH, no. 63/05, 31/09) ▪ Rulebook on the Form, Content, and Manner of Keeping a Register of Issued Licenses for Commercial Fishing (Official Gazette of FBiH, no. 63/05) ▪ Rulebook on Determining the Damage Caused to Fish Stocks (Official Gazette of FBiH, no. 63/05) ▪ Rulebook on the Method, Tools, and Resources Used in Fishing (Official Gazette of FBiH, no. 63/05) ▪ Rulebook on the Form, Content, and Manner of Management of the Fishing Cadastre (Official Gazette of FBiH, no. 63/05) ▪ Rulebook on the Organization and Work of the Fish Guard Service, Form and Content of the Legitimacy Form and Fish Guard Badge (Official Gazette of FBiH, no. 63/05)
BD	<ul style="list-style-type: none"> ▪ Law on Freshwater Fishing (Official Gazette of BD BiH, no. 35/05, 19/07)

2.7. AICHI TARGET 7: Sustainable Agriculture, Aquaculture and Forestry

The growing demand for food, materials and fuel leads to constant increase in the loss of biological diversity and ecosystem services worldwide. Sustainable management of natural resources is the only way to overcome this problem and reduce the pressures on ecosystems. The sustainable use of natural resources is one of the three main goals of the CBD, and from the point of Aichi Target 7 the particularly important sectors are those of agriculture, aquaculture and forestry.

BiH is characterized by natural resources (water, forests, mineral resources, land), whose excessive exploitation directly affects the state of biological diversity. It is therefore of utmost importance to ensure sustainable management of these resources and their use.

Management in the sector of agriculture, aquaculture and forestry in BiH is included in the "Strategic Plan for Harmonization of Agriculture, Food and Rural Development (2008-2011)" document, which brings up priority areas and general goals for agriculture, food and rural development, as defined by the Law on Agriculture, Food and Rural Development of BiH (Official Gazette of BiH, no. 50/08). The document brings a number of measures in connection with the fifth priority area (E goal), which strengthens coordination and ensures the sustainable management of agricultural land, waters and forests, in line with international standards and EU requirements. However, reports that monitor the implementation of this document do not include the progress towards this goal and measures, nor the agro-environmental situation. Other relevant strategies for agriculture and rural development at the entity level are shown in Chapter 3 (3.4) of the Fifth National Report of BiH to the CBD (2014).

2.7.1. Agriculture

According to the document "Report in the Sector of Agriculture for BiH for 2012" (MoFTER, 2013), agriculture in BiH is more than a primary economic sector in view of the strategic importance; it provides food security and employment rate (20.6 %), which primarily pertains to rural areas. The rate of the employed in agriculture in 2013 was 18.9 % and was decreased by 1.7 % compared to 2012 (Labor Force Survey, 2013). The share of agriculture in gross national income was 7.4 % in 2012 and 8.2 % in 2013 (BiH in Figures, 2014), which shows that agricultural production had become more efficient in 2013 compared to 2012.

The basic indicators of agriculture in BiH (Report in the Sector of Agriculture for BiH for 2012; 2013) are the following:

- There is about 0.56 ha of agricultural land per capita, of which 0.36 ha of arable land and gardens;
- Arable land covers about 1,000,000 ha, of which about 47 % is unused;
- Agricultural land covers 2,572,000 ha, which is 50.3 % compared to the total land area;
- Farmland extends to 1,585,000 ha, which is 62 % of the total agricultural land;
- Only 0.65 % of agricultural land is irrigated;
- The effects of climate change in the period of 2002-2012, some of which, particularly 2008, 2010 and especially 2012, have been characterized as extremely dry, were reflected in the reduction of agricultural production and the quality of the total yield.

According to the Agency for Statistics of BiH data, the structure of sowing areas in 2012 consists of cereals (57 %), fodder plants (26 %), vegetables (15 %) and industrial plants (2 %). In 2013, only the share of cereals and fodder plants increased by 1 %, while the share of vegetables and industrial crops remained the same as in 2012.

The recorded crop production in 2013 relates mostly to: corn, fodder corn, potatoes, wheat, clover, alfalfa, and grass-clover mixtures (Chart 1). Total wheat production increased by 17.8 %, rye by 12.2 %, corn by 48.0 %, buckwheat by 46.0 %, soy by 18.7 %, tobacco by 21.3 %, potatoes by 23.7 %, and cucumber by 20.2 %, compared to 2012.

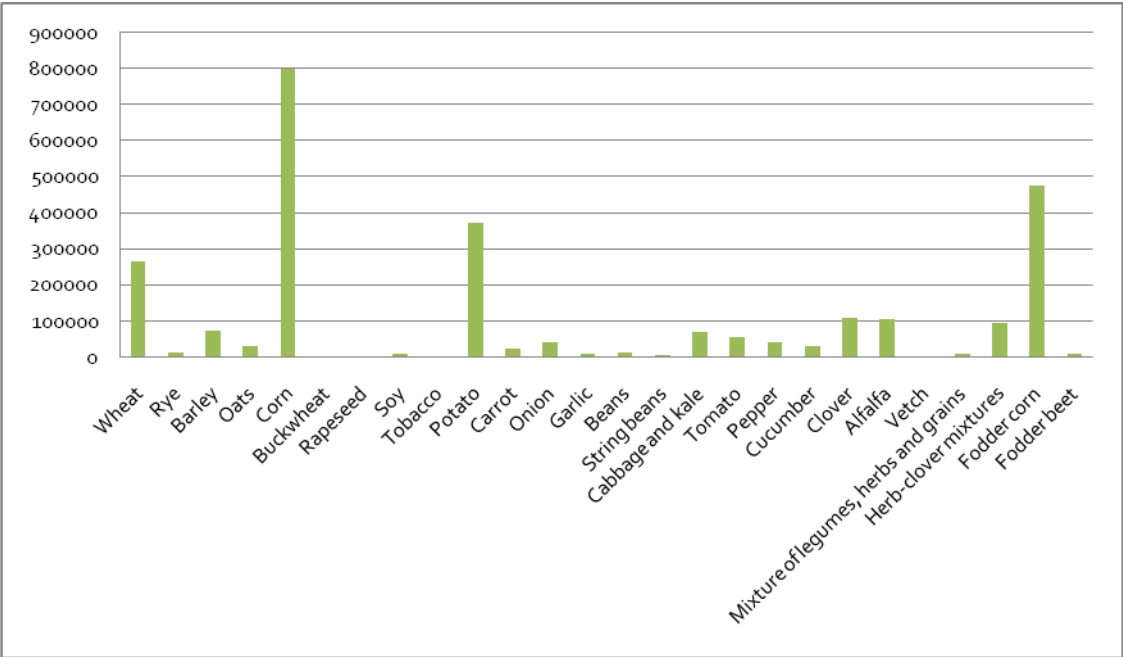


Chart 1: Plant Production in Tons for 2013
Source: Agency for Statistics of BiH

Chart 2 presents the production of fruits, among which the most prominent are plums, apples, pears, grapes, cherries, raspberries and strawberries. According to the Agency for Statistics of BiH related to the production of fruits and grapes in 2013, the total yield was increased for apples (70.2 %), pears (81.5 %), plums (104.4 %), cherries (37.4 %), sour cherries (44.0 %), peaches (8.1 %), apricots (1.7 %), quinces (57.5 %), nuts (61.8 %), almonds (15.9 %), raspberries (29.4 %) and grapes (22.6 %) compared to 2012.

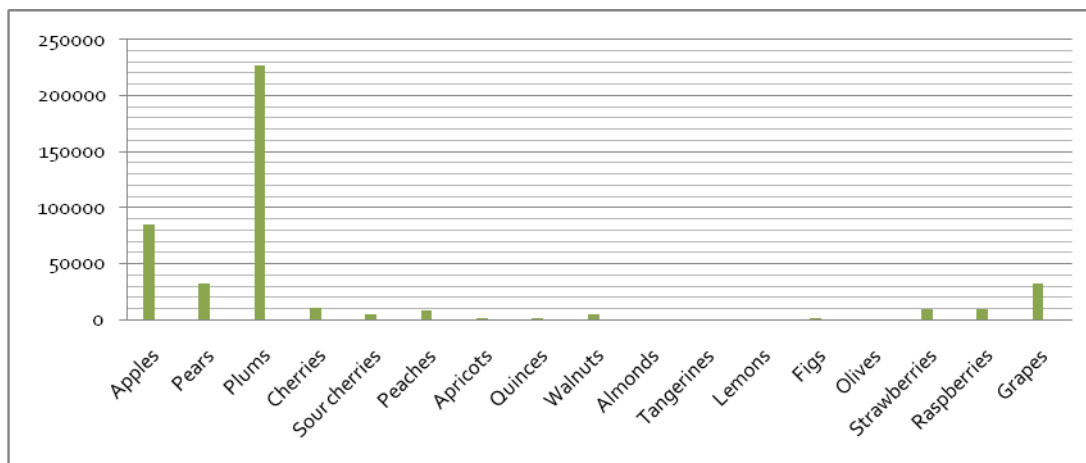


Chart 2: Production of Fruits in Tons for 2013
Source: Agency for Statistics of BiH

As for the livestock sector in BiH, more than 80 % of agricultural land has favorable conditions for cattle breeding, however there is an abundance of underutilized natural pastures (930,000 ha, or 36.7 % of agricultural land) (Report in the Sector of Agriculture for BiH for 2012; 2013).

For the period of 2008-2013, according to the Agency for Statistics of BiH, the numbers of livestock are reduced (cattle, sheep, goats and horses), which also reduced the production of milk and wool, while the numbers of pigs, poultry and beehives increased (Table 5), which contributed to an increase in production of honey and eggs.

Table 5: Numbers of Livestock for the Period of 2008-2013

Type	2008	2009	2010	2011	2012	2013
Cows (in 000 animals)	459	458	462	455	445	447
Sheep (in 000 animals)	1,031	1,055	1,046	1,021	1,004	1,020
Pigs (in 000 animals)	502	529	590	577	539	530
Horses (in 000 animals)	23	21	19	19	18	18
Poultry (in 000 animals)	16,185	18,741	21,802	18,703	19,401	24,736
Goats (in 000 animals)	70	71	64	65	65	69
Beehives (in 000 pieces)	334	347	367	382	384	393

Source: Agency for Statistics of BiH

The number of registered agricultural farms and client in BiH for 2012 amounted 114,740 of which 48,509 in the FBiH, 63,795 in the RS and 2,436 in the BD (Report in the Sector of Agriculture for BiH for 2012; 2013).

Organic Production

According to the State of the Environment Report in BiH (MoFTER, 2012), the production of organic food began in 2000. In 2007, there were about 600 manufacturers recorded involved in organic production, while 14 farms were registered for the production of organic dairy and meat products in BiH.

Also, in BiH there is production and a range of other products, such as buckwheat, corn, wheat, barley, rye, oats, potatoes, carrots, lettuce, onions, beets, peppers, cucumbers, strawberries, raspberries, cherries, grapes, figs and apricots. The exact number of manufacturers and companies that are today involved in organic production is not known.

In 2009, the area used for organic production was 262 ha, which covers 0.02 % of arable land. The average size of the farms in BiH was 1.2 ha of farmland. Although the organic sector is very small, organic production recorded a sharp rise in the period 2003-2007. (State of the Environment Report in BiH, 2012).

As far as legislation in the field of organic production, in the FBiH and the BD no law has been passed on organic farming, which gives freedom to each producer to mark and call their products organic, environmentally friendly, or bio-products, regardless of whether the quality of the products is confirmed and certified or not. Unlike the FBiH and the BD, the RS has adopted the Law on Organic Food Production (Official Gazette of RS, no. 75/04), which regulates food production methods in organic production. The registry of organic production is prescribed by the Law on Agriculture in the FBiH (Official Gazette of the FBiH, no. 88/07 and 4/10) and in the RS (Official Gazette of the RS, no. 70/06, 20/07, 86/07 and 71/09). Also, the Law on Financial Stimulations in Agriculture and Rural Development of the FBiH (Official Gazette of FBiH, no. 42/10), among other things, cites support for organic production, and it was achieved in recent years in the form of covering the costs of certification or as projects in the field of rural development (Inventory of the State of Agricultural Land and Its Use in the Region of Herzegovina, 2014). According to the same sources, on the entire territory of BiH there operate several international certification bodies (e.g. the Swedish KRAV (ARANEA), Italian ICEA, German IMO, etc.), as well as domestic ones (e.g. "Organska kontrola"), however the names and the exact number of certification bodies is not known.

Given that agriculture is an important segment of the economy in BiH, especially in rural areas, where 61 % of the population lives (Report in the Sector of Agriculture for BiH for 2012; 2013), one can see some improvement in agriculture (e.g. numbers of pigs, poultry and beehives for the period 2008-2013, plant production for 2013, production of fruits and grapes in 2013). However, there are a number of problems facing BiH in the field of agriculture, which primarily pertain to the use of old technical equipment (makes quality performance for farmers different), inadequate practices of sustainable development in agriculture (lack of subsidies for farmers, low level of awareness), the absence of laws on organic production in the FBiH and the BD, lack of agro-environmental data (e.g. consumption and composition of fertilizers, pesticides, nitrogen ratios, eco-efficiency, energy use, etc.), making it difficult to assess the real impact of agriculture on the environment, including biological diversity (State of the Environment Report in BiH, 2012).

In this connection, establishing a system of agricultural information and monitoring, as well as the implementation of the agricultural census, is crucial in order to obtain good quality data to enable the passage of appropriate agro-environmental schemes and sustainable development of the agricultural sector in the future.

2.7.2. Aquaculture

According to the Agency for Statistics of BiH, in the field of aquaculture there was a decrease in the number of facilities in operation (approximately 8.11 % of trout farms, 14.74 % of carp farms and 19 % of cages) when comparing 2013 to 2010 (Table 6).

Table 6: Structure of Facilities in Exploitation for the Period of 2010-2013

Type of Facility	Size of Facility			
	2010	2011	2012	2013
Trout Farms (m ³)	92,901.0	91,026.0	91,759.6	85,367.3
Carp Farms (ha)	2,462.0	2,278.0	2,130.1	2,099.0
Cages (m ³)	127,106.0	117,581.0	109,197.2	102,948.3

Source: Agency for Statistics of BiH

Looking at the overall production of fish monitored by the Agency for Statistics of BiH (trout, carp and other freshwater fish), production is constantly decreasing, specifically by 38.13 %, when comparing 2013 to 2010 (Table 7). Trout production decreased by 17.89 %, while carp production was reduced by 76.62 %, and 56.48 % by freshwater fish in the same reporting period. Of the total quantity produced adult fish and shellfish in 2013, 83.47 % relates to trout, 11.11 % to carp, and 5.41 % to other freshwater fish.

Table 7: Production of Consumer Fish and Shellfish for the Period of 2010-2013

Type	Production in Tons			
	2010	2011	2012	2013
Trout	2,900.9	3,052.8	2,818.0	2,381.8
Carp	1,355.8	925.8	573.2	317.0
Other freshwater fish	355.0	250.0	193.0	154.5
Sea fish	z ⁸	z	z	z
Shellfish	z	z	z	z
Total	4,611.70	4,228.60	3,584.20	2,853.30

Source: Agency for Statistics of BiH

The great importance for sustainable management of aquaculture in the protection of biological diversity lies in the laws on fisheries of the RS (Official Gazette of the RS, no. 72/12), FBiH (Official Gazette of the FBiH, no. 64/04) and the BD (Official Gazette of the BD of BiH, no. 35/05 and 19/07) and in other relevant regulations mentioned in Aichi Target 6.

Laws on fisheries regulate the following areas: protection, improvement and sustainable use of fish stocks in open waters, conservation of biological diversity, protection of waters and shores, recreational and commercial fishing in open waters, Fish Guard Service, professional examinations for persons who will be directly involved in the affairs related to restocking and conservation of fish stocks, fishing licenses, the contents of the legal framework, who can create the framework, the requirements for audit of the frameworks, records of catch and reports on the state of fish stocks, aquaculture activities, reports on the activities related to entrepreneurs or enterprises involved in aquaculture, farming of foreign and protected species of fish and other aquatic animals, organizations in the domain of fisheries, and penalty provisions. The laws on fisheries are

⁸ z – Confidential data

harmonized with the relevant regulations and directives of the EU, and it can be concluded that these laws have partially transposed the following:

- Regulation of the European Community (EC) 708/2007 of 11 June 2007 concerning the use of foreign and domestic species that have disappeared in aquaculture;
- Regulation EC no. 1198/2006 of 27 July 2006 on the European Fisheries Fund and,
- Directive of the European Economic Community (EEC) no. 92/43 of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

2.7.3. Forestry

BiH is deemed to be one of the European countries that are extremely rich in forest resources in terms of their distribution and biological diversity. The mere fact that forests cover 2,709,769 ha, or about 53 % of the total land area, indicates upon their importance in providing multiple benefits to the broader community (Possibilities for Use of Low-Value Wood Assortments and Conversion of Young Forests in BiH, 2013).

Economic recovery in the post-war period has been based mainly on the use of natural resources, leading to negative consequences for the forest resources in BiH. There has been increased degradation of these resources in terms of uncontrolled logging, pest calamities, forest fires, all of which affects the reduction potential of forest components in terms of providing long-term benefits for the society, especially for biological diversity conservation (Possibilities of Using Biomass from Forestry and Wood Industry in BiH, 2014). This condition is partially caused by the disorderly institutional, legislative and strategic frameworks for the management of forest resources, which due to complex administrative arrangement of BiH is often insufficiently reactive. In this connection, it is necessary to take serious strategic steps and apply a set of forest policy instruments in order to lead to the preservation and improvement of the potential of forest resources in BiH.

The traditional approach in the management of forest resources in BiH is based on ecological postulates, which are primarily reflected in the design and implementation of operational activities in the forestry sector. As a result, forest resources in BiH still have a natural structure, which helps in the cycle of natural regeneration of forest components, conservation of forest biological diversity and improving the potential of the generally beneficial functions of forests (Possibilities of Using Biomass from Forestry and Wood Industry in BiH, 2014).

The first large-scale forest inventory in BiH was carried out in the period of 1964-1968, while the other forest inventory started in 2006 and is currently in the final stage. Development of the forest management program is currently underway in the FBiH, and in 2012, the RS adopted the Strategy for Forestry of the RS (2010-2020). With regards to the legal framework, there is the Law on Forests in the RS (Official Gazette of the RS, no. 75/08) and in the BD (Official Gazette of the BD, no. 14/10) in place, however in the FBiH the law has not yet been adopted (it is at the preliminary draft stage).

Looking at the overall production of forestry assortments in BiH for the period of 2008-2013 (Chart 3), there is a sharp drop in production in the period of 2008-2009, and a gradual increase in the period of 2009-2013. The highest production of deciduous trees was recorded in 2008 and of conifers in 2013.

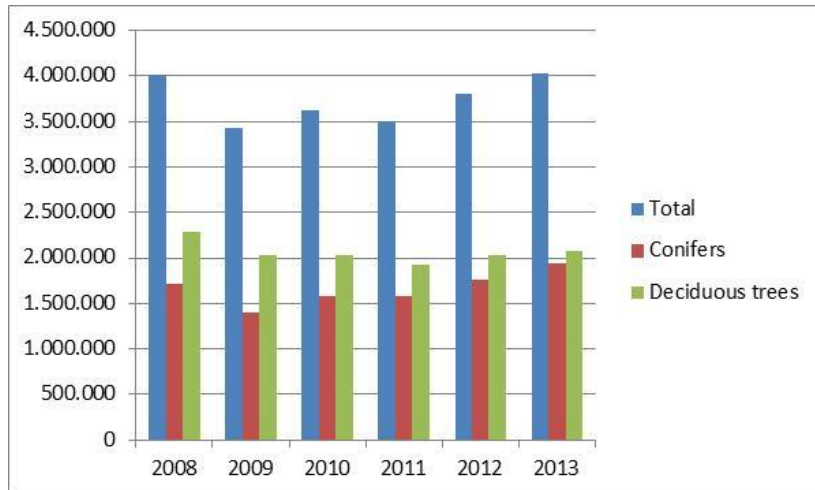


Chart 3: Production (m³) of Forest Assortments in BiH in the Period of 2008-2013
Source: Agency for Statistics of BiH

On the other hand, the total stock of forest assortments in BiH was recorded as highest in 2013 and 2010. In the period of 2008-2010, there was a gradual increase in the total stock of forest assortments and a gradual decline occurred in the period of 2010-2012. Coniferous tree stocks were highest in 2013, and deciduous tree stocks were highest in 2010 (

Chart 4).

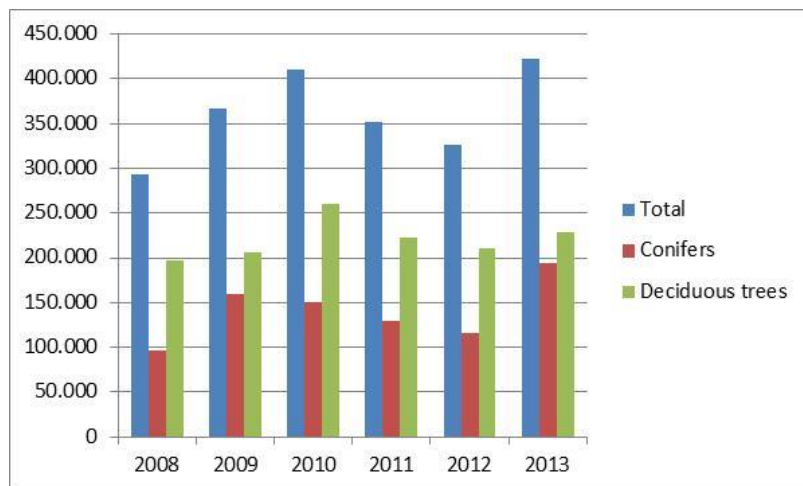


Chart 4: Stocks (m³) of Forest Assortments in BiH in the Period of 2008-2013
Source: Agency for Statistics of BiH

The structure of forest assortments in the total production of forest assortments is approximately identical for all three years of observation (2011-2013) and is mostly dominated by deciduous tree firewood and coniferous tree logs. The following chart provides data for 2013.

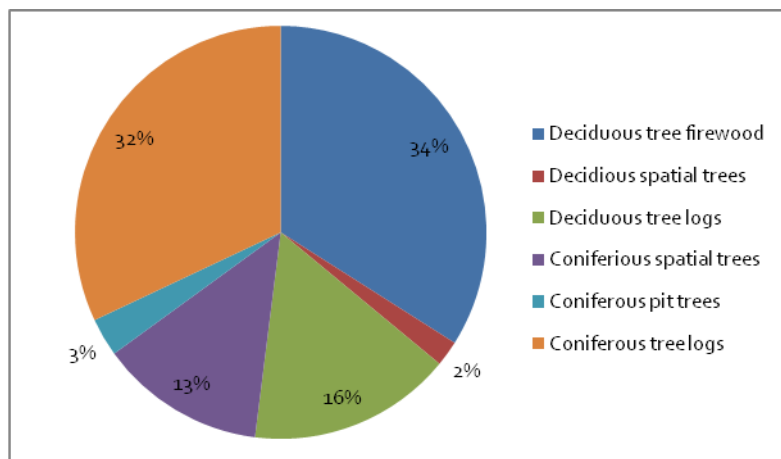


Chart 5: Percentage of Shares of Specific Forest Assortments in the Overall Production of Wood Assortments for 2013
Source: Agency for Statistics of BiH

According to the document "Possibilities for Use of Low-Value Wood Assortments and Conversion of Young Forests in BiH" (FIRMA, 2013) (Table 8), the area of available forest of productive character is 2,172,700 ha. Young forests cover 843,200 ha, and 246,300 ha is inaccessible (about 150,000 ha are inaccessible due to mines). There are 587,100 ha of inaccessible forest areas and forest lands (about 420,100 ha are inaccessible due to the presence of mines). This fact is a problem, primarily a commercial loss, because these areas cannot be used.

Table 8: Structure of Forest Areas and Forest Lands According to Vegetation Forms, Purpose of Use and Accessibility in BiH

Vegetation form	Accessible Areas				Inaccessible Areas	Total
	Productive	Forests with poor commercial conditions	Exclusively protective forests	Special purpose forests		
	ha	ha	ha	ha		
1. High forests	1,329,500	46,300	5,200	8,800	262,600	1,652,400
2. Young forests	843,200	158,700	1,600	2,400	246,300	1,252,200
1+2 All forests	2,172,700	205,000	6,800	11,200	508,900	2,904,600
3. Shrubbery	52,700	41,100	0	100	36,700	130,600
4. Barren lands	55,700	88,400	800	3,400	38,900	187,200
3.+4. Shrubbery and barren lands	108,400	129,500	800	3,500	75,600	317,800
5. Other forest areas	3,300	3,100	0	100	2,600	9,100
6. All forests and forest areas	2,284,400	337,600	7,600	14,800	587,100	3,231,500

Source: Possibilities for Use of Low-Value Wood Assortments and Conversion of Young Forests in BiH, 2013.

Timber harvesting in BiH is low, in terms of achieving the planned level of logging (felling volume). Apart from the fact that certain areas of forest resources cannot be used for productive purposes (mined areas, protective forests and special purpose forests), it is important to note that the effective use of production potential of forest resources is made difficult, and often impossible, due to insufficient openness of forest complex network to primary forest road infrastructure. The

openness of the high forests to the primary network of forest roads in BiH is 9.93 km/1,000 ha and is slightly higher than in young forests (8.65 km/1,000 ha), which is far from the average in the developed European countries, where the openness is 20-30 km/1,000 ha (Possibilities for Use of Low-Value Wood Assortments and Conversion of Young Forests in BiH, 2013).

Forest Damage

Five types of forest damage have been identified in BiH: the human factor, damage from insects, damage from natural disasters, damage by plant diseases and fire damage (Table 9). Total damage was the most recorded in fire damage cases (a drastic upward trend in the period from 2010 to 2012, where the most damage was recorded in 2012), then the human factor (gradual growth in the period of 2008-2012, and the worst damage was in 2012), damage from natural disasters (the most damage was in 2013 and 2010, and the least was in 2012), damage from insects (the most damage in 2008), and damage caused by plant diseases (the most damage recorded in 2013).

Table 9: Forest Damage (m³) in BiH for the Period of 2008-2013

Damage Type	2008	2009	2010	2011	2012	2013	Total
Human factor	77,857	79,996	83,632	112,854	171,890	150,044	676,273
Damage from insects	111,181	35,904	58,270	48,000	45,602	70,210	369,167
Damage from natural disasters	97,646	83,534	114,342	73,320	63,563	114,762	547,167
Damage from plant diseases	3,000	2,000	2,000	1,000	3,000	20,000	31,000
Damage from fire	35,025	5,840	5,368	100,303	1,039,974	16,883	1,203,393

Source: Institute of Statistics of the RS and the Institute for Statistics of FBiH

Reforestation

Sustainable forest management involves the implementation of measures of reforestation, which along with other forest-breeding measures are aimed at ensuring an adequate balance between the use of forests and forest regeneration.

Looking at the data on the implementation of reforestation, there is evident disregard for reforestation plans. According to the performance Review Report titled "Insufficient Renewal of Forests in the FBiH Resulting from Inefficient Forest Management System" (Audit Office of the Institutions in FBiH, 2014); the management of forest-breeding measures is ineffective and does not provide the investment of sufficient financial resources to ensure the necessary care and restoration of forests. The analysis of data on the implemented scope of reforestation shows that these activities are implemented on an area on average by 18 % smaller than planned. A significant reduction was also found of the implemented reforestation in 2012, which was by 26 % less than implemented in the previous year. It is evident that the low performance of the reforestation plan in one year was not compensated for in the next year, which again points to the non-compliance with guidelines for forest resource framework. In order to gain a clearer picture of the low volume of reforestation in the reporting period, the report shows a comparison of the average annual implementation of reforestation in different periods (Table 10).

Table 10: Average Annual Reforestation Volume in the FBiH (in 000 ha) in Specific Periods

Average Annual Reforestation Volume (in 000 ha)		
2002-2006	2007-2009	2010-2012
2.1	1.6	1.0

Source: Performance Review Report titled „Insufficient Renewal of Forests in FBiH As a Result of an Inefficient Forest Management System“, 2014

According to the data in the Forestry Development Strategy of the RS (2003-2008) in the framework of state forests, 9,086 ha were reforested (7,649 ha or 84 % within forests, and 1,437 ha or 16 % out of forests). The index showing increase in forested areas was 1.2. If raising of new forests were to continue, it can be expected that in the next 10 years some 20,000 ha of various categories of forest land in and outside forests would be reforested. Within the private forests and forest lands, no intensive reforestation has been done.

According to the conclusions of the document "Strategic Plan for Harmonization of Agriculture, Food and Rural Development (2008-2011)", there is an evident lack of sustainable forest management in the forestry sector, the biggest problems identified in the sector are:

- Illegal logging;
- Forest fires;
- Powerful attacks of pathogens and insect pests;
- Large areas of mined forests and forest lands;
- Large accumulation of waste materials in forests and water courses;
- Poor openness of forest areas to communications and poor forest road infrastructure.

2.8. AICHI TARGET 8: Pollution and Excessive Presence of Nutrients Harmful to Biological Diversity

Within their Fourth National Reports, almost all CBD Parties reported that pollution of media (water, soil and air) represents a threat to biological diversity. Excessive quantities of nutrients (substances that appear in the environment as a result of the use of mineral fertilizers, detergents, etc.), primarily nitrogen (N) and phosphorus (P), is a primary and increasing cause of biological diversity loss and ecosystem dysfunction.

This Aichi Target specifically points out that an excess of nutrients can lead to eutrophication, which is particularly harmful to aquatic ecosystems. Eutrophication may occur naturally (a slow process) or through human activities (an intensive and very fast process) due to improper discharge of nutrients in waste waters, straining of agricultural areas with massive use of fertilizers, deforestation of river basins and others. All of these can disrupt the ecological balance with very adverse consequences for biological diversity and the functioning of the ecosystem.

Aichi Target 8 does not require the elimination of all contaminants, but it does require that they be reduced to a level that does not exert a negative effect on biological diversity and ecosystems.

2.8.1. Water Pollution

The development of urbanization, industry and intensive agriculture, as well as increasing standards of living, have led to environmental pollution, and among its gravest forms is water pollution. Water consumption for various purposes has been on a constant rise, causing an increase in the amount of waste water. From the aspect of Aichi Target 8 and the organic pollution of water, the most relevant are waste sewage waters from households and wastewaters from various sectors, such as agriculture, industry, etc.

According to the data from the Agency for Statistics of BiH, the biggest burden in terms of water pollution comes from wastewaters (Table 11). For the period of 2008-2013, it can be concluded that there was a reduction in the total amount of wastewaters to 15.05 %. The quantities of domestic wastewaters are by far the most common and were reduced by 14.38 % when comparing 2013 with 2008. In the same period there was a significant reduction in the amount of wastewaters from the agricultural, forestry and fishing sectors by 41.43 %, from the industrial sector and construction activities by 57.02 %, and from other business activities by 73.55 %.

Table 11: Quantities of Wastewaters According to Origins, for the Period of 2008-2013 (000 m³)

	2008	2009	2010	2011	2012	2013
Total wastewaters	110,311	110,871	112,685	98,769	98,686	93,712
Households	80,736	80,452	83,141	76,704	73,595	69,124
Business activities (total):	29,575	30,419	29,544	22,065	25,091	24,588
Agriculture, Forestry, Fishing	905	1,562	1,571	975	642	530
Industrial and construction business	19,681	20,248	19,871	9,538	8,613	8,458
Other business activities	8,989	8,609	8,102	11,552	15,836	15,600

Source: Agency for Statistics of BiH

The total length of the sewerage network in 2013 amounted to 4,517 km, which was by 6.5 % more than in the previous year. The length of the main collector in 2013 amounted to 878 km, which was by 15 % more when compared to 2012.

In the period of 2008-2013, the amount of treated wastewater in BiH was at a very low level (mean value = 4.63 million m³ per year), compared to the total amount of wastewater, while the amount of non-treated wastewater slightly decreased in the same period (Chart 6).

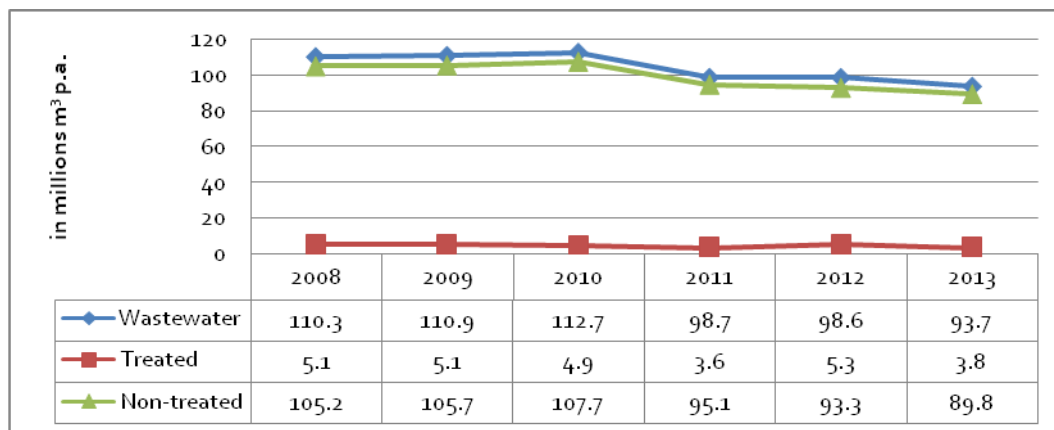


Chart 6: Quantities of Released Treated and Non-Treated Wastewater from the Public Discharge System
Source: Agency for Statistics of BiH

One of the reasons why the amount of non-treated sewage is greater than the amount of treated wastewater is that many cities and towns are not covered by sewerage systems and do not have facilities for treatment of wastewater in order to achieve the allowable parameters for the discharge of treated wastewater into watercourses. This results in the fact that only about 4 % of the total population is covered by treatment systems with primary (mechanical) and secondary treatment (Selected Environment Indicators 2013, 2014).

According to the State of the Environment Report in BiH (MoFTER, 2012) only several municipalities in the FBiH (Gradačac, Žepče, Odžak, Trnovo and Srebrenik in the Sava River Basin; Ljubuški, Čitluk, Grude, Živinice and Neum in the Adriatic Sea Basin), and two in the RS (Trebinje and Bileća in the Adriatic Sea Basin) have functional facilities for purification of sewage water.

One of the objectives of the Draft Water Policy in BiH (MoFTER, 2011) is that by 2035, BiH will have achieved a 78 % connection rate of the total population to the public sewer systems, and a 73 % connection rate to the wastewater purification plants; while the connection rate of the population living in agglomerations onto the public sewer system and wastewater treatment plants will be at the level of 95 %.

The agencies competent to monitor water quality are the Agency for the Sava River Basin - Sarajevo (FBiH), the Agency for the Adriatic Sea Basin - Mostar (FBiH), and the Public Institution "Vode Srpske" - Bijeljina (RS). The Federal Hydro meteorological Institute receives information about the water quality from the relevant agencies, and processes them and sends them to the EEA. Although reporting has improved in the last ten years, there are no regular reports in place yet and there are difficulties in gathering data for the whole of BiH (State of the Environment Report in BiH, 2012).

Chart 7 represents a comparative review of annual average nitrate values for the rivers in BiH (Sana, Vrbas, Bosna, Neretva, Drina, Sava and Una). The concentration of nitrate (NO_3) in rivers in BiH is different and based on the annual average nitrate values it varies from river to river and from year to year. During the monitoring period of 2008-2012, it can be said that only the Sana and Una rivers did not have high nitrate concentrations (up to 0.5 mg N/l) and were below the border values for

determination of the trophic status for running waters (0.9 mg/l)⁹, which are in accordance with the Urban Waste Water Directive (91/271/EEC) and the Directive on Nitrates from Agricultural Lands (91/676/EEC). The remaining rivers are located in regions with more developed industries and recorded much higher nitrate concentrations (above 0.5 mg / l), which exceed the above mentioned border values. It is evident that since 2010, especially in 2012, there has been a sharp increase in nitrate concentrations in all observed rivers, except in the Sana and Una rivers. Large concentrations of nitrate were observed in the Neretva, Bosna and Drina rivers (above 1.5 mg N/l) in the period of 2011-2012.

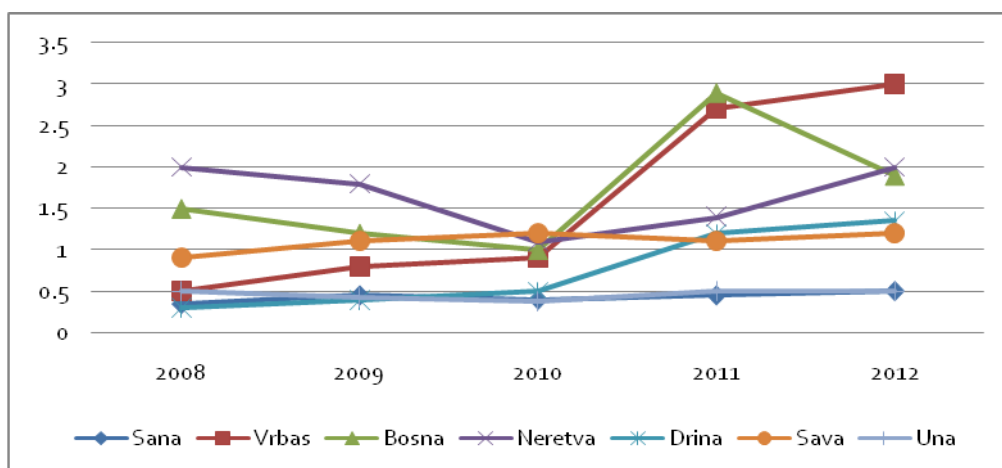


Chart 7: Mean Annual Values of Nitrates (mg N/l) in BiH Rivers in the Period of 2008-2012
Source: Agency for the Sava River Basin – Sarajevo; Public Institution „Vode Srpske” – Bijeljina

As for the mean annual values of phosphates (PO_4^{3-}) for the observed period of 2008-2012 (Chart 8), the Bosna River had the highest values - above 2 mg/l in comparison to other rivers. Only in 2011, the value of phosphates (up to 0.2 mg/l) were not above the border values for determination of the trophic state of watercourses (0.25 mg/l), which are in accordance with the Urban Waste Water Directive (91/271/EEC) and the Directive on Nitrates from Agricultural Lands (91/676/EEC). All other rivers, i.e. Sana, Vrbas, Neretva, Drina, Sava and Una, had mean annual values of phosphates below the permitted levels (up to approximately 0.1 mg/l) for the period of 2008-2012. The Una River had an increased concentration of phosphates in 2010, and the Neretva River in 2011; however, the measured concentrations of phosphates were not concerning, i.e. they were below the border values.

⁹ Rulebook on Determination of Areas Subject to Eutrophication and Sensitive to Nitrates (Official Gazette of the FBiH, no. 71/09); Decree on Classification of Waters and Categorization of Watercourses (Official Gazette of the RS, no. 42/01)

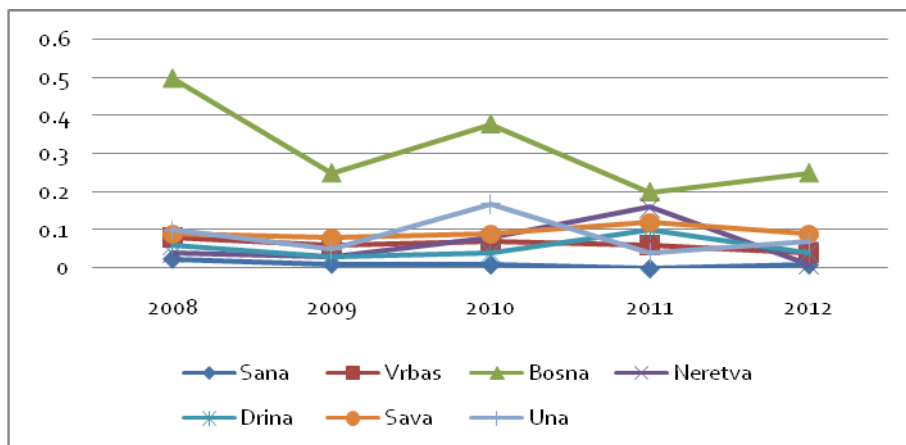


Chart 8: Mean Annual Values of Phosphates (mg P/l) in BiH Rivers for the Period of 2008-2012
 Source: Agency for the Sava River Basin – Sarajevo; Public Institution „Vode Srpske“ – Bijeljina

Monitoring of stagnant waters (lakes, reservoirs) is not continuous.

Chart 9 represents the total nitrogen and phosphorus for the Bočac reservoir and the total phosphorus for the Jablanica reservoir for the period of 2004-2009. Since 2007, the concentrations of nitrogen and phosphorus had slightly risen until 2009 (0.11 mg N/l and about 0.4 mg P/l) for the Bočac reservoir, while the phosphorus concentration in the Jablanica reservoir decreased (about 0.3 mg/l). The border values for phosphorus and nitrogen in stagnant waters is below 0.025 mg/l. Considering the period of 2004-2009, it can be concluded that the value of phosphorus and nitrogen in the Bočac and Jablanica reservoirs exceeded the border values, which may lead to frequent occurrence of "blossoming" algae in the epilimnion of stagnant waters, including hypoxia, anoxia and fish death.

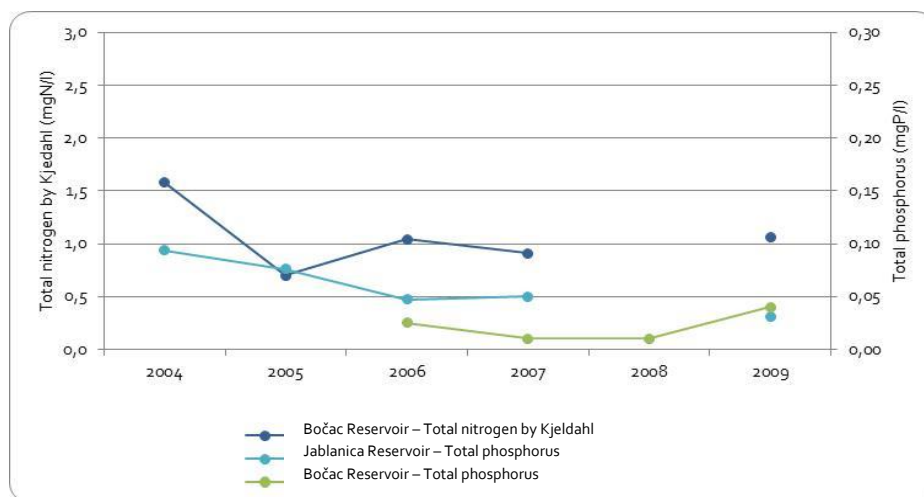


Chart 9: Nitrogen and Phosphorus Totals in Bočac and Jablaničko Lakes, for the Period of 2004-2009
 Source: State of the Environment Report in BiH, 2012

Table 12 shows the measured quantities of the various compounds of phosphorus and nitrogen in the period of 2008-2013 at the location of Buško Blato. Major amounts were observed, i.e. values above the permitted limits for total phosphorus, nitrogen and chlorophyll "a" for specific periods of time (marked in red in the table).

Table 12: Measured Quantities of Various Phosphorus and Nitrogen Compounds in the Period of 2008-2013 at the Buško Blato Location

Date	Total phosphorus mg P/l	Total nitrogen mg N/l	NH ₄ ⁻ N mg N/l	NO ₂ ⁻ N mg N/l	NO ₃ ⁻ N mg N/l	PO ₄ ⁻ P mg P/l	Chlorophyll "a" (fluorometric/specter) mg/m ³
BORDER VALUE¹⁰	> 0.025	> 0.025	>0.47	/	>2.0	>0.13	>0.02 mg/l
24-07-2008	0.02	0.24	0	0	0.24		
05-11-2008	0.02	0.33	0	0	0.32		
22-04-2010	0.003	0.296	0	0.004	0.229	0	0.36
24-05-2010	0.027	0.26	0.005	0.005	0.231	0.009	4.79
29-06-2010	0.032	0.259	0.027	0.005	0.229	0.004	1.47
19-07-2010	0.017	0.172	0.035	0.003	0.164	0.002	1.48
24-08-2010	0.013	0.158	0	0.002	0.145	0.009	1.83
22-09-2010	0.06	0.2	0.011	0.004	0.198	0.003	3.14
20-10-2010	0.035	0.266	0	0.005	0.246	0.012	5.43
15-11-2010	0.027	0.183	0.008	0.003	0.161	0.008	0
13-12-2010	0.073	0.253	0.015	0.008	0.232	0.009	1.101
26-06-2012	0.013	0.189	0.01	0.069	0.159	0.003	1.69
13-03-2013	0.015	0.742	0.006		0.668	0.001	3.79
No.	13	13	13	12	13	11	11
Mean value	0.03	0.27	0.01	0.01	0.25	0.01	2.28
Minimum	0.003	0.158	0	0	0.145	0	0
Maximum	0.073	0.742	0.035	0.069	0.668	0.012	5.43

Source: Agency for the Adriatic Sea Basin - Mostar

2.8.2. Soil Pollution

According to the State of the Environment Report in BiH (MoFTER, 2012), the principal features of the land in BiH are:

- acidity – acid soils cover 1/3 of the land;
- low content of humus;
- low content of major nutrient fertilizers;
- mainly shallow soils;
- surplus water on some 14 % of the territory;
- inadequate care for improvement of soil fertility;
- soil erosions on sloped terrains;
- small and fragmented individual land farms, which makes land management difficult.

From the aspect of Aichi Target 8, there is a particularly important problem of excessive presence of nutrients in the soil, which are usually the result of the use of mineral fertilizers. In BiH, data on gross balance of nutrients in the soil and the balance of nitrogen (e.g. kg of N per ha of land) are not available.

Large amounts of nitrogen are contained in fertilizers and other agricultural products, which affects the emission of nitrogen concentration in the soil, but also the production of N₂O, i.e. nitrogen oxide

¹⁰ Rulebook on Determination of Areas Subject to Eutrophication and Sensitive to Nitrates (Official Gazette of the FBiH, no. 71/09); Decree on Classification of Waters and Categorization of Watercourses (Official Gazette of the RS, no. 42/01)

(State of the Environment Report in BiH, 2012). The available data on the quantities of nitrogen and phosphorus in BiH were statistically analyzed and they represent the amount of trade (exports and imports) for fertilizers (mineral or chemical), for the period 2008-2012 (Table 13). However, there are no data on the quantities that are in use. However, it is noticeable that the reporting period saw an increase in the quantity of imported nitrogen fertilizers, while in the same period the amount of imported phosphate fertilizers decreased almost three times. The quantities of imported mineral or chemical fertilizers containing two or three elements (N, P and K) vary from year to year. On the other hand, in the period 2008-2012, BiH reduced its exports of nitrogen fertilizers and mineral or chemical fertilizers containing two or three elements (N, P and K).

Table 13: Exports and Imports of Fertilizers in Quantities (kg) for the Period of 2008-2012

	Description	2008	2009	2010	2011	2012
Exports	Nitrogen fertilizers, mineral or chemical	46,174,610	11,115,126	27,722,800	52,814,070	43,256,982
	Mineral or chemical fertilizers containing two or three elements (N, P and K)	1,083,906	1,119,291	255,938	175,765	70,035
Imports	Nitrogen fertilizers, mineral or chemical	33,819,779	55,354,310	50,717,455	46,030,117	51,805,879
	Phosphorus fertilizers, mineral or chemical	613,865	328,609	147,250	121,920	229,261
	Mineral or chemical fertilizers containing two or three elements (N, P and K)	58,261,139	30,603,962	65,901,286	31,326,247	62,610,657

Source: MoFTER

2.8.3. Air Pollution

Air pollutants in BiH come from various sectors, primarily energy, industrial processes and agriculture. Table 14 shows the key sources of methane, carbon dioxide and nitrogen oxide (CH₄, CO₂ and N₂O) emissions in the respective sectors.

The most important source of N₂O in BiH is agriculture (4.34 Gg⁷). Through many agricultural activities, nitrogen is added into the soil, and this increases the available nitrogen for nitrification and denitrification, which has an influence on the amount of N₂O emissions. In addition to agriculture, the energy sector also contributes to the creation of N₂O, but seven times less (0.62 Gg). By far the largest source of CO₂ is the energy sector, primarily the production of heat and power (7,895.3 Gg). Transport (road) is also an important source of CO₂, but three times lower (2,435 Gg) than the production of heat and power. Production of CH₄ is the largest in agriculture (40.8 Gg).

Table 14: Key Sources of Emissions by CRF¹¹ Categories for 2001 (Gg¹²)

No.	CRF Categories	Gg
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¹¹ The database for reporting on greenhouse emissions according to the UN Framework Convention on Climate Change (UNFCCC)

¹² 1 Gg (gigagram) = 1,000,000 kg

		CH ₄	CO ₂	N ₂ O
1.	Total energy	25.26	11,580.53	0.62
1.A	Fuel combustion activities	0.71	11,580.53	0.62
1.A.1.	Energy	0.1	7,895.3	0.12
1.A.1.a.	Production of heat and power	0.1	7,895.3	0.12
1.A.2.	Combustion in manufacture industries and construction	0	82.23	0.02
1.A.2.a.	Combustion in manufacture industries and construction: iron and steel	0	82.23	0.02
1.A.3.	Traffic	0.61	2,435	0.42
1.A.3.b.	Road traffic	0.6133	2,435	0.42
1.A.4.	Other sectors		1,168	0.06
1.A.4.a.	Commercial/Institutional		392	
1.A.4.b.	Housing		776	
1.B.1.	Fugitive emissions from solid fuels	24.55		
1.B.1.a.	Fugitive emissions from solid fuels: coal exploitation and handling	24.55		
2	Total industrial processes	0.0007	596.61	
2.A.	Mineral production		421.84	
2.A.1.	Cement production		350.87	
2.A.2.	Lime production		70.97	
2.C.	Metal production	0.0007	174.79	
2.C.1.	Iron and steel production			
2.C.2.	Ferrous alloy production	0.0007	2.64	
2.C.3.	Aluminum production		172.15	
4.	Total agriculture	40.8		4.34
4.A.	Intestinal fermentation	40.8		
4.D.	Agricultural lands			4.34
6.A.	Disposal of solid waste on soil	47.05		

Source: Second National Communication of BiH under the UNFCCC, 2013

Air monitoring in BiH is conducted by two hydro meteorological institutes, namely: the Federal Hydro meteorological Institute and the Republic Hydro meteorological Institute of the RS. Below given is data on air quality from the measurement stations in Sarajevo, Tuzla, Banja Luka, Bijeljina, Gradiška, Gacko and Ugljevik. Given the fact that there exist no results of continuous measurement for all parameters of air quality in these cities for all years, only the available data is given as follows:

- *Sarajevo* - According to the State of the Environment Report in BiH (MoFTER, 2012) in the period of 2008-2010, the annual average concentrations of pollutants (NO₂ and O₃) (Table 15) did not exceed the border values according to the Rulebook on Border Values of Air Quality (Official Gazette of the FBiH, no. 12/05) (hereinafter: the Rulebook). The annual average concentrations of SO₂ for 2008-2013 have changed from year to year, but did not exceed the border values from the Rulebook. The highest concentration of SO₂ was recorded in 2009 (28 µg/m³). For the same period, the largest concentration of soot was in 2008 and 2009 (27 µg/m³), and the lowest in 2013 (19 µg/m³). NO₂ concentrations were within the permitted border values.

Table 15: Annual Values of Pollutant Concentrations in Sarajevo for the Period of 2008-2013

Pollutants	Border values for pollutants ¹³	Years					
		2008	2009	2010	2011	2012	2013
SO ₂ µg/m ³	50 µg/m ³	22.00	28.00	24.00	27.00	22.00	19.00

¹³ Rulebook on Border Values of Air Quality (Official Gazette of the FBiH, no. 12/05)

NO ₂ µg/m ³	40 µg/m ³	<20.00	<10.00	<20.00	-	-	-
O ₃ µg/m ³	120 µg/m ³	≤50.00	<50.00	≤50.00	-	-	-
Soot µg/m ³	50 µg/m ³	27.00	27.00	23.00	32.00	22.00	19.00

Source: State of the Environment Report in BiH (2012); FBIH in Figures (2010, 2014)

- *Tuzla* – In the period of 2008-2013, SO₂ concentrations (Table 16) did not exceed the border values according to the Rulebook, except in 2013 (71.42 µg/m³), which can be caused by heating in the winter and by the presence of industrial plants in the city. Soot concentrations generally decreased from 2008 (27 µg/m³) to 2012 (20 µg/m³) and not exceed the border values.

Table 16: Annual Value of Pollutant Concentrations in Tuzla for the Period of 2008-2013

Pollutants	Border values for pollutants ¹⁴	Years					
		2008	2009	2010	2011	2012	2013
SO ₂ µg/m ³	50 µg/m ³	37.00	28.00	22.00	33.00	31.00	71.42
Soot µg/m ³	50 µg/m ³	27.00	24.00	26.00	29.00	20.00	-

Source: FBIH in Figures (2010, 2014)

- *Banja Luka* – According to the Annual Report on Air Pollution Measurement in the Banja Luka City for the Period of 2008-2013 („IG“ Construction Institute, Banja Luka, 2009; 2010; 2011; 2012; 2013, and 2014), Table 17 shows the annual values of pollutant concentrations (CO, SO₂, soot, PM₁₀, NO₂, and O₃) not exceeding the border values pursuant to the Decree on Air Quality Values (Official Bulletin of the RS, No. 124/12) (hereinafter referred to as: the Decree), however the recorded concentrations of CO (3.36 mg/m³) did exceed the border values (3 mg/m³) in 2009. The concentrations of CO, soot, and O₃ were reduced from 2008 to 2013, whereas the concentrations of SO₂ and NO₂ were increased over the same period.

Table 17: Annual Value of Pollutant Concentrations in Banja Luka in the Period of 2008-2013.

Pollutants	Border Value of Pollutants ¹⁵	Year*					
		2008	2009	2010	2011	2012	2013
CO mg/m ³	3 mg/m ³	1.38	3.36	1.48	1.14	1.02	0.61
SO ₂ µg/m ³	50 µg/m ³	20.23	29.97	33.68	28.01	26.40	25.47
Čađ	50 µg/m ³	19.27	18.93	19.32	15.97	16.34	15.44
PM ₁₀ µg/m ³	40 µg/m ³	30.28	38.78	38.14	31.13	31.97	30.21
NO ₂ µg/m ³	40 µg/m ³	18.67	9.98	28.99	23.74	27.45	30.76
O ₃ µg/m ³	120 µg/m ³	-	-	-	51.73	31.35	41.67

* Mean value taken from 5 measurement points in Banja Luka (Paprikovac, City Center, Obilićevo, Borik, Lazarevo, and K. Vijenac)

Source: Annual Report on Air Pollution Measurements in the City of Banja Luka, 2008; 2009; 2010; 2011; 2012; 2013

According to the Report on Air Quality in the RS for 2012 and 2013 (Republic Hydro-Meteorology Institute and MAFW RS, 2012; 2013), the table below provides the border values pursuant to the Decree, the annual values of pollutant concentrations (SO₂, NO₂, PM₁₀, CO, O₃, and soot) in Bijeljina, Gradiška, Gacko and Ugljevik, in the RS.

¹⁴ Rulebook on Border Values of Air Quality (Official Gazette of the FBiH, no. 12/05)

¹⁵ Decree on Air Quality Values (Official Bulletin of RS, No. 124/12)

Table 18: Measurement Points in the RS and Annual Values of Pollutant Concentrations for 2012 and 2013

Pollutants	Border Value of Pollutants ¹⁶	Measurement Points and Annual Values of Pollutant Concentrations							
		Bijeljina*		Gradiška**		Gacko		Ugljevik***	
		2012	2013	2012	2013	2012	2013	2012	2013
SO ₂ µg/m ³	50 µg/m ³	62.31	65.56	24.00	29.00	28.15	56.71	24.46	54.25
NO ₂ µg/m ³	40 µg/m ³	9.53	9.58	-	-	16.20	12.79	10.30	5.36
PM ₁₀ µg/m ³	40 µg/m ³	27.84	22.58	-	-	27.83	-	32.22	17.85
CO mg/m ³	3 mg/m ³	0.913	0.942	-	-	-	-	-	-
O ₃ µg/m ³	120 µg/m ³	27.06	30.71	-	-	-	-	-	-
Čađ	50 µg/m ³	12.07	10.27	19.00	21.13	-	-	-	-

*Mean value taken for 3 measurement points in Bijeljina (City Center, Panafleks, and Žitopromet)

**measurement point in Gradiška– Kej Pumping Station

***measurement point in Ugljevik – Thermal Power Plant

Source: Report on Air Quality in the RS for 2012 and 2013

It may be concluded from the table that the annual values of pollutant concentrations (NO₂, PM₁₀, CO, O₃, and soot) were below the border values. The annual values of SO₂ concentration were high in Bijeljina (above 60 µg/m³) in 2012 and 2013, and in Gacko and Ugljevik (above 50 µg/m³) in 2013.

Improvement in the state of quality for waters, soil and air, and reduction of pollution for biological diversity, requires as follows:

- Increasing the number of measurement stations at watercourses, lakes, sea shores, particularly in marshlands specific for their biological diversity (e.g. data needed for the N/P ratio);
- Improving and continually monitoring soil and use of protection agents and mineral fertilizers (e.g. data needed for gross balance of nutrients in soil, balance of N, expressed through kg N by ha of land area);
- Increasing the number of measurement stations for air in the cities of BiH;
- Developing mechanisms to reduce the use of chemical agents that have negative impacts on water, soil and air quality;
- Strengthening the mechanisms for expert assessment of the state of biological and landscape diversity in the process of obtaining environmental permits, and
- Completing and regularly updating pollutant registries.

2.9. AICHI TARGET 9: Invasive Species

The process of spreading of invasive species is most commonly associated with the various human activities and is one of the major factors threatening biological diversity, immediately after habitat destruction (First National Report of BiH to the CBD, 2008). In addition to the negative impact on biological diversity, these types of negative effects can manifest itself even towards human life and health. Invasive species usually have a great reproductive potential, strong competitive ability and adaptability, which allows them to make more progress in the new environment as compared to the native taxa.

¹⁶ Decree on the Values of Air Quality (Official Gazette of the RS, no. 124/12)

Although the issue of invasive species in BiH is governed by different laws and bylaws (Law on Nature Protection of the RS - Official Gazette of the RS, no. 20/14; Environmental Protection Law - Official Gazette of the FBiH, no. 33/03, and 39/09; Law on Nature Protection - Official Gazette of the FBiH, no. 66/13, etc.), there are no documents regulating the monitoring, control and minimization of negative impacts of these species. The list of prevalent invasive species, as well as the data on their distribution and the size of populations of these species are segmented and given as results of various studies.

2.9.1. Invasive Plant Species

Introduction of plants of foreign origin and their domestication causes significant changes in the autochthonous flora, and special risk lies in those species that have adapted and took on the character of invasive plants. In recent years in species are increasingly spreading in BiH that can be considered invasive and that cause damage to agricultural crops, and their control is difficult. Some invasive species of plants registered in BiH are: *Ailanthus altissima*, *Amaranthus blitoides*, *Amrosia artemisiifolia*, *Artemisia verlotiorum*, *Asclepias syriaca*, *Bidens frondosa*, *Bidens subalternans*, *Bunias erucago*, *Conyza canadensis*, *Echinocystis lobata*, *Eleusine indica*, *Elodea canadensis*, *Erigeron annuus*, *Euphorbia maculata*, *Euphorbia nutans*, *Galinsoga ciliates*, *Galinsoga parviflora*, *Impatiens glandulifera*, *regalis*, *Lathyrus tuberosus*, *Lepidium virginicum*, *Oxalis stricta*, *Paspalum dilatatum*, *Paspalum paspaloides*, *Phytolacca americana*, *Reynoutria japonica*, *Robinia pseudoacacia*, *Sisymbrium altissimum*, *Solidago gigantea*, *Sorghum halepense*, *Tagetes minuta* (First National Report of BiH to the CBD, 2008).

One of the most invasive species is common ragweed (*Ambrosia artemisiifolia*), which occurs in ruderal habitats of Posavina, Semberija, Krajina, eastern and central Bosnia. It is characterized by high production of pollen, and it ranks among the major allergens (Fourth National Report of BiH to the CBD, 2010). There is also a substantial expansion of Jerusalem artichokes (*Helianthus tuberosus*) and the Japanese knotweed (*Reynoutria japonica*) (Đikić *et al.*, 2007), as well as abutilon (*Abutilon theophrasti*), date (*Datura stramonium*), and clotbur (*Xanthium strumarium*)¹⁷ with a strong power of competition compared to the crop plants. Some of them are allopathically active, and thus damage crop plants. An example is the spread of invasive species of desert false indigo (*Amorpha fruticosa*), which was introduced in Europe in 1724 (Krpan *et al.*, 2011), primarily for binding and fixing embankments, decorative and honey-bearing properties, and today is spreading rapidly through large areas around main watercourses in BiH.

As one of the most successful competitive invasive species in northern and north-eastern Bosnia stands out daisy fleabane (*Erigeron annuus*), which spontaneously spreads thanks to the effective anemochory. The species is native to North America, and in BiH it spreads spontaneously thanks to the effective anemochory. It has been brought in as an ornamental species. It is very common on the alluvial plains of lowland rivers, wet meadows, and is most commonly found on hay meadows, because it turned out that this species develops more strongly through mowing.

¹⁷ According to the field research conducted by the Faculty of Sciences in Banja Luka.

From horticultural species that have eluded human control, today the most prevalent in BiH are: goosegrass (*Asclepias syriaca*), Jerusalem artichoke (*Helianthus tuberosus*), goldenrod (*Solidago gigantea*), wild marigold (*Tagetes minuta*), desert false indigo (*Amorpha fruticosa*), black locust (*Robinia pseudoacacia*), American pokeweed (*Phytolacca americana*), Japanese knotweed (*Reynoutria japonica*), tree of heaven (*Ailanthus altissima*) and Himalayan balsam (*Impatiens glandulifera*) (First National Report of BiH to the CBD, 2008).

The species that in recent years has been registered in the Republic of Slovenia and the Republic of Croatia, and is the most notable for its invasiveness, is *Epilobium ciliatum* Raff. (Strgulc-Krajšek and Jogan, 2004). Given the high invasiveness, it can be assumed that this species is also present in BiH. In general, within the *Epilobium* (Willow) genus there are species that are very important candidates to become invasive. Particularly noteworthy is the need to monitor the distribution and spread of plants of this genus in northern Bosnia, where abandoned and neglected agricultural lands are a largely suitable habitat for its expansion (Posavina, Semberija).

The current laws stipulate that the entity authorities (inspection offices in cooperation with the ministries of agriculture, forestry and water management) shall perform control and participate in the supervision of plants, plant products and regulated objects in order to detect and report on the introduction or spread of harmful organisms and their suppression. In this regard, appropriate decisions and action plans shall be adopted at the entity levels for governing the monitoring, controlling and minimizing the negative impacts of some of these species, especially those that exhibit adverse effects on human health (Action Plan for Public Awareness, Elimination and Suppression of Ragweed in the FBiH, 2009; Decision on Measures to Prevent the Spread and for Destruction of Weed Species *Ambrosia artemisiifolia* - common ragweed (Official Gazette of the FBiH, no. 89/11), Decision on Measures to Suppress and Eradicate the Weed *Ambrosia* (Official Gazette of the RS, no. 81/07).

2.9.2. Invasive Animal Species

Allochthonous animal species have arrived onto the territory of BiH directly influenced by humans, for the purpose of breeding and production, or indirectly in different activities. Of the invasive species in aquatic ecosystems, the most widespread are the species of fish that have arrived from culture into free waters or spontaneously from contact rivers or lakes (Environmental Protection Strategy of the FBiH 2008-2018).

Invasive species in water bodies distort the structure and endanger the autochthonous ichthyofauna, with special impact they have on endemic fish species. Some of the endemic species are at particular risk, both due to changes in habitat (Dekić *et al.*, 2011) and due to the presence of invasive species.

Table 19: Some Registered Allochthonous Species of Fish Most Prevalent in Waters in BiH

Latin name	Local name
<i>Oncorhynchus mykiss</i>	Rainbow trout
<i>Salvelinus fontinalis</i>	Brook trout

Latin name	Local name
<i>Salvelinus alpinus</i>	Arctic charr
<i>Carassius gibelio</i>	Prussian carp
<i>Carassius auratus</i>	Gold crucian carp
<i>Hypophthalmichthys molitrix</i>	Silver carp
<i>Pseudorasbora parva</i>	Topmouth gudgeon
<i>Ctenopharyngodon idella</i>	Grass carp
<i>Ameiurus nebulosus</i>	Brown bullhead
<i>Gambusia affinis</i>	Mosquito fish
<i>Lepomis gibbosus</i>	Common sunfish
<i>Aristichys nobilis</i>	Bighead carp

Source: First National Report of BiH to the CBD, 2008

One of the way for introduction of allochthonous species of fish consists of targeted bringing in for breeding in ponds, where some of the allochthonous species are present in fish farm production. However, the introduction of these types can also cause introduction of other species that are quickly acclimated to the new conditions of the environment, they become invasive and cause great damage to aquatic ecosystems. One such example is the Prussian carp (*Carassius gibelio*), which represents an allochthonous species that spread out in the waters of the Black Sea and in the waters of the Adriatic Sea Basin in BiH thanks to the large reproductive adaptive capabilities and high tolerance to changes in habitat conditions (well tolerated low concentrations of oxygen in water, high temperatures of water, and organic pollution of waters). The territory of BiH is characterized by richness of different water bodies (rivers, streams, lakes, reservoirs, etc.) that are important habitats in which even the introduced fish species have settled and found optimal conditions (First National Report of BiH to the CBD, 2008). Of all introduced species of fish in the waters of BiH, some show invasive character, and this especially characterizes the Prussian carp (*Carassius gibelio*), Common sunfish (*Lepomis gibbosus*), Topmouth gudgeon (*Pseudorasbora parva*) and Rainbow trout (*Oncorhynchus mykiss*), which because of their invasiveness threaten the survival of the native species. In addition to the above species, it is expected that some other invasive species will occur in the BiH waters, that are registered in the countries of the region, primarily Chinese sleeper (*Perccottus glenii*), which has been registered in the Republic of Croatia.

The introduced aquatic organisms in BiH are not represented only by fish, but also by some species of crustaceans, mollusks and shells.

When it comes to invertebrates, in BiH there are a number of invasive species, and among the most famous are the potato beetle or Colorado beetle (*Leptinotarsa decemlineata*) and corn rootworm (*Diabrotica virgifera*), which is also an invasive species registered in BiH (First National Report of BiH to the CBD, 2008).

Research results in entomofauna of forest and decorative woody plants in the area of the RS show that a number of allochthonous species of insects have been registered: sycamore lace bug (*Corytucha ciliate*), buffalo treehopper (*Stictocephala bisonia*), Pine bark adelgid (*Eopineus strobi*), mulberry scale (*Pseudaulacaspis pentagona*), Asian ladybird (*Harmonia axyridis*), honey-locust gall midge (*Dasyneura gleditchiae*), black locust gall midge (*Obolodiplosis robiniae*), locust leaf miner (*Phyllonorycter robiniae*), locust digitate leaf miner (*Parectopa robiniella*), horse chestnut leaf miner

(*Cameraria ochridella*), larch casebearer moth (*Coleophora laricella*), Japanese oak silk moth (*Antherea yamamai*), seed chalcid (*Bruchophagus Sophorae*) and Douglas fir seed chalcid (*Megastigmus spermotrophus*) (Mihajlović and Stanivuković, 2009).

The above mentioned insects are registered under the previously conducted research, and there is no systematic data on invasive species of this group of organisms in BiH, wherein their number is probably higher if one takes into account that by 2007 in Europe 109 invasive species of phytophagous insects were found, which had been incorporated and adapted within forest ecosystems (Matson *et al.*, 2007).

In addition, of great importance also are the invasive marine species for which, when it comes to BiH, there is a lack of data, and the monitoring of this segment of invasive species would be of particular importance. Some research shows that in the Adriatic Sea there are a total of 113 invasive species (Njegovan, 2014), and it is expected that in the part of the sea that belongs to BiH there is a certain representation of these species.

Given the fact that other invasive species were recorded (Matošević and Pernak, 2011) in the countries of the region, about which there is no data in BiH, it is expected that the total number of these species is higher and that the expanding geographic distribution also caused their introduction into the BiH territory.

2.10. AICHI TARGET 10: Sensitive Ecosystems Affected by Anthropogenic Pressures and Climate Change

The purpose of this objective is to take urgent action to reduce the direct anthropogenic pressures (e.g. conversion of habitat, pollution, overexploitation, and invasive species) in ecosystems that are most vulnerable to climate change in order to increase the possibilities of adaptation of ecosystems to survive under the new conditions.

The First National Report of BiH to the CBD (2008) states that the following landscapes are highly vulnerable to climate change:

- *High mountain landscapes* (in which the dominant ecosystems are the ones of dwarf pine, the ecosystems of sub-mountainous white bark pine forests, the ecosystems of mountain meadows of base and acid soils, ecosystems around glaciers of base and acid soils, the ecosystems of mountain waters and ecosystems in the cracks of carbonate and silicate rocks);
- *Mountain landscapes* (in which the dominant ecosystems consist of mixed deciduous-coniferous forests of beech and fir with spruce; ecosystems forests of spruce and fir, Pančić spruce ecosystems; mountain ecosystems of moderately wet meadows; ecosystems of high and low mires; ecosystems of mountain springs and streams);
- *Relict-refugial landscapes* (dominated by the ecosystems in canyons and gorges of Bosnian-Herzegovinian rivers. These are very diverse and endemic ecosystems in the crevices of limestone, dolomite, silicate and ultrabasic rocks, and also the different types of geological substrates: rock creep ecosystems, ecosystems of sub-Mediterranean and continental rocks, ecosystems of xerophilic meadows, ecosystems of light coniferous forests, ecosystems of

white bark pine forests, ecosystems of Illyrian black pine, ecosystems of thermophile deciduous forests and shrubbery, ecosystems of mesophilic and hygrophile polydominant forest communities, ecosystems of beech forests in canyons and gorges, ecosystems of alder forests, ecosystems of relict Dinaric fir forests, ecosystems of thermal springs around semi-shaded habitats, and many others).

According to the First and Second National Communication of BiH under the UNFCCC (2009, 2013) significant impacts of climate change are expected to occur on plants with habitats in mountainous areas of BiH. In the long term, we can expect the migration of some woody plants in the direction along the Dinaric Mountains towards the northwest and a decrease in the number of herbaceous plants of narrow ecological valence in the highest mountainous areas. The possible causes for this are an increase in average temperatures and stronger temperature extremes.

The same reports underline the high sensitivity of fir forests because of narrow ecological valence of this species in relation to temperature. It is necessary to highlight the fact here that for species such as spruce, fir and white pine (that build many communities in mountainous landscapes) BiH constitutes the southern border of existence. The increase in average temperatures could have a negative impact primarily on quantitative aspects of the populations of these species, which in combination with other anthropogenic factors may lead to their vulnerability and, finally, disappearance from the region.

According to the First National Report of BiH to the CBD (2008) and the Second National Communication of BiH under the UNFCCC (2013), the ecosystems situated in karst landscapes are also very vulnerable to climate change, and they are also subjected by other intensive anthropogenic pressures at the same time. Among them are particularly sensitive wetlands karst fields. One of them is the Nature Park (PP) of Hutovo Blato, located in the sub-Mediterranean zone and categorized as a group of Wetlands of International Importance, according to the guidelines of the Ramsar Convention. Climate change will upset the timing of migration and the availability of food sources. The loss of wetlands such as NP Hutovo Blato could lead to the disappearance of bird and turtle populations that inhabit swamps during the year or are present only during migrations.

As both of these reports indicate, no detailed research has been conducted in BiH in terms of mapping vegetation, nor have there been any studies of possible impacts of climate change. However, with regard to affiliation to the Mediterranean area, according to the reports of the Intergovernmental Panel on Climate Change (IPCC) (Climate change 2013 - The Physical Science Basis, 2013) in BiH strong impacts of climate change on biological diversity can be expected. Although the multiple anthropogenic pressures on fragile ecosystems are also present in high mountain landscapes, they are still weaker than in the mountain and relict-refugial landscapes.

According to the First National Report of BiH to the CBD (2008), in addition to climate change, in the area of these landscapes there is intensive construction of infrastructure, interventions in nature and impacts on nature, for the purposes of:

- Energy sector (water reservoirs, power plants, power lines, pipelines, etc.);
- Forest management sector (logging, forest roads);
- Water management sector (water captures, canals, reservoirs, embankments, etc.);

- Transport and communications sector (corridors, main roads, fast roads, airports, pollution from fossil fuel combustion products);
- Agricultural sector (melioration, depletion of land using monocultures, poorly controlled use of pesticides and fertilizers);
- Spatial planning sector (poorly controlled urbanization, ruralization and space use in line with ecosystem capacities).

The misbalance of the development goals at the state level and inadequate representation of nature protection in sectoral development plans and sectoral policies result in degradation of natural habitats, excessively high exploitation of natural resources, continuous pollution of all spheres of the environment, fragmentation and weakening of ecosystem functions and expansion of invasive species.

The multiple influences of anthropogenic factors, together with the work of climate change, have visible effects on the forests in BiH even today. Specifically, during the field visit of BiH in 2013 (made every year by the teachers and students of Faculty of Science - University of Sarajevo) intensive drying of individual trees of spruce, fir, white and black pine, juniper was observed (from Neum to the Sava River) even including the horticultural coniferous species in urban areas. The drying was first manifested by change of color (the whole tree or individual branches on the tree of conifers were brown to orange and red in color), then by the falling off of dry needles (conifers), falling off of the tree bark and by tree falls. To date, the causes of this drying are not known. It can be assumed that this phenomenon has affected the production of biomass, as well as all other ecosystem services (photosynthesis, carbon absorption, oxygen production, etc.) performed by healthy and balanced ecosystems.

During the same field visit, the same phenomena were also observed on broadleaved deciduous species. Specifically, there was a large number of individual trees of birch, black poplar, walnut, alder, willow, ash, elm, hornbeam, oak, beech and other woody species in which the leaves were completely emaciated already one month after leafing, or have never even formed. Many trees, especially birch and hazel, did not even leaf up during that spring. The same changes were observed even with invasive species, such as the tree of heaven or acacia.



Figure 6: Drying Up of Conifers
Photo: S. Barudanović, May 2013

In the canyon segments of relict-refugial landscapes usually shallow soils are formed, subject to erosion by wind and water. Drying of the trees in the canyons may subject the soils to even greater erosion, which would lead to stronger substrate temperature extremes. This can cause even more extensive drying of trees or may prevent the recovery of refugial forest communities.

Studies have shown that the incidence of drying trees (conifers) is most commonly linked to acid rains. The causes of drying trees, in addition to these options, may also be sought in frequent draught periods over the past several years, appearance of frosts, vermin activity, soil pollution, soil erosion with overheating of the substrate, or in the activity of multiple factors, supported by climate change.

It is clear that problem should be dealt with using a serious research approach method, especially if the visible trend of drying trees continues. In the meantime, it is necessary to initiate urgent measures to reduce direct sectoral pressures on forest habitats in mountainous and relict-refugial landscapes as some of the fragile ecosystems of BiH.

2.11. AICHI TARGET 11: Protected Areas

According to Aichi Target 11, by 2020 it is necessary to preserve at least 17 % of inland waters and 10 % of coastal and marine areas, especially areas of particular importance for biological diversity and ecosystem services, by using efficient and equitable management, ecologically representative and well-connected systems of protected areas and other effective measures for conservation of certain areas, and integrate them into the broader landscapes and seascapes.

In BiH, 153 areas belong to one of the protection level forms since 1954, 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, nor is there any clarification for the state of the decisions on protection issued on the basis of the Law on the Natural, Cultural and Historical Heritage of SRBiH, due to which these areas cannot be deemed officially protected. The Spatial Plan for BiH (1981-2000) provided protection for 8,062 km², or 15.03 %, of the state territory through an integrated approach. However, by 1990, only 0.55 % of the territory of BiH was protected (253 areas, i.e. 28,127 ha) (NEAP, 2003).

Given that the competence in the segment of nature protection in BiH is regulated at the entity level (the RS, FBiH and BD), the principal legal enactments that nature protection is based on, including the categories of protected areas and the protection procedure, are defined in the Law on Nature Protection of the FBiH (Official Gazette of the FBiH, no. 66/13), the Law on Nature Protection of the RS (Official Gazette of the RS, no. 20/14) and the Law on Nature Protection of the BD (Official Gazette of the BD of BiH, no. 24/04, 1/05, 19/07, and 9/09).

The jurisdiction over the proclamation of areas as protected in the FBiH is regulated between the Cantons and the Federation. The first two categories of protection (Ia - Strict Nature Reserve; Ib - Wilderness Area; II - National Park), pursuant to the categorization of the IUCN, are under the jurisdiction in terms of proclamation by the Parliament of the FBiH, while the other categories i.e. from three to six (III - Nature Park, IV - Areas of Habitats/Species, V - Protected Landscapes, and VI -

Protected Areas with Sustainable Use of Natural Resources) are under the jurisdiction of the cantons. If protected areas are located in two or more cantons, these areas are proclaimed by the FBiH Parliament. In the RS, expert tasks involving protection of nature and natural resources in the RS are performed by the Republic Institute for Protection of Cultural, Historical and Natural Heritage, which develops the Expert Base – the Study for Protection of the Protected Area, based on which an act proclaiming the protected area is passed. Depending on the category, National Parks are proclaimed by the RS National Assembly, while Strict Nature Reserves and Special Nature Reserves, Protected Habitats and Protected Landscapes are designated by the Government of the RS, upon the proposal by the MPPCEE RS. The assembly of a local self-government unit, under the consent of the ministry, proclaims the following protected zones: Natural Monuments and Protected Areas with Sustainable Use of Natural Resources. If protected areas are located in the area of both entities, the proposal for protection is provided by the FMET and MPPCEE RS in accordance with Inter-Entity Environmental Protection Program. In the DB, protected areas are declared at the level of the Assembly of the BD.

In BiH, there are 23 areas that are officially protected (forest ecosystems for the most part) (Table 20), covering the territory of 100,455.02 ha, constituting 1.96 %. The percentage of protected areas increased from 0.55% in 2003 to 1.96% in 2014, however it is still a small area size in relation to the global level (17 %) and regional level (e.g. in the Republic of Croatia, the protected areas today cover 8.44 % of the total territory, while in the Republic of Serbia 6.02 % of the territory is protected).

Table 20: Officially Protected Areas in BiH

No.	Name	Entity	IUCN Categorization	Area Size (ha)	Manager
STRICT NATURE RESERVE (SNR)					
1.	SNR Prašuma Janj	RS	I.a	295.00	Forest Management Company "Gorica"
2.	SNR Lom	RS	I.a	297.82	-
SPECIAL NATURE RESERVE (PNR)¹⁸					
NATIONAL PARK (NP)					
3.	NP Kozara	RS	II.	3,907.54	Public Institution "NP Kozara"
4.	NP Sutjeska	RS	II.	16,052.34	Public Institution "NP Sutjeska"
5.	NP Una	FBiH	II.	19,800.00	Public Institution "NP Una"
MONUMENT OF NATURE (MN)					
6.	MN Pećina Orlovača	RS	III.	27.01	Culture Center Pale
7.	MN Pećina Ljubačevo	RS	III.	45.45	City of Banjaluka
8.	MN Žuta bukva	RS	III.	0.50	Eco-ethno village "Žuta bukva"
9.	MN Pećina Rastuša	RS	III.	11.39	Municipality of Teslić
10.	MN Prokoško jezero	FBiH	III.	2,225.00	Central Bosnia Canton
11.	MN Skakavac	FBiH	III.	1,430.70	Public Institution for Protected

¹⁸ PNR Gromiželj and Lisina in the RS were placed under protection based decisions (15-960-18 / 08 and 15-960-1 / 10) by the MPPCEE RS during 2011, which are in accordance with the old Law on Nature Protection (Official Gazette of RS, no. 50/02, 34/08 and 59/08). Under these arrangements, the MPPCEE RS and the Republic Institute for Protection of Cultural, Historical and Natural Heritage had to prepare a proposal for placing these areas under protection in accordance with the old Law on Nature Protection during the next two years. During 2014, the new Law on Nature Protection entered into force (Official Gazette of RS, no. 20/14) according to which a deadline of 6 months for the harmonization of acts on designation of protected areas have been adopted in accordance with the old Law on Nature Protection (Article 101). Abandoned deadline has expired, and prescribed alignment is not yet done for these two areas. Therefore, PNR Gromiželj and Lisina do not have the institutional and legal protection.

No.	Name	Entity	IUCN Categorization	Area Size (ha)	Manager
12.	MN Tajan	FBiH	III.	3,510.00	Natural Areas of the Sarajevo Canton Forestry and Business Association of the Zenica-Doboj Canton
13.	MN Vrelo Bosne	FBiH	III.	603.00	Public Institution for Protected Natural Areas of the Sarajevo Canton
14.	MN Jama Ledana	RS	III.	28.26	Municipality of Ribnik
15.	MN Vaganska pećina	RS	III.	12.00	Municipality of Šipovo
16.	MN Pećina Đatlo	RS	III.	43.42	Municipality of Bileća and
17.	MN Pavlova Pećina	RS	III.	13.40	Municipality of Gacko
HABITAT MANAGEMENT AREA					
-	-	-	IV.	-	-
PARK OF NATURE (PN) –PROTECTED LANDSCAPE (PL)¹⁹					
18.	PN Blidinje	FBiH	V.	35,800.00	Public Enterprise Park of Nature „Blidinje“
19.	PN Hutovo blato	FBiH	V.	7,411.00	Public Enterprise Park of Nature „Hutovo blato“
20.	PL Konjuh	FBiH	V.	8,016.61	Tuzla Canton (TPK)
21.	PL Bijambare	FBiH	V.	497.00	Public Institution for Protected Natural Areas of the Sarajevo Canton
22.	PL Trebević	FBiH	V.	400.20	Public Institution for Protected Natural Areas of the Sarajevo Canton
RESOURCE MANAGEMENT AREA (RMA)					
23.	RMA University Campus	RS	VI.	27.38	Genetic Resources Institute of the RS

Source: Fifth National Report of BiH to CBD (2014) with Amendments

The Ramsar (wetland) areas in BiH are particularly characterized by a specific flora and fauna, and are singled out for their migratory bird species. These are: Hutovo Blato, Bardača and Livanjsko Field. The Important Bird and Biodiversity Areas (IBAs) in BiH are: Livanjsko Field, Boračko Lake, Bardača, and Hutovo Blato.

The existing protected areas do not fully implement the system of protection, monitoring and sustainable use. The reason for this is the lack of the budgetary allocations, inadequate structure of employees, the 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 FBiH and are not uniform, while for national parks the allocations are provided by the entity level. In most cases, the budget allocations are used for salaries, running costs and maintenance.

¹⁹ Since December 2014, the Law on Protection of PL Bentbaša has not been adopted yet.

As for the spatial planning documents in BiH, the Spatial Plan of the FBiH (2008-2028) envisages the establishment of 14 new protected areas with a total spatial coverage of about 4,488 km², which is 18.5 % of the territory of the FBiH (Table 21).

Table 21: Planned Protected Areas of Nature in the FBiH

No.	Name of protected area	Area size (ha)
1	Igman – Bjelašnica – Treskavica – Visočica – Rakitnica River Canyon	95,032.4
2	Prenj – Čabulja – Čvrsnica - Vran	101,744.3
3	Mt. Vranica	25,078.1
4	Mt. Grmeč	78,939.8
5	Raduša – Stožer - Crni Vrh	42,415.5
6	Mt. Šator	29,736.3
7	Dinara	26,314.9
8	Mt. Plješevica	5,094.7
9	Livanjsko Field	19,833.8
10	Mt. Vlašić	12,382.9
11	Popovo Field – Vjetrenica	3,572.5
12	Canyons of Neretva, Doljanka, Ribnica and Drežanka	7,357.3
13	Pliva Lakes	633.9
14	Una River Basin	34,685.8
Total		483,560.2
% of FBiH		18.5

Source: *Spatial Plan of the FBiH (2008-2028)*

For some of the above areas, the following studies have been made: Feasibility Study for Areas with Special Features of Significance for the FBiH – Igman, Bjelašnica, Treskavica and the Rakitnica River Canyon (Visočica) from 2007, Feasibility Study for Protection of the Area of Čvrsnica, Čabulja, Vran and Prenj with NP Blidinje from 2011, Feasibility Study for Protection of the Area of Mt. Zvijezda from 2014, while for some, such as e.g. Igman, Bjelašnica, Treskavica, and Visočica, the studies are currently underway. Also, the Study for Economic Transferability of the NP Plitvice Lakes into NP Una is at its final stage.

The Spatial Plan of the RS, in its initial phase (1996-2015) targeted at placing under protection 15 to 20 % of the total territory of the RS, as follows:

- 11 national parks;
- 11 regional parks (parks of nature);
- 107 recreational, cultural, scientific, landscape and other protected areas;
- 8 natural reserves;
- 13 memorial parks and monuments.

So far, there are no protected areas in the BD. The figure below (Figure 7) shows the existing and planned protected areas in BiH in line with the above mentioned spatial plans.

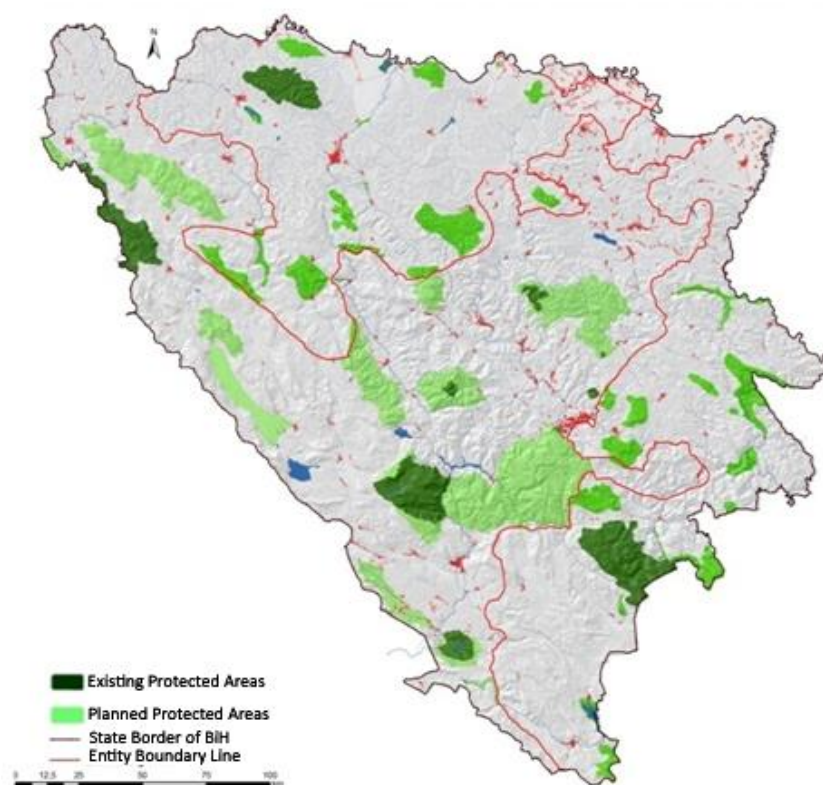


Figure 7: Network of Protected Areas in BiH
Source: Drešković, 2013

Under the „Dinaric Arch“ Project (2008-2011), financed by the World Wide Fund for Nature (WWF), the following cross-border cooperation areas were identified:

- Sutjeska NP (BiH) – Durmitor NP (Montenegro);
- Drina (BiH) – Tara NP (Serbia);
- Una NP (BiH) – Plitvice Lakes NP (Croatia);
- Dinaric Mountains (BiH – Croatia);
- PP „Hutovo Blato“ (BiH) – the protected areas of the Dubrovnik-Neretva Canton (the Delta of Neretva – Croatia).

Some of the cross-border areas, such as the Sutjeska NP (BiH) – Durmitor NP (Montenegro), and Una NP (BiH) – Plitvice Lakes NP (Croatia), have signed mutual agreements on further activities and cooperation.

In order to increase the size of protected areas, it is necessary to develop and implement a methodology that will allow constant monitoring of conditions and changes in the protected areas and their surroundings. The highest priority should be given to the development of a comprehensive information system as a key tool for effective monitoring and objective insight into the state of natural heritage. In this way, further degradation of natural resources could be prevented and harmonization of development activities with biological diversity would be enabled. It is also necessary to very carefully plan for new protected areas, as well as infrastructure, in environmentally sensitive individual zones, taking into account the visual identity and values of the landscape. A particular problem is the lack of professional institutions (Federal Institute for Nature Protection and

the cantons), which should be directly involved in all spheres involving the preservation, protection, monitoring and sustainable management of protected areas. It is very important to make a special connection and communication with the local community, which should be included in all spheres of activity in the protected area. The protection of natural heritage requires the establishment of 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.

2.12. AICHI TARGET 12: Endangered Species

The flora, fauna and fungi in BiH among the most diverse groups all over Europe, and a high level of endemic and relic qualities gives it significance of the global biological diversity level (Fourth National Report of BiH to the CBD, 2010). Data on the current state of biological diversity in BiH is presented in the following table:

Table 22: Biological Diversity Status in BiH

Taxon	Local Name	English Name	Number of Species Known
Eucaryota	Višecelijski organizmi	Multicellular organisms	17,223
Plantae	Biljke	Plants	4,696
Thallophyta*	Niže biljke	Thallophytes	514
Alge**	Alge	Algae	514
Rhodophyta	Crvene alge	Red algae	15
Chlorophyta	Zelene alge	Green algae	461
Xanthophyceae	Žutozelene alge	Yellow-green algae	13
Chrysophyceae	Zlatne alge	Golden algae	25
Lichenes	Lišajevi	Lichen	>300
Cormophyta*	Više biljke	Cormophyta	4,182
Bryophyta	Mahovine	Mosses	565
Pteridophyta	Paprati	Pteridophytes	61
Spermatophyta	Sjemenjače	Spermatophytes	3,256
Fungi	Gljive	Fungus	552
Ascomycota	Gljive mješinarke	Sac fungi	51
Basidiomycota	Gljive stapčarke	Higher fungi	501
Animalia	Životinje	Animals	12,016
Porifera	Spužve	Sponges	14
Cnidaria	Žarnjaci	Cnidarians	9
Platyhelminthes	Pljosnati crvi	Flatworms	90
Nemertea	Vrpčari	Ribbon worms	1
Nematoda	Oble gliste	Roundworms	47
Nematomorpha	Strunaši	Horsehair worms	5
Acanthocephala	Kukaši	Spiny-headed worms	9
Mollusca	Mekušci	Mollusks	347
Annelida	Gliste	Ringed worms	133
Arthropoda	Zglavkari	Arthropods	10,643
Bryozoa	Mahovnjaci	Moss animals	2
Echinodermata	Bodljokošci	Echinoderms	19
Chordata	Kičmenjaci	Chordates	697

* Names without a taxonomy position.

** *Cyanobacteria*, *Euglenophyta*, *Dynophyta* and *Bacillaryphyceae* pertain to the groups that today belong to other taxa (bacteria, unicellular eukaryotes).

Source: First National Report of BiH to the CBD, 2008; Lelo, 2012.

Under the influence of various factors (e.g. conversion of habitats, climate change, invasive species, pollution, excessive exploitation, eutrophication), the survival of many plant and animal species is endangered today, many are threatened by extinction, and a large number have disappeared for good. A very important step in the protection of endangered species is the formation and development of red lists and red books.

Data on threats to individual species in BiH can be found in scientific papers dealing with these issues. One of the most important research studies of this kind is the List of Plant Species (*Pteridophyta and Spermatophyta*) for the Red Book of BiH. As part of this research, 678 plant species were proposed, broken down by IUCN categories as follows: 3 extinct, 5 probably extinct, 43 very endangered, 286 endangered or vulnerable species, 289 rare or potentially endangered species, and 52 insufficiently known (Šilić, 1996).

In subsequent studies, Redžić (2010) revised the conservation status from the previously proposed "Red List" according to the IUCN criteria (1993, 1994, 1996, 1998, 1999, 2003). Even seven taxa were found whose status was debatable. Specifically, these taxa have not long been seen in their earlier habitats, and are believed to be extinct or nearly disappeared from natural populations. According to these studies, there are 45 threatened species, 280 species are vulnerable and very sensitive, 286 taxa are almost endangered, and 54 species are still with insufficiently studied conservation status (Redžić, 2012). The same author states that due to the excessive use of medicinal and aromatic plants, among the most endangered species are *Gentiana lutea*, *Menyanthes trifoliata*, *Arnica montana*, *Adonis vernalis*, etc.

Many species of fungi are under some degree of threat due to various pressures, global and local. Some species are even threatened by complete extermination (*Mycenatrum corium* from the moorlands around Bosanko Grahovo - Ždralovac). This is also similar for species linked to the endemic species for their survival, such as whitebark (*Pinus heldreichii*), Illyrian pine (*P. nigra ssp. Illyrica*), Greek maple (*Acer heldreichii*), Pancic spruce (*Picea omorica*) etc., which is particularly related to decaying and mycorrhizal fungal species. In the First National Report of BiH to the CBD (2008), the endangered species of fungi in BiH are grouped into the following categories: regionally extinct 3, critically endangered 22, endangered 12, vulnerable 13, insufficiently known 28, and potentially endangered 7.

Lichens in BiH are an extremely insufficiently studied group of organisms. On the territory of BiH, more than 300 species of lichens have been recorded so far, and their biological diversity is estimated at around 1,000 (First National Report of BiH to the CBD, 2008). However, for the territory of BiH, no assessment of the degree of threat according to the IUCN criteria has been made yet.

According to the Fourth National Report of BiH to the CBD (2010), 1,859 species from 217 genera within the group of cyanophytes and algae have been identified. The most diverse groups are *Charophyta*, i.e. the *Charophyceae* and *Chlorophyceae* classes, and *Heterokontophyta*, i.e. the *Bacillariophyceae* class.

In terms of ichthiofauna in BiH, here too the data varies according to the number of threatened species found on the IUCN list. Sofradžija (2009), in the study paper "Freshwater Fish of BiH", cited information on the classification of several categories according to the IUCN Red List. The category of endangered species includes 6 species, 3 are critically endangered, and 3 are almost endangered, while in the category of sensitive species there are 11. At the same time, four species have been classified into the category for which there are not enough data, while 11 species are insufficiently known. Also, one of the species represented in BiH, according to IUCN, is categorized as extinct. Also, it is stated that two species belong to the category of endangered *Ciclostomata*, while there is 1 species in the category of insufficiently known. The ichthiofauna in BiH is also characterized by a large number of endemic species (40), many of which are present only in some locations (Glamuzina *et al.*, 2010). In terms of threat to endemic fish of Herzegovina, the same authors, according to the "Red Book of Freshwater Fish of Croatia" (Mrakovčić *et al.*, 2006) and the IUCN categorization, state that eight species have the state of critically endangered (18 %), 9 species are threatened (20 %), 6 species are vulnerable (13 %), 3 species are in the category of insufficient data (7 %), while the state of nearly endangered species was designated for 2 species (50 %).

In previous studies of birds (Obratil and Matvejev, 1989) on the BiH territory for the needs of the Red List it was established that 97 species were in the endangered category, of which the authors classified 15 species into the category of Ex+Ex (extinct and probably extinct), 16 into category E (very endangered), 39 species into category V (endangered), 18 into category R (potentially endangered), and 9 species into other categories.

According to official data obtained from the Association for Biodiversity Research and Protection (Društvo za istraživanje i zaštitu biodiverziteta - DIZB) and the Ornithology Society "Naše ptice," data on endangered birds in BiH in line with the most recent issue of the Red Lists of Birds of Europe are as follows: LC (of the lowest concern) – 286; VU (vulnerable) – 20; NT (almost endangered) – 14; EN (endangered) – 6; CR (critically endangered) – 1 (BirdLife International, 2015).

According to aforementioned international data and according to data from domestic research, some endangered species nesting in BiH are: (Common) Pochard *Aythya ferina* (VU), Lanner Falcon (EN), Rock Partridge *Alectoris graeca* (NT), (Eurasian) Coot *Fulica atra* (NT), (Northern) Lapwing *Vanellus vanellus* (VU), (European) Turtle Dove *Streptopelia turtur* (VU), (Common) Kingfisher *Alcedo atthis* (VU), while internationally endangered species such as: Red Kite *Milvus milvus* (NT), Lammergeier *Gypaetus barbatus* (VU), Egyptian Vulture *Neophron percnopterus* (EN), Bonelli's Eagle *Aquila fasciata* (NT), Saker Falcon *Falco cherrug* (VU), are registered as extinct or probably extinct in BiH. A certain number of endangered bird species are of unknown status or are wintering and migrating in BiH, such as: Great Northern Loon *Gavia immer* (VU), Slavonian Grebe (Horned Grebe) *Podiceps auritus* (NT), Lesser White-fronted Goose *Anser erythropus* (EN), Red-breasted Goose *Branta ruficollis* (NT), Marble Duck *Marmaronetta angustirostris* (VU), (Greater) Scaup *Aythya marila* (VU), (Common) Eider *Somateria mollissima* (VU), Long-tailed Duck *Clangula hyemalis* (VU), Velvet Scoter *Melanitta fusca* (VU), Red-breasted Merganser *Mergus serrator* (NT), White-headed Duck *Oxyura leucocephala* (EN), Hen Harrier *Circus cyaneus* (NT), Pallid Harrier *Circus macrourus* (NT), (Greater) Spotted Eagle *Clanga clanga* (EN), Red-footed Falcon *Falco vespertinus* (NT), Great Bustard *Otis tarda* (VU), Little Bustard *Tetrax tetrax* (NT), (Eurasian) Oystercatcher *Haematopus ostralegus* (VU), Black-tailed Godwit *Limosa limosa* (VU), Slender-billed Curlew *Numenius tenuirostris*

(CR), (Eurasian) Curlew *Numenius arquata* (VU), Curlew Sandpiper *Calidris ferruginea* (VU), Little Gull *Hydrocoloeus minutus* (NT), (Black-legged) Kittiwake *Rissa tridactyla* (VU), Pallas's Sandgrouse *Syrhaptes paradoxus* (EN), Meadow Pipit *Anthus pratensis* (NT), Redwing *Turdus iliacus* (NT), Aqualic Warbler *Acrocephalus paludicola* (VU), Great Grey Shrike *Lanius excubitor* (VU).

When it comes to reptiles, according to the available data 11 species are threatened, while among amphibians 3 species are threatened, and 24 species are threatened among mammals (Fourth National Report of BiH to the CBD, 2010).

The Red Lists of protected species of flora and fauna are governed by the laws of nature protection at the entity level and the level of the BD. Of the official documents, the Decree on the Red List of protected species of flora and fauna of the RS (Official Gazette of RS, no. 124/12) has been issued, which contains a list of vascular plants, birds, fish, mammals, amphibians, reptiles and the subregnum of metazoans. The number of species in each category that are on the Red List of the RS is presented in the next chart.

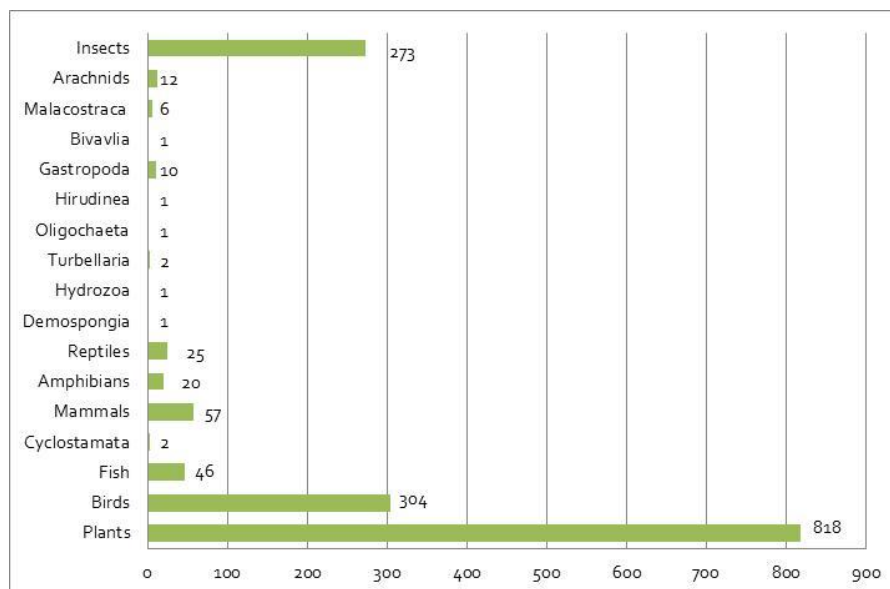


Chart 10: Breakdown of the Number of Species by Specific Systematic Categories According to the Red List of the RS
 Source: Red List of Protected Flora and Fauna Species of the RS, 2012

The adopted Decree contains the listings of all species recorded, but it does not provide separate threat categories, and in practice not all species are covered by protection. The collective breakdown of the recorded species is yet to establish a more precise threat status and should be made in compliance with the IUCN categorization.

As for the FBiH, the Red List of Endangered Plants, Animals and Fungi in the FBiH has been adopted (Official Gazette of FBiH, no. 07/14). This list includes plants, mammals, birds, reptiles, amphibians, fish and cyclostamata, with a breakdown by the appropriate categories of threat. The list also includes the endangered species of fungi in the FBiH, classified by categories, as well as a breakdown of the species from order *Ephemeroptera* (mayflies), *Odonata* (dragonflies), *Plecoptera* (stoneflies) and *Trichoptera* (caddisflies), a breakdown of daytime butterflies, ground beetles and

dung beetles in the FBiH, then the species from the orders of *Amphipoda* (crayfish), *Decapoda* (decapods), *Opiliones* (harvestmen) and *Pseudoscorpionida* (pseudoscorpions).

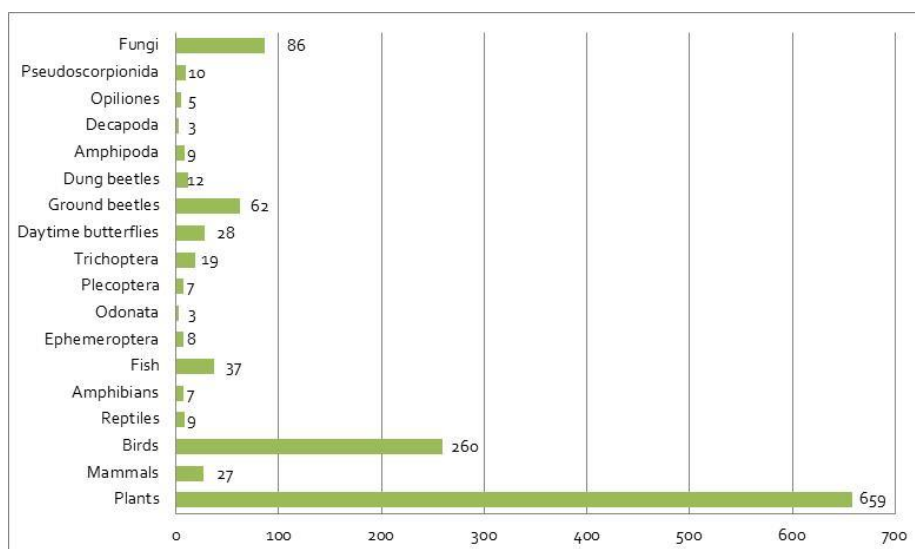


Chart 11: Breakdown of the Numbers of Species by Systematic Categories of the Red List of the FBiH
 Source: *Red List of Fungi of the FBiH, 2013; Red List of Fauna of the FBiH, 2013; Red List of Flora of the FBiH, 2013*

This document contains a list of species that have been proposed for specific threat categories (Table 23): insufficient data (DD), least concerning (LC), near threatened (NT), vulnerable (VU), endangered (EN), critically endangered (CR), extinct (EX) and regionally extinct (RE).

Table 23: Species by Threat Categories in the FBiH

Species	Threat Categories
Plants	DD – 161; LC – 52; NT – 58; VU – 173; EN – 145; CR – 69; EX – 1
Mammals	EX – 2; EN – 10; VU – 15
Birds	Nesting birds (198) of which RE – 10; CR – 8; EN – 13; VU – 19; NT – 32; LC – 95; DD – 21 Winter birds and migratory birds (62) of which EN – 8; VU – 6; NT – 4; LC – 4; DD – 40
Reptiles	VU – 5; EN – 1; NT – 3
Amphibians	EN – 1; VU – 3; NT – 3
Fish	CR – 7; EN – 16; VU – 7; DD – 7
Ephemeroptera	DD – 1; VU – 2; EN – 5
Odonata	NT – 3
Plecoptera	VU – 7
Trichoptera	VU – 4; CR – 12; NT – 3
Daytime butterflies	CR – 4; EN – 6; VU – 18
Ground beetles	EN – 5; VU – 25; NT – 32
Dung beetles	EN – 2; VU – 10
Amphipoda	VU – 9
Decapoda	VU – 2; EN – 1
Opiliones	EN – 2; VU – 2; NT – 1
Pseudoscorpionida	EN – 2; VU – 8
Fungi	DD – 59; NT – 2; VU – 7; EN – 4; CR – 14

Source: *Red Book of Fungi of the FBiH, 2013; Red List of Fauna of the FBiH, 2013; Red List of Flora of the FBiH, 2013*

Based on the above it is evident that the entities have adopted the Red Lists, where it is necessary to point out that these lists include a lot of deficiencies that need to be corrected in the coming period.

The current lists represent a starting point for further research which should result in production of documents in accordance with the applicable criteria.

2.13. AICHI TARGET 13: Genetic Diversity

The overall biological diversity of indigenous gene pool has also conditioned a high diversity of genetic resources in BiH contained in a large number of original forms (geno- and eco-types) of plant varieties and animal breeds and their habitats. In terms of genetic diversity in BiH, a major problem is the lack of scientific and technical data on the established number of indigenous (domesticated) plant varieties and animal breeds (the absence of a valid inventory), as well as the lack of certified indigeneity parameters.

The activities on the preservation of indigenous genetic resources, primarily for plants, have been intensified in the period after the war, specifically by establishment of the gene banks in the RS and the FBiH. This process began in 2004 by implementation of the SEEDNet Project (South East European Network for Plant Genetic Resources), which aimed to establish a network for the conservation of plant genetic resources for agricultural cultures in southeastern Europe. Within the SEEDNet Project, centers were established for plant genetic resources – the Gene Bank as part of the Faculty of Agriculture and Food Sciences - University of Sarajevo, as well as the Genetic Resources Institute - University of Banja Luka (Food and Agriculture Organization - FAO, 2008).

The Center for Plant Genetic Resources – the Gene Bank in Sarajevo, was established in 2009 and currently has more than 500 acquisitions of certain crops that are organized into functional groups: gardening, farming, fodder plants, medicinal and aromatic plants, fruit growing and wine growing.

The Genetic Resources Institute - University of Banja Luka was established in 2009 and consists of two sub-units – the Center for Biological Diversity and the Center for the Sustainable Use of Genetic Resources. Within the Center for Biological Diversity there is the Gene Bank of the RS, which accommodates the seed collection of cereals, vegetables, fodder plants, industrial plants, medicinal plants and aromatic plants. There are currently about 600 acquisitions in long-term conservation. The list of acquisitions in the field collection currently includes 106 varieties. The conservation and use of genetic resources at the plant gene bank of the RS is subject to application of international standards, and the measures set forth in these standards are defined through *in situ* and *ex situ* conservation, *on farm* conservation and sustainable use of biological diversity. On the other hand, the activities to preserve animal genetic resources are few, there is no organized gene bank, and *in situ* conservation takes place at the level of individuals or associations.

2.13.1. Plant Genetic Resources

In BiH there are only several protected forms of plant genetic resources (several varieties of vines - Blatina and Žilavka, and one variety of apple of an unknown name), even though there is a much larger number of varieties of fruits, vegetables and grains, which are authentic for BiH and exist in some parts of the territory.

According to the First National Report of BiH to the CBD (2008), from among the genetic resources of cereals, particularly distinctive are the varieties of corn, wheat (Bosanka, Granada, Kristina,

Prijedorčanka, Banjalučanka, Orion, Stojanka, Jelena, Šamčanka), barley, oats, rye, millet and soya (Sana, Sonja, Marina, Milica). From among the vegetable gardening varieties there are important forms of gourd and pumpkin, beans (čučo, bubnjo, trešnja, kućičar, mesni), cabbage, peppers, okra, watermelon, melon and potato (romanijski, kupreški, fojnički, glamočki).

There is also a high diversity of fruit species, which is primarily reflected in the large number of varieties of cherries, plums, pears, apples and sour cherries, apricots, peaches, almonds, raspberries, blackberries, strawberries and currants (Table 24).

Table 24: List of Indigenous Varieties of Fruits in BiH

Plums	Stenli, Požegača, Čačanska rodna, Čačanska ljepotica, Bilska rana, Kalifornijska plava
Apples	Ajdared, Jonagold, Zlatni delišes, Melrose, Elstar, Gloster, Greni Smit, Topaz
Pears	Viljamovka, Boskova bočica, Butiraprecoce Morettini, Santa Maria, Passe Crassane, Cure, Champion, Abbefetel, Junska ljepotica, Citronka
Strawberries	Toplička jagoda, Mis, Maja, Marmelada, Pokahontas, Zengazengana, Čangler, Belrubi, Selena
Raspberries	Miker, Vilamet
Blackberries	Jamnbo, Tornfri
Cherries	Burlat, Đurševka, Bing, Stela, Hedelfingerova
Sour Cherries	Oblačinska, Reksele, Hajmanova
Peaches	Red i Fajer Heven, Kolins, Haleova pozna, Red Top, Diksired
Apricots	Mađarska, Kečkemedska ruža, Naget
Grapes	Žilavka, Blatina, and Plavka

Source: First National Report of BiH to the CBD, 2008

Great value is inherent with many fruit plants serving as a basis for grafting, and some of the recognized base cultivars in BiH are: almond (*Amygdalus communis*), apricot (*Armeniaca vulgaris*), cherry plum (*Prunus*), plum (*Prunus domestica*), domesticated chestnut (*Castanea sativa*), sour cherry (*Cerasus vulgaris*), dogwoods (*Cornus mas*), quince (*Cydonia oblonga*), walnut (*Juglans regia*), crab apple (*Malus sylvestris*), medlar (*Mespilus germanica*), hawthorn (*Crataegus oxyacantha*), olives (*Olea europea*), cherry (*Prunus avium*), St. Lucie cherry (*Prunus mahaleb*), peach (*Prunus persica*), pomegranate (*Punica granatum*), pear (*Pyrus pyraeaster*), rose hip (*Rosa canina*) and domestic elder (*Sambucus nigra*). A significant place in the genetic resources of BiH is taken up by different varieties of forage crops (alfalfa, birdsfoot trefoil, orchard grass, timothy, red fescue, field peas, etc.).

The importance of ornamental plants should also be emphasized, and they are present above all in yards: "đulbešećerka" (*Rosa polyantha*), "đulhatma" (*Althaea rosea*), "ruta" or "rutica" (*Ruta graveolens*), basil (*Ocimum basilicum*), hyssop (*Levisticum officinale*), peony (*Paeonia sp.*), bloodred (*Erysimium sp.*) etc. (First National Report of BiH to the CBD, 2008), rosemary (*Rosmarinus officinalis*), castor oil plant (*Ricinus communis*), marigold (*Calendula officinalis*), southernwood (*Artemisia abrotanum*), houseleeks (*Sempervivum spp.*), and primrose (*Primula vulgaris*)²⁰.

Studies have shown that in BiH today about 160-170 species of medicinal plants are subject to collecting, among which at most 15 to 20 species are traded commercially (Table 25) (Bijelić, 2012).

Table 25: Registered Medicinal Herbs Significant for Traditional Medicine, Socio-Economic and Cultural Aspects of BiH

²⁰ Official Memo of the Faculty of Sciences in Banja Luka (July 09, 2015).

Latin Name	Local Name
<i>Juniperus spp.</i>	Smreka, kleka
<i>Salvia officinalis</i>	Kadulja, žalfija
<i>Betula pendula</i>	Obična breza
<i>Helichrysum arenarium</i>	Smilje
<i>Rhamnus frangula</i>	Pasja lijeska, pasje grožđe, krkavina
<i>Satureja montana</i>	Vrijesak, gorska metvica
<i>Sambucus nigra</i>	Zova, bazga
<i>Vitex agnus – castus</i>	Konopljika, kaluđerski biber
<i>Tilia argentea</i>	Lipa
<i>Thymus serpyllum</i>	Majkina dušica, majčina dušica
<i>Crataegus monogyna</i>	Glog
<i>Teucrium montanum</i>	Iva trava, dupčac
<i>Plantago lanceolata</i>	Muška bokvica
<i>Achillea millefolium</i>	Hajdučka trava, kunica
<i>Verbascum thapsus</i>	Divizma, divlji tabak
<i>Tilia cordata</i>	Sitnolisna lipa
<i>Tilia platyphyllos</i>	Krupnolisna lipa
<i>Hipericum perforatum</i>	Kantarion
<i>Gentiana lutea</i>	Lincura
<i>Centaurium erythraea</i>	Kičica
<i>Valleriana officinalis</i>	Odoljen, macina trava
<i>Pulmonaria officinalis</i>	vrste roda Mentha, plućnjak
<i>Adonis vernalis</i>	Gorocvijet
<i>Althea officinalis</i>	Bijeli sljez
<i>Melissa officinalis</i>	Matičnjak
<i>Polygonum bistorta</i>	Srčanik
<i>Vaccinium myrtillus</i>	Borovnica
<i>Vaccinium vitis-idaea</i>	Brusnica
<i>Cornus mas</i>	Drenjak
<i>Arctostaphylos uva-ursi</i>	Uva
<i>Symphytum officinale</i>	Gavez
<i>Artemisia absinthium</i>	Pelin
<i>Primula veris</i>	Jagorčevina

Source: Bijelić, 2012; Official Memo of the Faculty of Sciences in Banja Luka (July 09, 2015).

In BiH, the forests have succeeded in preserving their genetic structure. 100 years ago, the development of intensive forestry began, where it was started with the introduction of forest species, but in most cases this was without success, and now BiH is one of the few countries not burdened with genetic pollution and altered genetic structure of the principal economic tree species (e.g. fir, spruce, beech, sessile oak) (Ballian, 2009).

2.13.2. Animal Genetic Resources

On the territory of BiH there are numerous breeds of domesticated animals. In particular, horses stand out (bosanskohercegovački brdski konj), as well as cattle (buša and gatačko govodo), sheep (pramenka), goats (domaća balkanska rogata koza), pigs (šiška), dogs (bosanskohercegovački pastirski tornjak and bosanski oštrodlaki gonič barak) and pigeons (travnički kratkokljuni golub, sarajevski prevrtač, bihački prevrtač and zenički prevrtač), although indications of autochthony are also observed with the Herzegovinian donkey, dog and chickens (First National Report of BiH to the CBD, 2008).

Certain types of (hunting) game, too, are characterized by their distinctive features and unique gene pool (roe deer, chamois, wild boar, wolf, marten, brown bear, etc.) (First National Report of BiH to the CBD, 2008).

As for the legislation, in BiH there is very little or no laws or by-laws dealing exclusively with the recording and protection of genetic resources. In the RS, there is no legislation that deals exclusively with the realm of biological diversity and the protection of genetic resources (the law on genetic resources of the RS is in its final drafting stages), while the laws and bylaws that more or less deal with the given issues are the following:

- Law on Seeds of Agricultural Plants (Official Gazette of the RS, no. 37/09, 100/11);
- Law on Forests (Official Gazette of the RS, no. 66/03, 75/08, 30/10);
- Law on Forest Tree Reproductive Material (Official Gazette of the RS, no. 70/09);
- Law on Planting Material (Official Gazette of the RS, no. 37/09);
- Law on Livestock Breeding (Official Gazette of the RS, no. 34/06);
- Law on Bee Farming (Official Gazette of the RS, no. 52/10);
- Law on Fisheries (Official Gazette of the RS, no. 72/12);
- Law on Hunting (Official Gazette of the RS, no. 60/09, 34/08) etc.

In the FBiH the following laws and bylaws directly or indirectly cover these issues:

- Law on the Recognition and Protection of Agricultural and Forest Plants (Official Gazette of the FBiH, no. 31/00);
- Law on Seeds and Seedlings of Forest and Horticultural Species of Trees and Shrubs (Official Gazette of the FBiH, no. 71/05, 8/10);
- Law on Hunting (Official Gazette of the FBiH, no. 4/06);
- Law on Wine (Official Gazette of the FBiH, no. 55/12);
- Law on Genetically Modified Organisms (Official Gazette of the FBiH, no. 315/09);
- Rulebook on Cultivation, Exploitation, Collection and Trade of Secondary Forest Products (Official Gazette of the FBiH, no. 66/05) etc.

In the BD, the following laws and bylaws are relevant:

- Law on the Forests of the BD BiH (Official Gazette of the BD BiH, no. 14/10);
- Law on Wine and Brandy (Official Gazette of the BD BiH, no. 35/05, 19/07) etc.

2.14. AICHI TARGET 14: Preserved Ecosystems Providing Essential Services

A prerequisite for the functioning of ecosystems is a good condition of all its components and elements. The good condition implies preserved abiotic structure and the presence of accompanying species in the community. Due to the reduction of the number of populations or complete disappearance of certain species, the functionality of a large number of ecosystems has been reduced. Therefore, the ecosystem services delivered by these same ecosystems are today significantly reduced.

According to the First National Report of BiH to the CBD (2009), BiH is a space characterized by a high diversity of environmental conditions, including ecosystems. The mosaics of different ecosystems are grouped into the following landscapes: the Mediterranean, sub-Mediterranean, Mediterranean-mountainous, mountainous, hilly, peri-Pannonic and Pannonic ones. A special group

of specific landscapes, characterized by endemic ecosystems and species, consists of: alpine, relict-refugial, karst fields and wetlands landscapes (Redžić, 2008).

Each of these types of ecosystems provides specific benefits to the people of BiH.

2.14.1. Ecosystems of BiH Providing Essential Goods and Performing Essential Functions

According to the First National Communication of BiH under the UNFCCC (2009), forests and forest soils cover an area of about 27,100 km², or about 53 % of the country. Some 2.6 million ha are suitable for agricultural activity. Fertile lowlands in BiH consist of 16 % of agricultural land, 62 % are less fertile hilly and mountainous areas, while the Mediterranean area accounts for some 22 %.

Although the nature of BiH consists of different types of ecosystems in spatial and syngeneic or landscape continuity, three groups of ecosystems with essential services have been singled out:

1. Forest Ecosystems

It should be noted that, unlike most countries in this part of the world, the large majority of the forest ecosystems in BiH still has the primary, natural structure. From the aspect of production of timber, as one of the first essential services to the population of BiH, forest ecosystems can be roughly differentiated into:

- Highly productive forests, and
- Low productive forests.

The highly productive forests in BiH are primarily the forests of the hilly and mountain belts. In the mountainous area, there are mostly mixed deciduous-coniferous communities, on deep brown calcareous and siliceous soils. The composition of these communities includes a large number of deciduous species, among which the most important and rare in BiH are *Fagus sylvatica* (significant for economy), *Acer pseudoplatanus*, *Acer platanoides* and *Ulmus montana* (significant for biological diversity) and others. Among coniferous species, the most important species in these forests are *Picea abies* and *Abies alba*.

In addition to the above, high-level production can also be achieved in dark coniferous forests (especially forests of spruce in the mountainous area) and light coniferous forests (pine forests on different geological substrates). In the hilly belt, the most productive are oak and hornbeam forests, dominated by the *Quercus petraea* and *Carpinus betulus* species. In the Pannonic and peri-Pannonic area, highly productive are forests of English oak (*Quercus robur*). In the hilly belt, the highest productivity is reached in oak-hornbeam forests (*Quercus petraea* and *Carpinus betulus*) and in oak forests (*Quercus Robur*).

In the group of highly productive forests in BiH, thermophile forests and thickets of Herzegovina stand out above all.

From the aspect of protective functions of forests as special ecosystem services, the following in the territory of BiH have an essential role:

- Alpine forests (top borders of forests); and
- Riparian forests (forests along river courses and wetland habitats).

It should be noted that especially the riparian forests of alder, as well as other hygrophile forest habitats, are under severe pressure due to urbanization. The expansion of settlements and economic development require more extensive construction of road communications, which on the territory of BiH has traditionally been done along river flows. This way of construction during the past century has caused a significant reduction or otherwise narrow ranges of alder forests. The riparian alder forest habitats today are also under great pressure because of planning for construction of a large number of small hydropower plants in BiH on mountain streams. In appreciation of the importance of these forests in flood protection and in the fixation of atmospheric nitrogen, alder forests have gained priority status in terms of protection under Annex VII of the Habitats Directive. However, given that BiH is still not bound to apply the EU policy in relation to the protection and sustainable use of biological diversity, these and other habitats are not protected by appropriate mechanisms.

When singling out production of timber and the protective role of forests as a particularly important ecosystem service, one should not ignore the role of different types of forest ecosystems for the development of other ecosystem services and benefits from forests, many of which are of essential importance for the population of BiH. These include reducing the risk of flooding, the absorption of CO₂, climate regulation, air purification, regulation of soil erosion, etc.

For the purpose of understanding the complex functions of forests and their role in quality of life, Table 26 shows the disturbance in the natural balance that occurs after deforestation.

Table 26: Local, Regional and Global Effects of Deforestation

EFFECTS OF DEFORESTATION					
LOCAL		REGIONAL		GLOBAL	
Soil	Vegetation	Microclimate	Hydrological regime	Mezzoclimate	
Free water drain	Change of species	Increased insolation	Disturbed regional water balance	Disturbed average precipitation	Disturbed balance and cycle of carbon
Erosion	Reduction of total biomass	Rising air and soil temperature	Increased transport of sediment	Change in average temperatures	Carbon emissions into atmosphere
Reduced infiltration rate	Appearance of weed and invasive species	Reduced relative humidity	Potential for flooding	Water off-flow from the basin	Global warming
Change of nutrient cycle	Pest outbreaks	Increased evaporation	Transport of dissolved materials and organic carbon		Disturbed distribution of precipitation

In relation to the values that forest ecosystems provide to the citizens of BiH, there are some indicative statements from the FMAWMF report (2012) on the Project "Social Aspects of Forest Management" which states that "according to the data on the operations of forestry companies in the FBiH, the total revenue is dominated by the revenue coming from the sale of forest assortments

at about 80 % (in 2006), 90 % (in 2009), up to 92 % (in 2010)", and "that there is a noticeable downward trend of increasing the revenues in forestry only by increasing the cutting mass".

2. *Freshwater Ecosystems*

BiH possesses considerable water resources, therefore in the future water could become one of the foundations of the general economic development in many areas (Second National Communication of BiH under the UNFCCC, 2013). The water resources of BiH are part of the ecosystem of rivers, mountain streams, glaciers, lake ecosystems and wetland habitats, along with moorland ecosystems have special value.

It should be noted that, according to the First National Report of BiH to the CBD (2008), in BiH there is a distinctive group of specific landscapes, including the relict-refugial, alpine, wetlands and karst field landscapes. The central component of each of these landscapes is water. According to this report, the canyon ecosystems in the relict-refugial landscapes of the Una, Vrbas, Drina, and Neretva rivers represent a special ecological and natural value in BiH.

On the other hand, "we can see the most beautiful parts of the mountain landscapes along the powerful mountain streams of the BiH Dinaric Mountains. The clear water rushes along narrow troughs between the surrounding massifs down to the calm waters of Bosna, Vrbas and Drina. Hiding a unique, inimitable world of living organisms, cold mountain water, even nowadays they make up the treasury of the BiH biological and ecological riches" (Redžić, 2008). The aforementioned article on aquatic ecosystems BiH also hides numerous ecosystem services, such as drinking water supply, food production, nutrient cycling, biological diversity conservation, and aesthetic, cultural, recreational, tourism and other services.

However, the fact is that the water in BiH is increasingly viewed in the light of an economic resource, which is the cause of one of the major conflicts in sustainable water management. While doing so, it is particularly important to understand the hydro potential for power generation, because water is indeed a renewable energy source. Small Hydropower Plants (HPPs) are a source of renewable energy that, according to the First National Communication of BiH under the UNFCCC (2009) hold potentials in BiH. In addition to the hydropower potentials of large flows (there are already 13 large hydropower plants in BiH), BiH also has available hydropower potentials in small water courses. According to the entity spatial plans, large parts of water habitats have been planned for the construction of small hydropower plants.

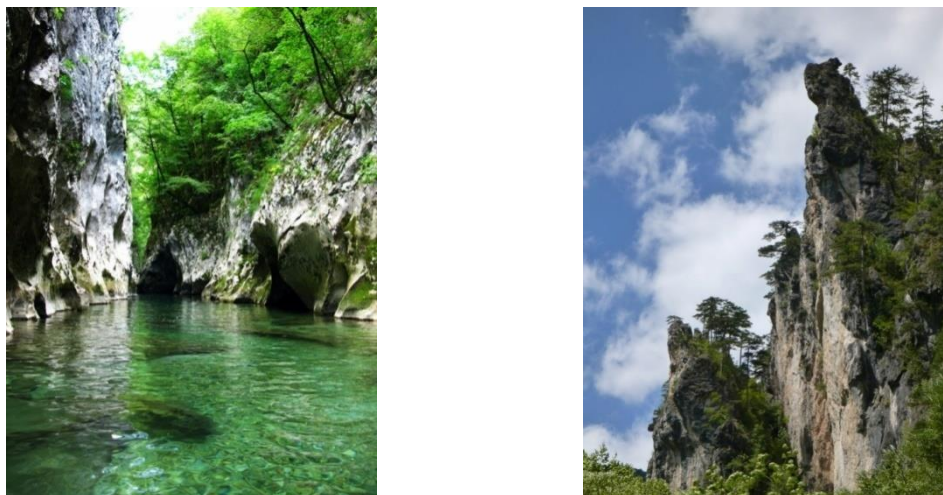


Figure 8: Relict-Refugial Canyon Ecosystems in BiH
Photo: A. Herić

The previous NBSAP BiH (2008-2015) pointed out that the aquatic ecosystems of BiH are affected by a large number of pressures: "The construction of water reservoirs, opening of quarries and transport infrastructure through the most valuable relic-refugial ecosystems in BiH irretrievably makes them lose a large part of the spaces in which for thousands of years populations of particular species have managed to survive, which now represent rarities in the global biological diversity of the planet. Drying, burning, drainage improvements and establishment of agricultural land on wetlands have caused, both in qualitative and quantitative terms, the loss of much of the biological diversity of BiH. Numerous animal species, especially birds, amphibians and reptiles, adapted to wetlands conditions, have been losing their living space through these anthropogenic activities".

3. Agricultural Ecosystems

The development and survival of agri-biological diversity is based on the same biological and ecological principles prevailing in the primary ecosystems. The ecosystem services derived from agri-biological diversity are essential for the socio-economic situation of the society. In those terms, food production is the most important service, but it is conditioned by other services or processes that take place in the ecosystem (e.g. pollination, water circulation, nutrient cycling, etc.).

As discussed in more detail in Aichi Target 7, agriculture is one of the most important sectors of the economy in BiH, due to the fact that in 2012 the number of employed persons was 18.9 % (Labor Force Survey, 2013), while the share of agriculture in the GDP 7.4 % (BiH in figures, 2014).

Meadows and pastures occupy more than half of the agricultural land in BiH. Meadows are more productive, most of them are located in lowland areas and in the highland plateaus. Pastures are developed mainly on shallow soils at higher positions. In phytocenological sense, there is a high diversity of meadow ecosystems in BiH, as a result of the extraordinary diversity in environmental conditions and, consequently, of the high diversity at the level of species.

Despite the relatively favorable climate and soil conditions for agricultural production, it should be noted that BiH is an importer of food. Migration to the cities and the economic instability of agricultural producers are certainly the contributing factors. A consequence of depopulation in rural areas is the loss of genetic biological diversity, accompanied with a rapid loss of traditional knowledge and practices in the post-war period.

However, there are recognizable potentials and positive trends as well. In view of the general ecosystem status, BiH has great potentials for development of organic agriculture and organic food production. One of the indicators in terms of positive trends is the production of plums and blackthorn, which according to FAO has had a growing trend over the past ten years (Table 27). According to the same source, BiH is ranked 12th in the world for plum production.

Table 27: Production of Plum and Blackthorn in BiH in the Period of 2001-2012

Year	Rank	Production (\$1000)	Production (MT)
2012	5	66,244	111,005
2011	3	93,993	157,504
2010	2	94,028	157,562
2009	2	92,957	155,767
2008	4	79,145	132,623
2007	3	82,776	138,707
2006	4	73,542	123,234
2005	5	57,272	95,971
2004	3	100,158	167,834
2003	4	52,699	88,308
2002	10	11,937	20,002
2001	6	19,101	32,008

Source: FAO Statistical Department (FAOSTAT)

The climate and production potentials of the region show the fact that the neighboring country, the Republic of Serbia, is ranked second in the world for plum production. In connection with the above example, it should be noted that the potentials in agricultural production in BiH are not sufficiently tapped. Food production in agri-ecosystems is an ecosystem service that is not used in accordance with its potentials, and this also demonstrates the need for serious and organized restoration of the neglected agri-ecosystems.



Figure 9: Ecosystem Services Support Production of Healthy Food

Photo: A. Herić

2.15. AICHI TARGET 15: Restored Ecosystems and Increased Resistance

In line with the vision and mission of the Strategic Plan 2011-2020, it is necessary to ask the following question: *How to fix the current state of the degraded ecosystems?*

The degraded ecosystems in BiH are for the most part located in industrial and urban areas. The high degree of degradation occurs in the mining zones in BiH, through coal strip-mining and pit mining.

The nature, in which processes never stop, heals the wounds caused by this activity by itself. In the deep craters, formed by settling down of pits or strip mines, today there is a large number of standing lakes, which are slowly inhabited by life. These are characteristic for the area around Ljubija, Tuzla, Kakanj, Vareš, and other cities mining industry has been or is still developed. Some of the lakes are even over 50 years old, and the most recent have been created over the past decade.



Figure 10: Strip-Mine Lakes around Kakanj (left) and Tuzla (right)

Photo: E. Mašić (left) and J. Kamberović (right)

The shore areas of such origin of lakes are irregular, with steep slopes, landslides and local depressions. The depth of lakes ranges from several up to 50 m, depending on the method of water filling. With the arrival of plant and animal species and through biological interactions, typical wetland ecosystems have been slowly established here. The progradation process runs spontaneously, and some highly progressed stages are already present on some of the older lakes. The emergence of these anthropogenic wetland habitats is a process that is opposite to the trend of disappearance of wetlands and ponds in the world (Barudanović and Kamberović, 2011).

However, the natural process of establishment of wetland ecosystems on strip-mine lakes has been very slow. Through restoration activities, it would be possible to achieve different types of benefits for both people and biological diversity. In addition to all of the familiar services provided by wetland ecosystems (e.g. water purification, intake of CO₂ from the atmosphere, ensuring habitats for

globally threatened wetland species, etc.), the restoration activities could also provide jobs, especially for socially vulnerable groups, in development of eco-tourism, aquaculture and other activities.

2.16. AICHI TARGET 16: The Nagoya Protocol

The protocol on access to genetic resources and fair distribution of profits generated by their use (the Nagoya Protocol) is a civilizational step forward. The history of use of genetic resources outside the country of their origin dates back to the past millennia. The modern age is characterized by new forms of exploitation of genetic resources, primarily for the pharmaceutical and food industries, but also through a variety of biotechnological and scientific developments as the basis of progress for any society. The Nagoya Protocol assumes the use of genetic resources only on mutually agreed terms between the two countries, on the basis of pre-determined information and arrangements (Barudanović, 2012).

It should be noted that today in BiH, there is insufficient control of the use and export of various products arising from the use of local genetic resources. Also, there is no sufficient control of the use and export of medicinal, vitaminized and aromatic species, as well as other ecosystem goods onto which BiH claims its sovereign rights.

In addition, over the past decade, a large number of scientists from around the world have shown interest in the research of Bosnian-Herzegovinian biological diversity at the genetic and species levels. Local experts are often called to assist in the identification of habitats, but without the opportunity to participate in the research themselves. Thus, in BiH there is an identified need for regulation of profits obtained from the use of local biological diversity.

BiH is one of the countries participating in the UNEP Project for early ratification and accession to the Nagoya Protocol. Currently, the ratification has been postponed until the adoption of the national legislation on genetic resources.

2.17. AICHI TARGET 17: NBSAP as an Adopted Policy Instrument

This target implies that by 2015 each Party has developed, adopted as a legal document, and begun to apply effective, participatory and revised NBSAP. NBSAP is a document that brings together the obligations of each party defined in the CBD and the decisions taken at the COP.

As a development and a living document, NBSAP aims at each party, by 2015, to have determined its needs, priorities and opportunities for biological diversity conservation in terms of defining its national targets in the domain of modern development of environmental and social planning in line with the Strategic Plan 2011-2020. The purpose of this document is to be streamlined into the government and company policies so that the given activities could be successfully implemented and integrated into sectoral plans and programs, the activities of which have either positive or negative impacts on biological diversity.

The COP has adopted consolidated guidelines for the development, updating and revision of NBSAP (Decision IX/8). In accordance with this Decision, NBSAP should consolidate the national targets, e.g., integrate biological diversity issues into a wide range of national strategies; strengthen communication, education and public awareness; enable information and knowledge sharing through a developed CHM website; build capacity and facilitate access to finance; ensure monitoring and reporting, including the identification and use of indicators, if necessary.

NBSAP BiH (2015-2020) provides a detailed overview of the state of biological diversity, which is of great regional and global importance. This document is a dynamic process of planning and decision making; it provides instructions for easy acquisition and adoption of knowledge in the system of education and strengthens and raises public awareness of the importance of biological diversity. In addition to being designed so as to integrate all sectors at local levels through the designated actions that can meet their own development, economic and political interests, it also creates functional linkages with international bodies, which is of special importance for BiH.

2.18. AICHI TARGET 18: Traditional Knowledge, Innovations and Practices

Sustainable use of biological diversity components in BiH has very good prospects in traditional knowledge, innovations and practices.

The long process of ethno genesis with strong diversity of cultures have given enough time and space to develop practices that have characterized the diversity of use of natural resources on the one hand, and moderation in their consumption on the other. Traditional knowledge on the use of biological diversity is largely related to the production of food, which has proceeded in the abundant and climatically favorable conditions in BiH with the constant development of new land farming practices. These production methods have ensured enough food for the population of the BiH territory. In addition, knowledge and practices related to the use of medicinal herbs have been extremely well developed.

In the modern Bosnian-Herzegovinian society, easy and fast ways to meet the needs of life are sought on a constant basis, while the traditional approach is no longer attractive. With the older generations of citizens, the old knowledge and practices disappear for good, which is a loss that the BiH society today is not aware of.

In today's economic situation, the traditional knowledge on the use and preservation of indigenous gene pool and good production and natural resources are the basis for intensive production of healthy food. One of the good old practices in BiH is growing fruit trees and methods of processing and canning fruit. For example, trees of apples, plums, pears, cherries, sour cherries, quinces and other fruit trees are part of almost every yard in rural and suburban areas in BiH. In addition, a large part of fragmented agricultural farms that are outside villages are under fruit plantations. Orchards with apples, pears and plums are typical of a wide area from northern Herzegovina (the Neretva valley from Jablanica and Konjic towards the north), all of the Drina valley, central Bosnia with the settlements along the Bosna river valley, the Vrbas and Una river valleys, and the Peri-Pannonic and Pannonic parts of Bosnia. In the vertical sense, orchards are typical of the mountain and hilly belts, and appear up to an altitude of about 1,000 m.

Since these are seasonal fruits, there is the need for conservation, so that numerous processing practices have been developed. Among the most popular products that are made from these fruits are: juices, jams, sweet and alcoholic drinks. In addition to these methods for use of large quantities of fruits, there is another, very old way of processing and preservation - drying of fruits. Drying of fruits has been developed as an indigenous technology at the time when other ways of conserving fruits were not known or available. Dried fruit is used throughout the winter and the following spring, when it is served as a healthy source of sugars, vitamins and fiber. As early as in the 70's and 80's of the last century, almost all rural households had drying kilns, where selected fruits were dried in autumn days, kept on continually maintained weak wood embers. Collection, preparation and selection of fruits for drying and maintaining the embers at drying kilns were the duty of all family members, but mostly women.

Traditional knowledge and experience have been passed on from generation to generation, developing and keeping their own recipes for drying of fruits. Unfortunately, much of this knowledge was lost during the war and post-war times. It should also be noted that a large part of the rural population was displaced from their homes at the time, and that the population of the rural areas in many parts of the country today mainly consists only of the elderly.

Although the practice of fruit drying has now been largely abandoned and forgotten, in the marketplaces in BiH, however, one can still find high-quality dried fruits. This shows that knowledge of this process is still living among the rural population, and on the other hand that numerous orchards in BiH still exist. Some of them have been abandoned, but painted trees in the springtime suggest that a large part of the population still cares about the yield of fruit trees.

Traditional knowledge, innovations and practices also particularly reflect themselves on the extraordinary abundance of indigenous cheeses. So far, several dozen cheeses have been identified that have indigenous characteristics. There is also a tradition for the production of sour milk cream and preparation of buttermilk, milk spread, cow butter and other dairy products. Very recognizable autochthonous dairy products are the Travnik cheese, Livno cheese, dry smoked cheese and cheese from the bellows (NERDA, 2009).

When it comes to fresh meat products, there are particular dried meat products such as: Bosnian smoked sausage, smoked meat – "pastirma" (especially from Visoko), Herzegovinian ham etc.

Clearly, the existing traditional knowledge will be preserved only if the teaching practices in which the knowledge is applied continue. However, due to the rapid loss of traditional knowledge, at this point it would be necessary to undertake activities on their documentation, along with undertaking a serious attitude on the part of the society towards this resource they have.

2.19. AICHI TARGET 19: Scientific Knowledge and Technology

Within their Fourth National Reports, the majority of the CBD Parties have listed the activities needed for monitoring and research, but most of them has reported that the lack of relevant data or difficulties in accessing relevant information are barriers to implementation of the CBD targets.

Actions towards achieving Aichi Target 19 include encouraging new research, developing new technologies and improving the monitoring of biological diversity. Therefore, achieving this target will require substantial investment in global and national biological diversity monitoring networks and investment in numerous research studies.

2.19.1. Science and Research Activity

The Framework Law on Basics of Scientific Research Activities and the Coordination of Internal and International Scientific Research Cooperation of BiH (Official Gazette of BiH, no. 43/09) defines that for the purpose of planning and implementation of strategic objectives, directions and priorities of scientific and technological development, BiH should adopt and implement the Scientific Development Strategy in BiH (2010-2015). The Council of Ministers of BiH adopted the Strategy on December 22, 2009.

In November 2008, BiH signed the Memorandum on Scientific and Technical Cooperation with the EU and obtained the status in the Seventh Framework Program (FP7)²¹. Since May 2009, BiH has been a full member of COST, an intergovernmental framework for European cooperation in science and technology. BiH also has the state of a national information point in the EUREKA initiative, the Pan-European Network for Market-Oriented Industrial Research and Development.

The scientific research work in BiH is in a transitional phase. Actions are needed at all levels in BiH as well as at the international level, in both the financial and professional terms.

The position of science and scientific research organizations in BiH is best described by the fact that so far no inventory has been made of the available capacities, their legal status, staffing, financing methods or technical equipment. In the absence of such an inventory, there is no information available for scientific research activity for CBD issues in BiH.

According to the Science Development Strategy in BiH (2010-2015), the scientific research activity in BiH is characterized by:

- Lack of trained and accredited institutions for scientific research activity and a small number of researchers;
- Low level and unfavorable structure of the funding sources - the total funds for the financing of science are below 0.1 % of the GDP; the share of the state is over 80 %, the share of the business sector is about 10 %, and the share of the educational institutions and others is below 10 %;
- A plethora of higher education institutions that has also produced certain lobbying behavior at the expense of specialized scientific research institutions;
- Low mobility of researchers and their major concentration in the entity centers;

²¹ FP - Framework Program for Research and Technological Development is the EU program for financing of research and technological development. Partners from BiH have successfully participated in previous framework programs of the EU, such as: FP5 (implemented 14 projects) and FP6 (implemented 43 projects) and were limited solely to the specific programs of scientific - technological cooperation, while in FP7 have the opportunity to be involved in all research activities. So far in FP7, 7 projects are successfully completed and 22 projects are under implementation (link: www.ncp-fp.ba/ba/ucisce-bih-u-fp7.aspx accessed September 8, 2014). In these projects, the following universities participated among others: University of Sarajevo, University of Banja Luka, and the University "Džemal Bijedić" in Mostar.

- Low competitiveness of scientific papers by numbers and quality;
- Low level of transformation of scientific research into innovation and products of high added value;
- Inability to organize public scientific events;
- Modest or almost no publishing efforts, lack of journals and periodicals in the libraries - low interest among young people in post-graduate studies and doctoral research studies (future doctoral studies) and in the work of the research field;
- Very scarce statistics on scientific research results based on relevant international standards, etc.

2.19.2. Financing of Scientific Research Work and Technological Development

Financing of scientific research work and technological development in BiH is implemented at a number of levels, specifically:

- At the state level, the funds for these purposes are allocated only the Ministry of Civil Affairs, all scientists and research institutions of BiH are invited to take part in the tender;
- The BiH entities allocate some 0.07 % to 0.1 % of the GDP;
- The competent entity ministries have supported the co-financing of different programs: programs for basic, applied and development research; training programs and training of personnel and encouragement for gifted young people to become involved in scientific research (postgraduate and doctoral studies, preparation of theses and dissertations); programs for issuance of scientific publications and issuance of reference scientific journals; programs for international scientific cooperation and visits to scientific events abroad; programs for providing equipment and conditions for scientific research; programs for the promotion activities of scientific and professional societies; organization of scientific events; subscriptions to scientific databases in electronic form and the purchase of scientific literature; the work of the Republic Council for Science and Work of Expert Committees (RS); support to the work of universities and scientific institutions; participation in scientific events, etc.;
- Scientific research institutions and universities are financed through international projects, for example, the TEMPUS program, and thus funds are provided for research and scientific work and development (Strategy for Development of Science in BiH 2010-2015).

Also, in the period of 2008-2013, funds for environmental protection have funded a number of scientific research projects in the field of protection of natural biological diversity (Annex 2 to the Fifth National Report of BiH to the CBD, 2014).

2.19.3. State of Infrastructure and Institutions in the Domain of Science

According to the conclusions from the adopted Strategy for Development of Science in BiH (2010-2015) on the state of scientific research and technology in BiH, the research and development infrastructure in BiH is not at a satisfactory level.

The research and development infrastructure in BiH is characterized by the following:

- The largest part of nowadays existent research and development infrastructure is located at public universities, and this is where all the scientific research work for BiH is mostly done;
- Publicly and privately scientific and research-development institutes in most cases do not have the necessary materials, technical conditions and staff for the tasks they are registered for, i.e. they do not work on developing new products and new technologies;
- Most of the scientific and research and development institutes that have significantly contributed to the technological development of BiH was destroyed during the war (1992-1995);
- The research equipment is purchased without a common plan and a general strategy (problems related to incompatibility, inconsistency and outdated equipment are constantly increasing);
- Due to new public procurement legislation, procurement of equipment is very complicated, causing the least expensive options to be selected, while the compatibility and quality is often neglected;
- Insufficient equipment at most scientific laboratories prevents intensive development of cooperation between institutes and the industry.

2.19.4. Status of Scientific Research Activity

Academies of Science

The following highest-level scientific institutions operate in BiH: Academy of Science and Arts of BiH (ANUBiH) in Sarajevo, and Academy of Science and Arts of the RS in Banja Luka. Both academies have departments for natural sciences.

Institutions of Higher Education

Information on institutions of higher education and their curricula for environmental protection domain, including biological diversity, are described in more detail under Aichi Target 1.

Institutes

Currently, the Register of Scientific Research Institutions of the RS, maintained at the Ministry of Science and Technology, contains entries of 21 institutes meeting the requirements for scientific activity in line with the Law on Scientific Research Activity and Technological Development (Official Gazette of the RS, no. 6/12), specifically: 4 public institutes established by the RS Government, 1 institute within a public university, 10 institutes within public faculties, 2 institutes within private universities, and 4 privately owned institutes.

In the FBiH, there are 20 active institutes within faculties or universities, and 10 institutes in the capacity of autonomous legal entities. The problems of registration of institutes in the FBiH is much more complex than in the RS, because the overall licensing and entries into the registry of scientific research institutions have not been updated.

The number and geographical distribution of institutes and laboratories relevant to biological diversity issues in BiH is shown in the figure below.

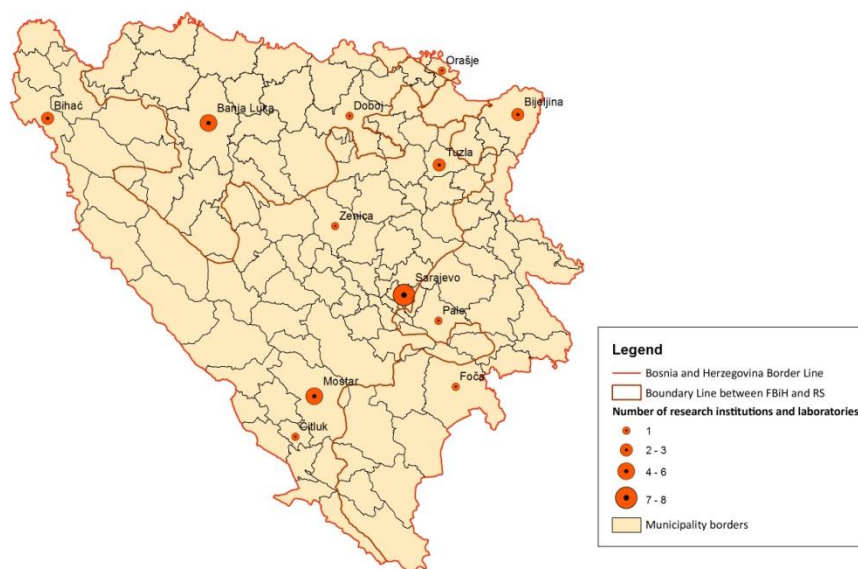


Figure 11: Number of Institutes and Laboratories Relevant to Biological Diversity Issues in BiH
Source: State of Laboratories in BiH, 2010 with Amendments

Table 28: List of Research Institutions and Laboratories Relevant to Biological Diversity Issues in BiH

Name	Ownership	Location
Faculty of Sciences, University of Banja Luka	Public	Banja Luka
Faculty of Agriculture, University of Banja Luka	Public	Banja Luka
Genetic Resources Institute, University of Banja Luka	Public	Banja Luka
Agricultural Institute of RS	Public	Banja Luka
Veterinary Institute of RS „Dr. Vaso Butozan“	Public	Banja Luka
Technological Faculty, University of Banja Luka	Public	Banja Luka
Biotechnical Faculty, University of Bihać	Public	Bihać
Veterinary Institute	Public	Bihać
Agricultural Institute of Una – Sana Canton	Public	Bihać
Veterinary Institute “Teolab”	Public	Bijeljina
Institute for Waters	Public	Bijeljina
Euro-Inspekt d.o.o.	Private	Doboj (and Sarajevo)
Regional Laboratory of the Institute for Plant Protection of the RS	Public	Foča
Agronomy Institute - University of Mostar	Public	Mostar
Agri-Mediterranean Faculty - „Džemal Bijedić“ University	Public	Mostar
Agricultural and Food Faculty - University of Mostar	Public	Mostar
Veterinary Institute of Herzegovina-Neretva Canton	Public	Mostar
Herkon d.o.o.	Private	Mostar
Federal Agri-Mediterranean Institute	Public	Mostar
Agrokontrola d.o.o.	Private	Orašje
Sistem Qualita, S d.o.o.	Private	Pale
Inspekt RGH Sarajevo	Private	Sarajevo
Federal Agricultural Institute	Public	Sarajevo
Faculty of Agriculture and Food Sciences, University of Sarajevo	Public	Sarajevo
Veterinary Station of Canton Sarajevo	Public	Sarajevo
Veterinary Faculty, University of Sarajevo	Public	Sarajevo

Name	Ownership	Location
Institute for Genetic Engineering and Biotechnology	Public	Sarajevo
Technological Faculty, University of Tuzla	Public	Tuzla
Veterinary Institute of Tuzla Canton	Public	Tuzla
Faculty of Sciences (Biology Department) - University of Tuzla	Public	Tuzla
Veterinary Institute of Zenica-Doboj Canton	Public	Zenica

Source: *State of Laboratories in BiH, 2010 with Amendments*

The analysis of the situation related to Aichi Target 19 has shown that the major problem is the lack of a registry of scientific and research institutions, staffing, funding method and technical equipment, particularly in the domain of biological diversity in BiH.

2.20. AICHI TARGET 20: Financial Resources

Aichi Target 20 is aimed at mobilization of financial funds for effective implementation of the Strategic Plan (2011-2020) from all sources. The aforementioned mobilization of funding needs to be in compliance with the consolidated and adopted procedure described in the Strategy for Mobilization of Financial Resources adopted at COP 10. The Strategy contains the process of target financing, indicators, specific activities and initiatives, as well as the method of implementation and supervision of the use of financial funds. The CBD Parties are also required to develop the Resource Mobilization Plan.

The fulfilment of Aichi Target 20 will have implications on the feasibility of achieving the other 19 Aichi Targets described in this document. The mobilization of financial resources is strictly related to Articles 20 and 21 of the CBD, pertaining to financing sources. In accordance with Article 20, the Parties undertake, in accordance with their national plans, priorities and programs, to ensure, according to their capacities, the financial support and to encourage activities that are intended to achieving the CBD targets. Similarly, the more developed and richer Parties will provide new and additional financial resources to the developing Parties in order to enable them to fully meet the rising costs of performance of the obligations arising from the CBD. Pursuant to Article 21 of the CBD, it is necessary to establish a mechanism to ensure the financial resources for the developing Parties. The mechanism should function under the authority and guidance of the CBD Parties, which will determine the policy, strategy, program priorities and eligibility criteria regarding access to and utilization of such resources.

As outlined in the previous NBSAP BiH (2008-2015), the current economic situation, along with the accompanying social effects, does not allow BiH to use its own resources to ensure full and continuous financial support to the biological diversity conservation system. In addition, the fact is that so far poorly interconnected flows of finance have been existing within BiH for the purpose of biological diversity conservation, making it difficult to achieve this goal.

The implementation of the Strategy for Mobilization of Financial Resources should include the establishment and expansion of financial flows to support the conservation of biological diversity in BiH. In BiH, entity funds exist for environmental protection that are regulated by the Law on the Environmental Protection Fund of the FBiH (Official Gazette of the FBiH, no. 33/03) and the Law on the Fund and Financing of Environmental Protection of the RS (Official Gazette of the RS, no. 117/11

and 63/14) and by other by-laws, but these are not sufficient to finance the implementation of the Strategic Plan (2011-2020).

The activities in the field of nature protection under the jurisdiction of the RS authorities are performed by the MPPCEE. The Department of Environmental Protection carries out the activities involving integral protection and improvement of environmental protection, research, planning and management of the environmental protection measures, protection of natural resources, and of natural and cultural heritage. Excluding the budget of the EPEEF RS, the MPPCEE RS budget for 2012 amounted to 3,936,000 KM (Council of Ministers of BiH, 2012).

In the FBiH, activities related to environmental protection are the responsibility of FMET via the Department for the Conservation of Biological and Landscape Diversity and the Department for Preservation of Natural Values and Eco-Tourism. In accordance with the Environmental Protection Strategy Action Plan of the FBiH (2008-2018), the allocation for the conservation of biological diversity from the FBiH budget was 500,000 KM for 2010, 1,000,000 KM each for 2011 and 2012. For the same purpose, the planned allocations from the FBiH budget for 2013 are in the amount of 1,150,000 KM (Council of Ministers of BiH, 2012). Of the above listed funds, 500,000 KM were allocated in 2011 and 2012 for the NP "Una", and 500,000 KM was allocated as assistance to other protected areas in the FBiH (Council of Ministers of BiH, 2012).

In addition to these funds, funds from international donors have been used as well in BiH, and a portion of these funds is directed toward 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 partly also include the area of biological diversity protection, but there are no accurate figures on how much money was invested/earmarked exclusively for this domain.

In the area of environmental protection, the MoFTER cooperates with the Entity Ministries of Environment, Agriculture, Water and Forestry, as well as the relevant agencies for water and the BD, while all these institutions have their coordination meetings with donors. Donors that are active in the environmental sector regularly attend the meetings of the Donor Coordination Forum (DCF) organized by the Ministry of Finance and Treasury/Sector for Coordination of International Aid. As for the forestry sector, there is no formal coordination mechanism at the BiH level.

All participants of the environmental protection sector support the establishment of a formal coordination mechanism at the BiH level, led by the MoFTER and with the support of the Ministry of Finance and Treasury/Sector for Coordination of International Aid, in order to better harmonize and coordinate donor initiatives. However, all stakeholders have emphasized that at the current stage the MoFTER has insufficient capacity for the implementation of this process (Donor Mapping Report, 2011-2012).

The amount that donors have earmarked for the environmental sector and the sector of agriculture and forestry is lower than in other sectors. However, it may be observed that the allocations for these two sectors had nevertheless increased in 2012 when compared to 2011 (Chart 12).

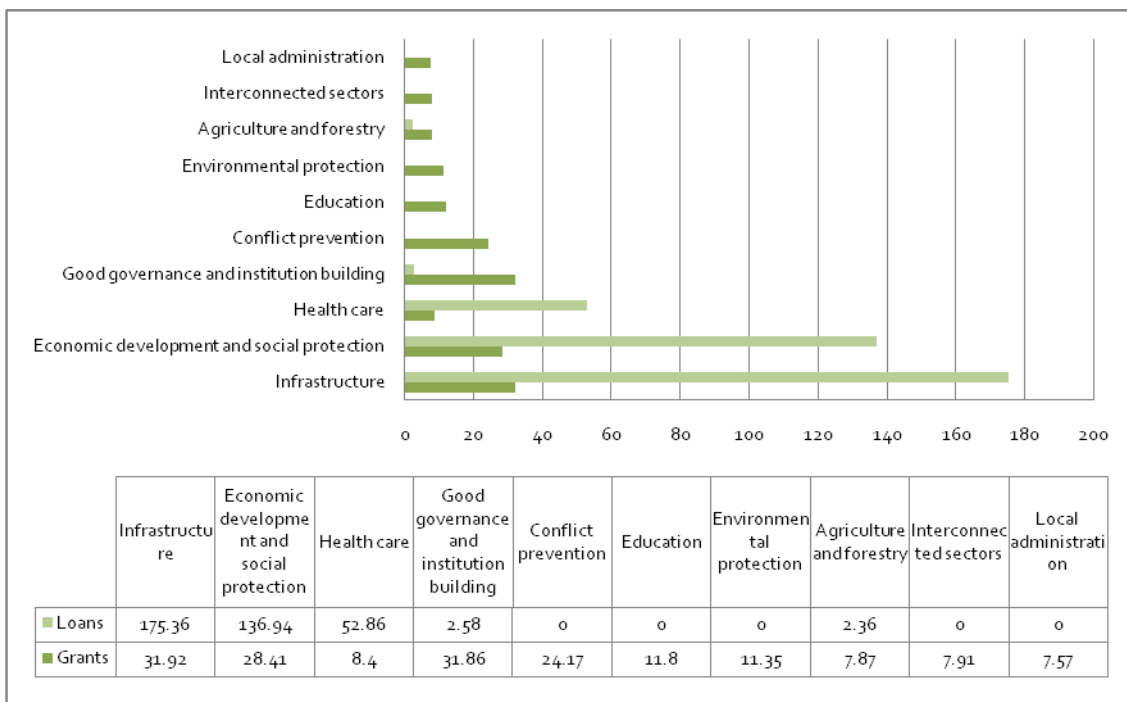


Chart 12: ODA by Sectoral Shares in 2011. – Grants in Proportion to Loans (in million euro)
 Source: Donor Mapping Report, 2011-2012

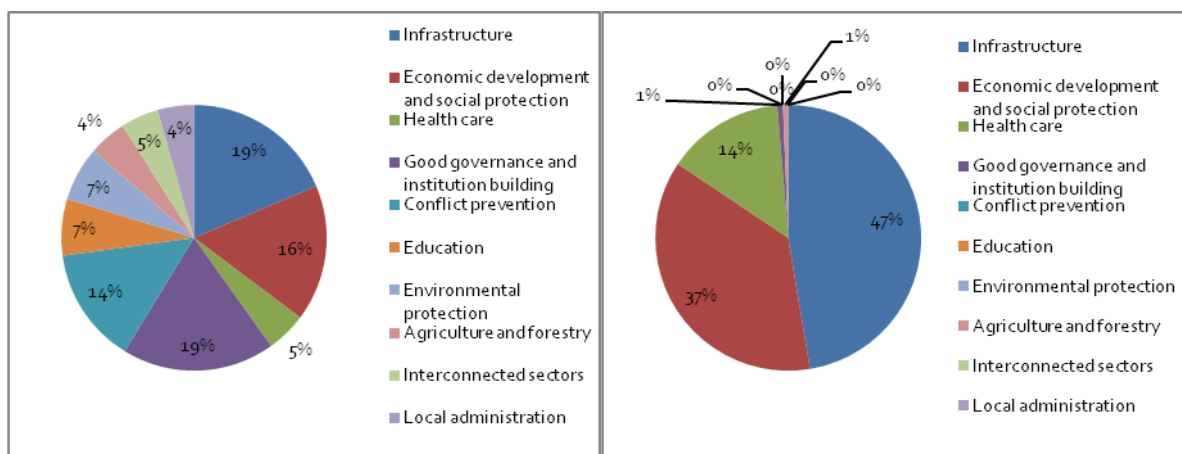


Chart 13: The Shares of ODA Funding by Sectors in 2011 (left) and in 2012 (right) (%)
 Source: Donor Mapping Report, 2011-2012

The total allocations of the DCF members for the needs of the environmental protection sector amounted to 11.35 million euro for 2011 (in grants), whereas for 2012 they amounted to 12.79 million euro (in grants). The DFC members active in the environmental protection sector in the period of 2011 - 2012 were: EU/EC, UNDP, World Bank, Germany, Italy/IC, Czech Republic, Norway and the Netherlands (Chart 14) (Donor Mapping Report, 2011-2012).

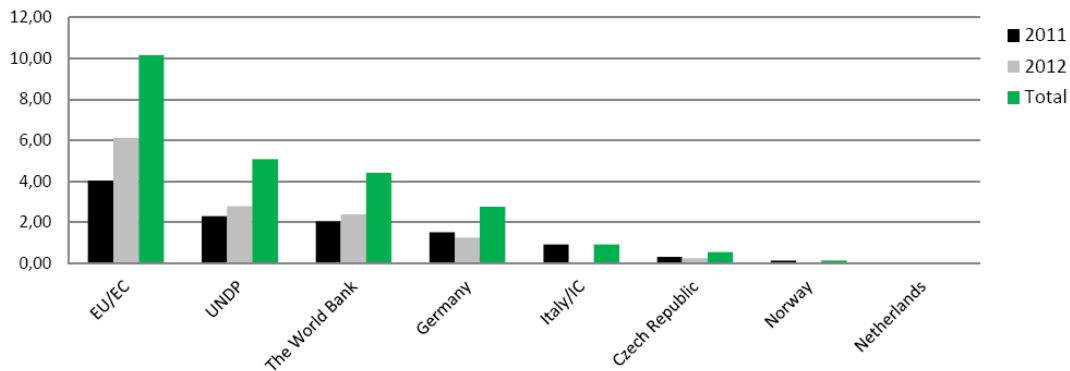


Chart 14: Flows of Aid from Donors/IFIs for the Environmental Protection Sector 2011-2012 (in million euro)
 Source: Donor Mapping Report, 2011-2012

A decrease official development aid/funding (ODA) was observed in 2011 when compared to 2009, when the funding allocations were the highest, that is, the allocations decreased by 8.73 million euro. Nevertheless, a slight increase was recorded in 2012 in comparison with 2011 in the amount of 1.44 million euro, wherein it is important to note that the amount of ODA funding pertains to the first half of 2012.

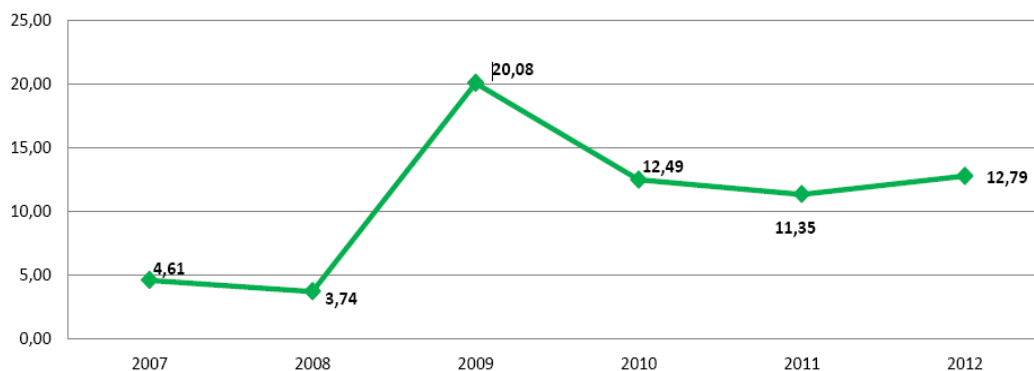


Chart 15: Distribution of Aid from Donors/IFIs for the Environmental Protection Sector 2007-2012 (in million euro)
 Source: Donor Mapping Report, 2011-2012

Among the funds for the environmental protection sector, it is important to emphasize the GEF (World Bank as the donor with 2,400,750 euros), which, through the implementation of the "Forest and Mountain Protected Areas" Project, aims to strengthen the institutional and technical capacity for sustainable management of protected areas and natural resources and the expansion of the network of forest and mountain protected areas in BiH. The Project consists of three components:

- Development of protected areas;
- Capacities and support for protection of biological diversity;
- Local initiatives for protection of biological diversity.

In addition to this Project, GEF (World Bank as the donor) has also funded the implementation of "Project for Management of the Neretva and Trebišnjica" (over the period of 2008-2013)²². The Project aims to establish mechanisms for effective and equitable distribution among the users of the

²² The Project has subsequently been extended for BiH until June 2015.

Neretva and Trebišnjica river basin at a cross-border level. Another objective of the Project is to improve the ecosystem and biological diversity of the basins through improved management of water resources. The amount of funding allocated by the World Bank for the implementation of this Project is 4,235,750 euros (Donor Mapping Report, 2011-2012).

The DCF members active in the agriculture and forestry sector in the period of 2010-2011 were: USA/USAID, World Bank, Sweden/SIDA, EU/EC, Italy/IC, Czech Republic, Japan/JICA, and Norway (Chart 16) (Donor Mapping Report, 2011-2012).

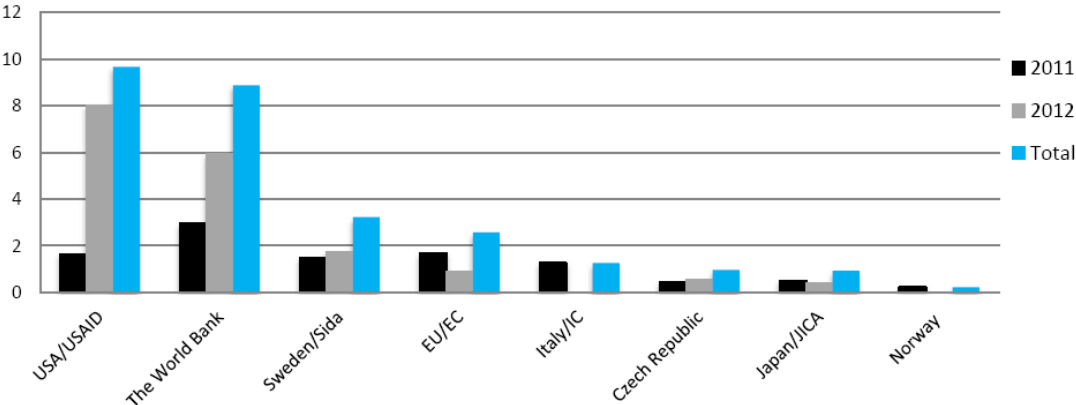


Chart 16: Flows of Donor Aid in the Agriculture and Forestry Sectors 2011-2012 – Grants and Loans (in million euro)
 Source: Donor Mapping Report, 2011-2012

The total allocations of the DCF members for the needs of the agriculture and forestry sector amounted to 10.23 million euro (7.87 million euro in grants and 2.36 million euro in loans) for 2011, whereas for 2012 the allocations amounted to 17.60 million euro (12.87 million euro in grants and 4.72 million euro in loans).

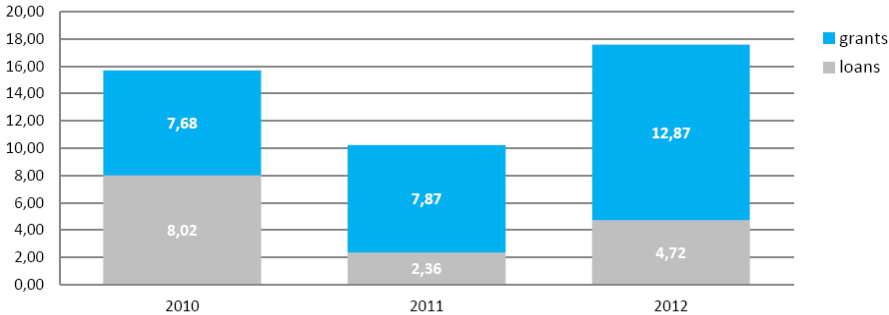


Chart 17: The Shares of Grants and Loans in the Agriculture and Forestry Sectors 2010-2012 (in million euro)
 Source: Donor Mapping Report, 2011-2012

The total allocations by DCF members for the agriculture and forestry sector were 10.23 million euro (7.87 million euro in the form of grants and 2.36 million euro in the form of loans) in 2011, whereas in 2012 they were 17.60 million euro (12.87 million euro in the form of grants and 4.72 million euro in the form of loans). There are oscillations and imbalances in the allocation of ODA funding within the agriculture and forestry sector. There was an obvious significant increase in investment in 2009, with a sharp decrease in 2010, and a somewhat milder fall in 2011 (Donor Mapping Report, 2011-2012).

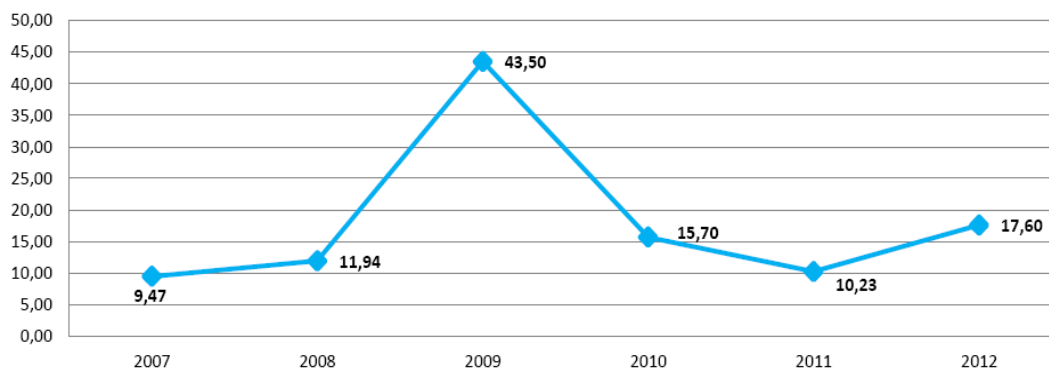


Chart 18: Distribution of Aid from Donors/IFIs for the Agriculture and Forestry Sectors 2007-2012 (in million euro)
 Source: *Donor Mapping Report, 2011-2012*

As for forestry, it is important to note that in the period of 2011-2012 this subsector was one of the areas least financed in BiH. In the forthcoming period, the World Bank is planning on providing support to this subsector through Project for „Management of Sustainable Forest and Abandoned Land“, which is in preparation. The World Bank will also continue providing support for increase of the size of protected areas in BiH and for their management, through implementation of the Project “Protected Forest and Mountain Areas” (Donor Mapping Report, 2011-2012).

The newest data related to ODA funding are found in the publication „*Donor Mapping Report*“ for 2013, which shows allocations in the environment and climate change sector. In 2013, 165.48 million euro were earmarked for this sector (of which 37.03 million euro in the form of grants, and 128.45 million euro in the form of loans), whereas the allocations were 48.24 million euro (of which 24.22 million euro in the form of grants, and 24.02 million euro in the form of loans).

The DFC members active in the environment and climate change sector in 2013 were: Germany, EBRD, EU, World Bank, Sweden/Sida, UNDP, the Netherlands, Czech Republic, USA/USAID, Japan/JICA, Slovenia, Norway, and Hungary. The allocations in the environment and climate change sector pertain to two subsectors, and these are: transposition and implementation of the EU *Acquis* in the domain of environment and of the other international commitments and improvement of environmental infrastructure.

Chart 19 shows the flow of earmarking and allocation of ODA funding in the environment and climate change sector in the period from 2007 to 2013. Evidently, the funds earmarked were increasing year by year until 2010, following which there was a decrease in the funding earmarked in this sector, particularly in 2012 (almost 100 million euro less than in 2011). Only in 2013, the funding allocated for the environment and climate change sector was increased (165.48 million euro).

As for the funding allocated to this sector, save for the variations that happened over the period from 2007 to 2009, the funding allocated had similar values and ranged from 48.24 million euro (2013) to 55.24 million euro (2010).

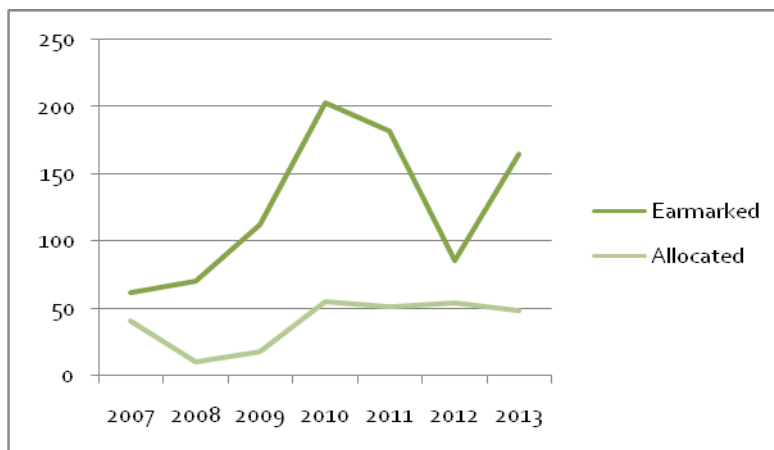


Chart 19: ODA Funding Earmarked and Allocated for the Environment and Climate Change Sector in the Period of 2007 – 2013 (in million euro)

Source: Donor Mapping Report, 2013

In order to achieve Aichi Target 20, it is needed to establish the system of monitoring the financial flows aimed at conservation of biological diversity in BiH, as invested by state institutions, private entrepreneurs, foreign investments and foreign donors.

3. NATIONAL TARGETS AND INDICATORS FOR BIOLOGICAL DIVERSITY

3.1. National Targets

The NBSAP BiH (2015-2020) contains a total of 21 national targets for biological diversity, distributed under 5 global strategic goals (A, B, C, D and E) as identified in the Strategic Plan 2011-2020.

The establishment of adequate national targets, in line with the Strategic Plan 2011-2020, has been conducted in application of the SMART methodology ensuring that all of the defined targets be specific (S), measurable (M), achievable (A), realistic/relevant (R) and time-bound (T).

The established national targets for biological diversity in BiH are shown in Table 29.

3.2. Indicators

Indicators are used to monitor the state of biological diversity. Indicators are defined as „a measure or metric based on verifiable data that conveys information about more than the subject itself” (BIP and UNEP-WCMC, 2010).

Given that the CBD Parties have committed that under the implementation process of the Strategic Plan 2011 – 2020, i.e. the NBSAP document review process, they would establish their national and targets, it is also necessary to create and propose the indicators for monitoring of the implementation and impact of the established national targets.

In order to assist the CBD Parties in the NBSAP review process and in creation of indicators for national and global targets, the BIP has been formed. The BIP has supported the development of the proposed indicators for each of the Aichi Targets, which constitute primary mechanisms for monitoring of progress of the Strategic Plan 2011 – 2020 at a global level.

Given that national targets may differ from the Aichi Targets themselves, thus the proposed indicators should also be tailored to the situation and capacities of states (BIP and UNEP-WCMC, 2010). There may be one or more than one proposed indicators, depending on the valid quantitative and qualitative data available in the state.

The framework for development of biological diversity indicators proposed by the BIP has been used in the development of the NBSAP BiH (2015 – 2020) (

Figure 12). The framework is divided into three main stages:

- **Purpose** – actions required for the selection of successful indicators;
- **Development** – essential actions for generation of the indicators;
- **Permanency** – mechanisms to ensure the continuity and sustainability of the indicators.

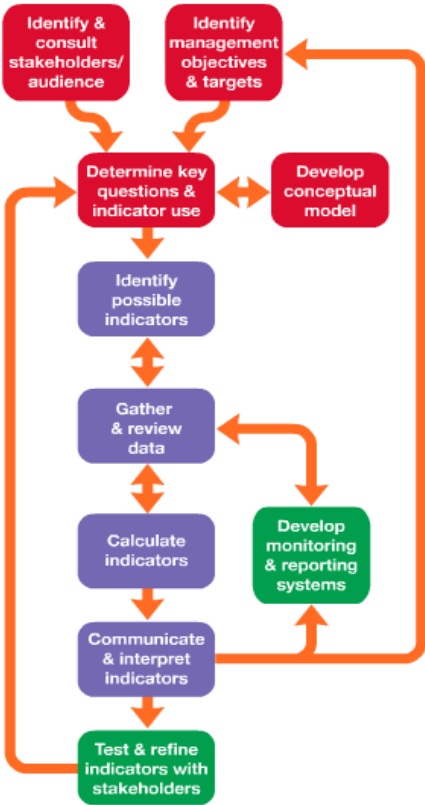


Figure 12: Methodological Framework for Development of Indicators

Table 29 shows the established national targets and proposed indicators for NBSAP BiH (2015-2020).

Table 29: National Targets and Proposed Indicators for NBSAP BiH (2015-2020)

National Targets	Proposed Indicators
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	<ul style="list-style-type: none"> ▪ The number of projects related to protection of biological diversity ▪ A trend of reporting biological diversity notions in the media
2. By 2020, integrate biological diversity values into development strategies and strategic plans, with an emphasis on rural development	<ul style="list-style-type: none"> ▪ The number of strategic documents that have integrated biological diversity values into strategic plans
3. By 2020, reduce negative and increase positive incentives and subsidies in order to conserve biological diversity	<ul style="list-style-type: none"> ▪ The number and types of positive and negative incentives and subsidies for biological diversity
4. By 2019, prepare and adopt plans for sustainable production and consumption of natural resources	<ul style="list-style-type: none"> ▪ The number of adopted sectoral plans for sustainable use of natural resources ▪ The number of passed laws and bylaws in the domain of biological diversity or other closely related domains
GLOBAL STRATEGIC GOAL B: Reduce the direct pressures on biological diversity and promote sustainable use	
5. By 2020, prepare and implement sustainable management programs for all fishing waters (fisheries basis)	<ul style="list-style-type: none"> ▪ Proportion of fishing waters with implemented sustainable management plans ▪ The trend of population density for indigenous, endemic and invasive fish species
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)	<ul style="list-style-type: none"> ▪ The trend of population density for commercially significant fish species in water courses ▪ Number of fish farms
7. By 2020, certify all state-owned forests in BiH	<ul style="list-style-type: none"> ▪ Areas of certified state-owned forests
8. By 2020, establish and develop a system for sustainable agricultural production, especially organic and integral production, and conservation and breeding of indigenous species	<ul style="list-style-type: none"> ▪ Areas under organic and integral production
9. By 2020, establish a system for treatment of industrial and utility wastewaters and monitoring of pesticide and fertilizer consumption	<ul style="list-style-type: none"> ▪ The quality and types of pesticides and fertilizers used ▪ The number of wastewater treatment systems installed
10. By 2018, prepare strategies for invasive species	<ul style="list-style-type: none"> ▪ Number of strategies implemented 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 BiH (canyon, mountain, alpine and wetland ecosystems, karst fields and alluvial plains) in compliance with the applicable spatial planning documents	<ul style="list-style-type: none"> ▪ Percentage of each habitat under protection status
12. By 2020, complete the inventory of: (i) flora, fauna and fungi in BiH; (ii) ecosystems and types of habitats in BiH	<ul style="list-style-type: none"> ▪ The number of species and ecosystems in the inventory
13. By 2020, develop the red books of plants, animals and fungi, and adopt action plans for protection of the most endangered taxa	<ul style="list-style-type: none"> ▪ The number of measures implemented for protection of endangered taxa ▪ The number of species under protection
14. By 2020, prepare and implement <i>in situ</i> and <i>ex situ</i> programs for protection of domestic varieties, breeds and their animal relatives, including their inventory and establishment of indigenosity parameters	<ul style="list-style-type: none"> ▪ The number of local sorts and breeds and their wild relatives under <i>ex situ</i> and <i>in situ</i> protection

National Targets	Proposed Indicators
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	<ul style="list-style-type: none"> ▪ Published reports of the benefits from forest, agricultural and water ecosystems ▪ Number of environmental permits and supervisory inspections
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 %	<ul style="list-style-type: none"> ▪ The number of restored lakes ▪ The size of urban green areas ▪ Volume of forests by categories
17. By 2018, prepare the legislation and establish the conditions for ratification and implementation of the Nagoya Protocol	<ul style="list-style-type: none"> ▪ The number of legislative documents harmonized with the requirements of the Nagoya Protocol
GLOBAL STRATEGIC GOAL E: Enhance implementation through participatory planning, knowledge management and capacity building	
18. By 2017, establish centers for preservation and implementation of traditional knowledge and practices, particularly in rural areas of interest	<ul style="list-style-type: none"> ▪ The number of scientific and expert references on traditional knowledge and practices
19. By 2020, strengthen the role of the scientific research and professional institutions, NGO sector and media including improvement of scientific technologies	<ul style="list-style-type: none"> ▪ A registry of scientific research and expert institutions, NGOs and media in the domain of biological diversity
20. By 2017, prepare and adopt the strategy for mobilization of financial resources for conservation of biological diversity	<ul style="list-style-type: none"> ▪ Earmarked financial resources (local and international) for protection and sustainable use 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	<ul style="list-style-type: none"> ▪ The number of cross-border cooperation projects aimed at protection and sustained use of biological diversity

3.3. Prioritization of National Targets

The fifth NBSAP stakeholder meeting established five priority national targets. One priority each that requires attention as soon as possible has been selected from every strategic goal (A, B, C, D and E). The five priority national targets for biological diversity in BiH are:

1. By 2020, increase the public awareness level in the field of biological diversity protection (A);
2. By 2020, establish a system for treatment of industrial and utility wastewaters and monitoring of pesticide and fertilizer consumption (B);
3. By 2020, map and urgently protect the specific biological diversity of BiH (canyon, mountain, alpine and wetland ecosystems, karst fields and alluvial plains) in compliance with the applicable spatial planning documents (C);
4. 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 (D);
5. By 2017, prepare and adopt the strategy for mobilization of financial resources for conservation of biological diversity (E).

It is important to note that the priorities have been established and based on the sectoral and multi-disciplinary analysis and transparency, and on democratic principles involving the participation of all stakeholders.

4. ACTION PLAN FOR THE PERIOD OF 2015-2020

In line with the human, technical and financial capacities available in BiH, the Action Plan has been developed to define measures for each national target that need to be implemented in the next five-year period for the purpose of protection of biological diversity and its sustainable use. The Action Plan also contains other components, such as timelines, activity levels, implementation holder(s), other participants and sources of funding at local and international levels for each measure defined.

It is necessary to point out that during the NBSAP BiH (2008-2015) revision, it was perceived that the implementation of the earlier Action Plan was questioned due to shortage of funding. Therefore, the RS adopted the document titled Strategy for Protection of Nature of the RS (2011), but without an Action Plan, because no funding for their implementation has been secured.

Table 30 shows the Action Plan for the period of 2015-2020.

Table 30: Action Plan for the Period of 2015-2020

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
1	By 2020, increase the public awareness level in the field of biological diversity protection	1.1. Public surveys and media monitoring	2015-2020	Entity, District, Cantonal, Municipal	NGO sector, media (printed and electronic), scientific research institutions/agencies	Competent ministries and entity, district, cantonal and municipal sectors/departments for protection of environment, education, culture and science	
		1.2. Enable securing of financial resources for biological diversity protection projects	2015-2020	Entity, District, Cantonal, Municipal	Scientific research and professional institutions/agencies, NGO sector	Competent ministries and entity, district, cantonal and municipal sectors/departments for protection of environment, agriculture, water management and forestry	Entity budgets, BD budget, budgets of cantons and municipalities, entity funds for protection of environment, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		1.3. Formation of a database with implemented projects	2016	State, Entity, District, Cantonal, Municipal	FMET	All institutions providing financial resources for CBD implementation projects and beneficiaries of the funding	
		1.4. Prepare and adopt of the CEPA Strategy for BiH	2017	State, Entity, District	Competent ministries and entity and district sectors/departments for protection of environment, education, science and culture	Scientific research and professional institutions, NGO sector	
2	By 2020, integrate biological diversity values into development strategies and strategic plans, with an emphasis on rural development	2.1. Prepare the Study on Economics of Ecosystems and Biodiversity (TEEB)	2019	Entity, District	Competent ministries and entity/district sectors/departments for protection of environment, agriculture, water management and forestry	Federal ministry of development, entrepreneurship and crafts, Ministry of Commerce of the RS, competent entity ministries for energy, industry and mining, scientific research and professional institutions/agencies, NGO sector	Entity budgets, BD budget, and funding from various international funds, programs, initiatives and implementation agencies (Annex 3)
		2.2. Harmonize the existing and new development strategies,	2016-2020	Entity, District, Cantonal, Municipal	Competent ministries and entity, district, cantonal and municipal sectors/departments for	Competent ministries and entity, district, cantonal and municipal sectors/departments for agriculture, water management,	Entity budgets, BD budget, budgets of cantons and municipalities, and

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
		including poverty reduction, with national biological diversity targets			spatial planning and protection of environment	forestry, energy, industry, mining and transport	funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		2.3. Integrate national biological diversity targets into existing and new spatial plans		Entity, District, Cantonal, Municipal	Competent ministries and entity, district, cantonal and municipal sectors/departments for spatial planning and protection of environment, cantonal institutes	Competent ministries and entity, district, cantonal and municipal sectors/departments for agriculture, water management, forestry, energy, industry, mining and transport	Entity budgets, BD budget, budgets of cantons and municipalities
3	By 2020, reduce negative and increase positive incentives and subsidies in order to conserve biological diversity²³	3.1. Define and calculate positive and negative incentives and subsidies	2016	State, Entity, District, Cantonal	MoFTER, competent ministries and entity, district, and cantonal sectors/departments for protection of environment		Entity budgets, BD budget, cantonal budgets, entity funds for protection of environment
3.2. Enable securing of financial resources for positive incentives and subsidies		2016-2020	Entity, District, Cantonal	Competent ministries and entity, district, and cantonal sectors/departments for protection of environment	Competent ministries and entity, district and cantonal sectors/departments for agriculture, water management, forestry, energy, industry, mining and transport, competent inspections, entity funds for environment	Entity budgets, BD budget, cantonal budgets, entity funds for environment, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)	
3.3. Introduce the monitoring system for positive and							Entity budgets, BD budget, cantonal budgets, entity funds for environment, and

²³ Currently there is no official definition of harmful or negative subsidies for biological diversity. However, in 2005, the Organization for Economic Cooperation and Development (OECD) adopted the definition used by analysts. According to the aforementioned definition, a harmful subsidy for biological diversity is *the result of government action that favors consumers and producers so they can supplement their revenues or reduce their costs, while at the same time discriminating the environmental protection policy. The harmful (negative) subsidies increase the level of waste, pollution and exploitation of natural resources.*

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
		negative incentives and subsidies, and prepare annual reports					funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
4	By 2019, prepare and adopt plans for sustainable production and consumption of natural resources	4.1. Establish a functioning institutional and legal framework for sustainable production and consumption of natural resources	2017	Entity, District	Competent ministries and entity and district sectors/departments for agriculture, water management and forestry	Competent ministries and entity and district sectors/departments for protection of environment, energy, industry, mining, entity funds for environment, entity institutes for statistics, scientific research and professional institutions/agencies	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		4.2. Draft and adopt action plans for sustainable production and consumption of natural resources	2019		Competent ministries and entity and district sectors/departments for agriculture, water management and forestry, Entity institutes for statistics	Competent ministries and entity and district sectors/departments for protection of environment, energy, industry, mining, entity funds for environment, NGO sector, scientific research and professional institutions/agencies	
5	By 2020, prepare and implement sustainable management programs for all fishing waters (fisheries basis)	5.1. Draft programs for sustainable management of all fishing waters	2015-2017	Entity, District, Cantonal, Municipal	Competent ministries and entity, district, cantonal and municipal sectors/departments for agriculture, water management and forestry	Agencies in charge of water basins, sports fishing associations, other scientific research and professional institutions/agencies, NGO sector	Entity budgets, BD budget, budgets of cantons and municipalities, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		5.2. Implementation of programs for sustainable management of all fishing waters	2018-2020			Agencies in charge of water basins, sports fishing associations, other scientific research and professional institutions/agencies, NGO sector, competent inspections	
6	By 2019,	6.1. Map areas and	2017	Entity, District,	Competent ministries and	Entity institutes for statistics,	Entity budgets, BD

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
7	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)	determine commercially significant species for ranching and breeding		Cantonal, Municipal	entity, district, cantonal and municipal sectors/departments for agriculture, water management and forestry	scientific research and professional institutions/agencies, NGO sector	budget, budgets of cantons and municipalities, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		6.2. Prepare and implement strategies for development of aquaculture and ranching of commercially significant species	2019	Entity, District	Competent ministries and entity and district sectors/departments for agriculture, water management and forestry		Electric power companies in BiH, entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		7.1. Passage/adoption of the Law on Forestry of FBiH	2016	Entity	FMAWMF	Competent cantonal ministries for agriculture, water management and forestry, logging companies, scientific research and professional research institutions/agencies, NGO sector	/
	By 2020, certify all state-owned forests in BiH	7.2. Secure financial resources and involve companies accredited for certification	2018	Entity, District, Cantonal	Competent ministries and entity, district, and cantonal sectors/departments for agriculture, water management and forestry, and logging companies	Scientific research and professional institutions/agencies, NGO sector	Entity budgets, BD budget, cantonal budgets, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		7.3. Ensure controls during the certification implementation process itself	2019		Accredited agency, Competent ministries and entity, district, and cantonal sectors/departments for		

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
					agriculture, water management and forestry, and logging companies		
		7.4. Develop forest certification schedule plans	2019		Competent ministries and entity, district, and cantonal sectors/departments for agriculture, water management and forestry, and logging companies	Scientific research and professional institutions/agencies	
8	By 2020, establish and develop a system for sustainable agricultural production, especially organic and integral production, and conservation and breeding of indigenous species	8.1. Adopt the Law on Organic Food Production in FBiH	2016	Entity	FMAWMF	Competent cantonal ministries for agriculture, water management and forestry, Scientific research and professional institutions/agencies, NGO sector	/
		8.2. Analyze the current status and market in the area of organic and integral production					
		8.3. Select potential agencies for certification of organic and integral production	2017	Entity, District	Competent entity and district ministries for agriculture, water management and forestry, and logging companies	Scientific research and professional institutions/agencies, NGO sector	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		8.4. Continually increase incentives and subsidies for organic and integral					

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
		production, and for <i>in situ on farm</i> breeding of indigenous species					and implementation agencies (Annex 3)
		8.5. Draft the action plan for development of organic and integral agricultural production in BiH	2019	State, Entity, District	MoFTER	Competent ministries and entity and district sectors/departments for agriculture, water management and forestry, scientific research and professional institutions/agencies, NGO sector	
9	By 2020, establish a system for treatment of industrial and utility wastewaters and monitoring of pesticide and fertilizer consumption	9.1. Establish the system for prioritization in construction of the largest and most significant treatment facilities	2016	Entity, District	Competent entity and district ministries for agriculture, water management and forestry, and logging companies, agencies in charge of water basins, Entity institutes for statistics	Competent ministries and entity and district sectors/departments for protection of environment, Entity funds for environment, scientific research and professional institutions/agencies	Power companies in BiH, entity budgets, BD budget, Entity funds for environment, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		9.2. Establish wastewater quality monitoring and form databases	2019				
		9.3. Analyze the types and quantities of pesticides and fertilizers used	2016	Entity, District		Scientific research and professional institutions/agencies, NGO sector	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		9.4. Establishment of the system for monitoring of pesticides, fertilizers and soil fertility	2018			Scientific research and professional institutions/agencies	
10	By 2018,	10.1. Identification of	2016	Entity, District,	Competent ministries and	Scientific research and	Entity budgets, BD

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
	prepare strategies for invasive species	species and populations of invasive animals, plants and fungi, and formation of databases		Cantonal	entity, district, and cantonal sectors/departments for protection of environment, agriculture, forestry and water management	professional institutions/agencies	budget, cantonal budgets, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		10.2. Preparation of strategy for invasive species	2017				
		10.3. Formation of the system for monitoring and definition of methods for control of spread of invasive species	2018				
11	By 2020, map and urgently protect the specific biological diversity of BiH (canyon, mountain, alpine and wetland ecosystems, karst fields and alluvial plains) in compliance with the applicable spatial planning documents	11.1. Prepare the analysis (including mapping) of planned protected areas	2016	Entity, District	Competent entity and district ministries and sectors/departments for protection of environment and spatial planning	Institutes for protection of cultural, historical and natural heritage	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		11.2. Start procedures for establishment of protected areas planned in spatial plans, and monitor their progress	2017-2020	Entity, District, Cantonal, Municipal	Competent ministries and entity, district, cantonal and municipal sectors/departments for protection of environment and spatial planning	Institutes for protection of cultural, historical and natural heritage, NGO sector	Entity budgets, BD budget, budgets of cantons and municipalities, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		11.3. Establishment or appointment of existing institutions to	2020	Entity, District, Cantonal	Competent ministries and entity, district, and cantonal sectors/departments for	Scientific research and professional institutions/agencies, NGO sector	Entity budgets, BD budget, cantonal budgets, and funding from various

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
		manage the protected area			protection of environment and spatial planning, agriculture, water management and forestry		international funds, programs, initiatives, and implementation agencies (Annex 3)
12	By 2020, complete the inventory of: (i) flora, fauna and fungi in BiH; (ii) ecosystems and types of habitats in BiH	12.1. Conduct the inventory of ecosystems and types of habitats in BiH 12.2. Conduct the inventory for flora, fauna and fungi in BiH	2018 2020	State, Entity, District, Cantonal	MoFTER, competent ministries and entity, district, and cantonal sectors/departments for protection of environment, agriculture, water management and forestry	Scientific research and professional institutions/agencies, NGO sector	Entity budgets, BD budget, cantonal budgets, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
13	By 2020, develop the red books of plants, animals and fungi, and adopt action plans for protection of the most endangered taxa	13.1. Identify the endangered species and their localities 13.2. Form the <i>in situ</i> and <i>ex situ</i> protection of endangered species 13.3. Completion, adoption and implementation of action plans and red books	2018 2019 2020	Entity, District	Competent ministries and entity and district sectors/departments for protection of environment, agriculture, water management and forestry	Scientific research and professional institutions/agencies, NGO sector	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
14	By 2020, prepare and implement <i>in situ</i> and <i>ex situ</i> programs for protection of domestic varieties, breeds and	14.1. Identification and evaluation of the state of existing indigenous genetic resources	2018	Entity, District, Cantonal	Competent ministries and entity, district, and cantonal sectors/departments for agriculture, water management and forestry, protection of environment, science and technologies	Entity funds for protection of environment, Institutes for genetic resources, NGO sector, other scientific research and professional institutions/agencies	Entity budgets, BD budget and cantonal budgets, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
	their animal relatives, including their inventory and establishment of indigenesness parameters	14.2. Improvement of existing and drafting of new laws and bylaws dealing with genetic resources issues	2015-2017	Entity, District	Competent ministries and entity and district sectors/departments for agriculture, water management and forestry, protection of environment, science and technologies	Institutes for genetic resources, Food Safety Agency of BiH, other scientific research and professional institutions/agencies	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		14.3. Drafting and implementation of programs for sustainable use of genetic resources	2017				
		14.4. Favoring of agricultural practice based on breeding of indigenous domesticated plant varieties and breeds of domestic animals	2016-2020				
15	By 2020, map and evaluate the benefits from forest, agricultural and water ecosystems, and strengthen the environmental permit mechanism and	15.1. Secure human and technical capacities for assessment of ecosystem services in BiH	2017	State, Entity, District	MoFTER, competent ministries and entity and district sectors/departments for protection of environment, agriculture, water management and forestry	NGO sector, scientific research and professional institutions/agencies	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		15.2. Complete the analysis of the state of ecosystem services in BiH	2018-2019				
		15.3. Strengthen the environmental	2016-2020				

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
	supervisory inspection within protected areas, areas of special interest and areas from the Natura 2000 ecological network plan	permit mechanism and supervisory inspection		Municipal	and municipal sectors/departments for protection of environment, competent inspections	sectors/departments for agriculture, water management and forestry	cantons and municipalities, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
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 %	16.1. Establish cooperation and synergy among the relevant institutions	2016-2020	State, Entity, District	MoFTER, competent ministries and entity and district sectors/departments for protection of environment	Competent ministries and entity and district sectors/departments for agriculture, water management and forestry, spatial planning, energy, industry and mining, competent inspections, NGO sector	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		16.2. Secure funding and other capacities for restoration of lakes and existing flood forests, and implement the restoration measures				Competent ministries and entity and district sectors/departments for agriculture, water management and forestry, spatial planning, energy, industry and mining	
		16.3. Conduct forestation of degraded forest ecosystems with indigenous species	2017-2020	Entity, District, Cantonal	Competent ministries and entity, district, and cantonal sectors/departments for protection of environment, agriculture, water management and forestry, spatial planning	NGO sector, scientific research and professional institutions/agencies, local community	Entity budgets, BD budget and cantonal budgets, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		16.4. Secure funding for increase of urban	2018	Entity, District, Cantonal, Municipal	Competent ministries and entity, district, cantonal and municipal	Competent ministries and entity, district, cantonal and municipal sectors/departments for	Entity budgets, BD budget, budgets of cantons and

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEM ENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
		green areas			sectors/departments for protection of environment	agriculture, water management and forestry	municipalities
17	By 2018, prepare the legislation and establish the conditions for ratification and implementation of the Nagoya Protocol	17.1. Harmonize domestic legislation with the Nagoya Protocol requirements	2018	State Entity, District	MoFTER, Food Safety Agency of BiH, Institutes for genetic resources, competent ministries and entity and district sectors/departments for agriculture, water management and forestry, protection of environment	Scientific research and professional institutions/agencies	Entity budgets, BD budget
		17.2. Ratify the Protocol	2019	State, Entity, District	MoFTER	Council of Ministers of BiH	Funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
18	By 2017, establish centers for preservation and implementation of traditional knowledge and practices, particularly in rural areas of interest	18.1. Document traditional knowledge and practices for sustainable use of biological diversity	2015-2016	State, Entity, District	Food Safety Agency of BiH, competent ministries and entity and district sectors/departments for agriculture, water management and forestry, protection of environment, entrepreneurship and crafts	NGO sector, scientific research and professional institutions/agencies, local communities	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		18.2. Establish monitoring of traditional knowledge and practices	2016				

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
19	By 2020, strengthen the role of the scientific research and professional institutions, NGO sector and media, including improvement of scientific technologies	19.1. Ensure maintenance of the CHM website	2015-2020	State, Entity, District	NFP of CHM BiH (need to be appointed by FMET)	Competent ministries and entity and district sectors/departments for protection of environment	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
		19.2. Organization of symposia/conferences in the domain of conservation of biological diversity			MoFTER, scientific research and professional institutions/agencies	NGO sector and media, competent ministries and entity and district sectors/departments for protection of environment	
		19.2. Enhancement of scientific technologies		Entity, District and Cantonal	Competent ministries and entity, district, and cantonal sectors/departments for protection of environment, agriculture, water management and forestry	Scientific research and professional institutions/agencies	Entity budgets, BD budget and cantonal budgets, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
20	By 2017, prepare and adopt the strategy for mobilization of financial resources for conservation of biological diversity	20.1. Prepare and adopt the strategy for mobilization of financial resources	2017	State, Entity, District	MoFTER, Ministry of Finance and Treasury of BiH, competent ministries and entity and district sectors/departments for protection of environment, science and technology	Competent ministries and entity and district sectors/departments for agriculture, water management and forestry, energy, industry, mining, entity funds for environment, scientific research and professional institutions/agencies	Entity budgets, BD budget, and funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)
21	By 2020, establish and strengthen cooperation for improved protection and sustainable use	21.1. Holding of annual meetings between NFPs and scientific community representatives on potential cross-border projects	2015-2020	Regional, State, Entity, District	NFP and scientific community representatives in the West Balkans countries	Other relevant ministries, scientific research and professional institutions/agencies in the domain of biological diversity	Funding from various international funds, programs, initiatives, and implementation agencies (Annex 3)

Br.	NATIONAL TARGET	MEASURES TO IMPLEMENT	IMPLEMENTATION TIMELINE	ACTIVITY LEVELS	IMPLEMENTATION HOLDER(S)	OTHER PARTICIPANTS	SOURCES OF FUNDING
	of biological diversity in the countries of the West Balkans	21.2. Exchange of information, data and good practices in the domain of biological diversity management					

The funding estimate for the proposed measures provided (Table 31) is for the most part based on the comparison of amounts of costs in similar activities implemented. Such information constitutes only an indicative cost estimate, not exact/precise amounts. The costs are provided in convertible marks (KM), where 1 EUR = 1.98 KM, and 1 USD= 1.57 KM according to the exchange rate listing of the Central Bank of BiH (as of December 16, 2014)

Table 31: Description of Measures under the Action Plan

National Target	1. By 2020, increase the public awareness level in the field of biological diversity protection
Measures	1.1. Public surveys and media monitoring
	<p>So far in there has been no research in BiH related to public awareness of citizens or media monitoring in the field of protection of biological diversity. This measure entails two activities: a) surveying the public and b) media monitoring. Public surveys should be carried out by research institutions/agencies, in cooperation with the NGO sector through, online surveys, by telephone, or by direct contact, and the sample should be less than 400. The surveying should be carried out at least two times during the period of 2015-2020, specifically: a) in 2015 and b) in 2020. The aim of the surveys is to identify the current level of public awareness, do a comparative analysis and see the trend of public awareness change. This can also serve as a fundamental basis for the development of the CEPA Strategy of BiH (Measure 1.4.). Media monitoring pertains to the representation of concepts and information related to biological diversity in the media (print and electronic ones) in BiH at all administrative levels. Media monitoring requires for research institutions/agencies to conduct monitoring of least 5 print and 5 electronic media at the same time every year over the period of 2015-2020. <i>Funding estimate:</i> 40,000 KM (15,000 KM for the needs of surveying, and 25,000 KM for the needs of media monitoring over the period of 2015-2020.</p>
	1.2. Enable securing of financial resources for biological diversity protection projects
	<p>During the development process of the Fifth National Report of BiH to the CBD (2014), a significant lack of financial resources and institutional capacity was observed in the progress of implementation of NBSAP BiH (2008-2015). However, this document showed that the NGO sector and scientific research and professional institutions played a key role in the implementation of projects (over 50), and indirectly even in the implementation of the NBSAP BiH (2008-2015). Therefore, the NGO sector, media, scientific research and professional institutions can and must play an increased role in the implementation of projects related to the protection of biological diversity, which also requires allocations of funds on an annual basis. Financial allocations should be increased from year to year, for projects at all levels (entity, district, cantonal and municipal levels). In this regard, in order to facilitate the implementation of this measure, it is essential that professional institutions/agencies or NGO sector organize seminars (at least 2) and round tables (at least 2) for the government representatives at all levels, with a view to inform them about the importance of allocation of funds for biological diversity protection, standardization of project documentation and reports for beneficiaries of the funds, and to provide assistance in completing applications for financing from international funds. All of the above mentioned meetings are aimed at raising awareness among decision-makers in the government (in accordance with the Communication Plan - Implementation Plan in Chapter 5), as well as in decision making to allocate funding that would be directed into priority areas in biological diversity protection. This measure also contributes to Measure 20.1. <i>Funding estimate:</i> 20,000 KM for 2015; a total of 100,000 KM for the period of 2015-2020.</p>
	1.3. Formation of a database with implemented projects
	<p>During the preparation of NBSAP BiH (2015-2020) and the Fifth National Report of BiH to the CBD (2014), the problem was recognized concerning identification and tracking of funds for projects aimed at conserving biological diversity, due to the different forms of reports and project documents or inability to access them. Therefore, the aim of this measure is to establish a database of implemented projects related to the protection of biological diversity. The activities that this measure involves are: a) establish communication between FMET, as the NFP of BiH for the CBD, and relevant institutions at all levels which finance projects through informative and educational meetings (at least 2), and b) development of a database by the FMET. The database should be publicly available online on the CHM website, by the designated CHM NFP. This measure is directly related to Measure 1.2. and contributes to Measure 20.1. <i>Funding estimate:</i> 30,000 KM for 2016 (10,000 KM for informative and educational meetings, and 20,000 KM for database creation).</p>
	1.4. Prepare and adopt the CEPA Strategy for BiH
	<p>At COP-6, the CEPA program was adopted, recognized as a key factor in the implementation of the CBD. The CEPA program is a global initiative that provides support in the development of the CEPA Strategy. The aim of this measure is to prepare and adopt the CEPA Strategy in BiH. The CEPA Strategy in BiH is</p>

	<p>prepared by relevant ministries for protection of environment, education, science and culture at the entity level and district level and it is adopted by the Council of Ministers of BiH. It is also essential that the above said ministries, in cooperation with the NGO sector, develop the promotional materials in terms of raising of public awareness on the importance and future implementation of the CEPA Strategy among the BiH authorities, which needs to be published on the CHM website by the designated CHM NFP.</p> <p><i>Funding estimate:</i> 60,000 KM (50,000 KM for development of the CEPA Strategy, and 10,000 KM for promotional materials) for 2017.</p>
National Target	2. By 2020, integrate biological diversity values into development strategies and strategic plans, with an emphasis on rural development
Measures	2.1. Prepare the Study on Economics of Ecosystems and Biodiversity (TEEB)
	<p>TEEB is a global initiative concerning the economic benefits of biological diversity, including the growing costs of biological diversity loss and ecosystem degradation. The aim of TEEB is for decision-makers to recognize the value of ecosystem services and biological diversity. In BiH, certain information is either or missing or not publicly available, and only some general assessment can be provided on the use of ecosystem services and biological diversity. It is therefore necessary that the ministries responsible for protection of environment in cooperation with the ministries of agriculture, water management and forestry develop the TEEB with the help of Measures 15.1. and 15.2. The competent ministry is responsible to hold 3 consultative meetings with relevant stakeholders from the governmental and non-governmental sectors and determine a plan of work prior to the development of the TEEB.</p> <p><i>Funding estimate:</i> 65,000 KM (50,000 KM for development of the TEEB and 15,000 KM for consultative meetings with stakeholders for 2019).</p>
	2.2. Harmonize the existing and new development strategies, including poverty reduction, with national biological diversity targets
	<p>Prior to the implementation of this measure, it is necessary to first implement Measure 16.1. The working groups formed by sector from Measure 16.1. should do the GAP analysis and determine the extent to which values, i.e. the national targets on biological diversity, are integrated into each of the existing and new strategies. After the adoption of these strategies, it is also necessary to monitor their implementation through the annual reports prepared by the working groups by sectors. The reports are to be sent to FMET, which should summarize all of the received reports and provide the conclusions as to the extent to which each of the strategies has contributed to the implementation of national targets on biological diversity.</p> <p><i>Funding estimate:</i> 12,000 KM per strategy per annum</p>
	2.3. Integrate national biological diversity targets into existing and new spatial plans
	<p>The parties to the CBD are expected to integrate values, i.e. the national targets on biological diversity, into spatial planning, such as e.g. mapping and systematic planning for ecosystem services, distribution of diversity at the level of genes, species, ecosystems and landscapes in a particular area, etc. Prior to the implementation of this measure, it is first necessary to implement Measure 16.1. The working groups formed by sector from Measure 16.1. should do the GAP analysis and determine the extent to which values, i.e. the national targets on biological diversity, are integrated into each of the existing and new strategies. After the adoption of these strategies, it is also necessary to monitor their implementation through the annual reports prepared by the working groups by sectors. The reports are to be sent to FMET, which should summarize all of the received reports and provide the conclusions as to the extent to which each of the strategies has contributed to the implementation of national targets on biological diversity.</p> <p><i>Funding estimate:</i> 12,000 KM per plan per annum</p>
National Target	3. By 2020, reduce negative and increase positive incentives and subsidies in order to conserve biological diversity²⁴
Measures	3.1. Define and calculate positive and negative incentives and subsidies

²⁴ Currently there is no official definition of harmful or negative subsidies for biological diversity. However, in 2005, the Organization for Economic Cooperation and Development (OECD) adopted the definition used by analysts. According to the aforementioned definition, a harmful subsidy for biological diversity is *the result of government action that favors consumers and producers so they can supplement their revenues or reduce their costs, while at the same time discriminating the environmental protection policy. The harmful (negative) subsidies increase the level of waste, pollution and exploitation of natural resources.*

In BiH, there is no data on incentives or subsidies that are detrimental to biological diversity, nor on those that have positive impacts. In order to implement these measures, it is necessary that the working groups formed by sectors referred to in Measure 16.1. do the following: a) analyze the existing incentives and subsidies, and b) determine which of these incentives and subsidies pose a threat and cause damage to biological diversity, and which have a positive impact in terms of protection. Subsidies and incentives of this type are found in the sectors of industry, transport, energy, environment, agriculture, forestry and water management. Once it has been determined which the negative and positive incentives and subsidies are, in consultation with relevant ministries for protection of environment and MoFTER, the working groups by sectors should calculate their values and develop a plan to increase the positive reductions or elimination of the negative incentives and subsidies by 2020.

Funding estimate: 55,000 KM for 2016

3.2. Enable securing of financial resources for positive incentives and subsidies

Once the positive incentives and subsidies have been determined, the ministries responsible for protection of environment should organize at least 4 consultative meetings with stakeholders from various sectors, at which they would agree on the following: a) prioritization of existing and new possible initiatives and subsidies, b) securing of funding at the state level, c) drafting of guidelines for applications for international funding, and d) equitably distribute the resulting funding by sectors. This measure also contributes to Measures 1.2. and 20.1.

Funding estimate: 20,000 KM for consultative meetings for the period of 2016-2020.

3.3. Introduce the monitoring system for positive and negative incentives and subsidies, and prepare annual reports

In order to maintain the continuity in monitoring of incentives and subsidies that have negative and positive effects on biological diversity, it is necessary to establish a system for their monitoring. With the help of Measures 3.1 and 3.2., each working group referred to Measure 16.1. per sector should prepare an annual report on the values of positive and negative incentives and subsidies and send it to FMET. This monitoring system would provide regular and transparent reporting on the progress in reducing negative incentives and subsidies and in increasing the positive ones. Based on the annual reports for various sectors, FMET should make a joint progress report on achieving the national targets on biological diversity.

Funding estimate: 35,000 KM per annum for preparation of the joint report

National Target

4. By 2019, prepare and adopt plans for sustainable production and consumption of natural resources

4.1. Establish a functioning institutional and legal framework for sustainable production and consumption of natural resources

In order to implement this measure, the relevant ministries of agriculture, water management and forestry should analyze the existing institutional and legal frameworks in order to identify which institutions should be strengthened, in which areas and in what way, which laws, rulebooks or regulations need to be passed at the state or entity levels, etc. After the analysis, it is essential that the relevant ministries for agriculture, water management and forestry hold at least 4 consultative meetings with stakeholders where it is necessary to determine the needs and shortcomings in the field of sustainable production and consumption of natural resources, as well as organize at least 3 training sessions for the employees of relevant institutions. Establishment of functional institutional and legal frameworks for sustainable production and consumption of natural resources should be in line with the objectives of the Capacity Development Plan - Implementation Plan (Chapter 5). Once these steps are implemented, this will strengthen the vertical and horizontal cooperation among the existing institutions in the field of sustainable production and consumption of natural resources.

Funding estimate: 65,000 KM (30,000 KM for the analysis, 20,000 KM for 4 consultative meetings, and 15,000 KM for 3 training sessions) for 2017

4.2. Draft and adopt action plans for sustainable production and consumption of natural resources

Based on Measure 4.1., i.e. the analysis of the institutional and legal frameworks, as well as consultative meetings with stakeholders, the ministries responsible for agriculture, water management and forestry should determine the current status, i.e. collect data on production and current consumption of natural resources in order to determine the objectives to be achieved and the measures to be taken to ensure that production and consumption of natural resources is sustainable. It is important during the status analysis to do an assessment of impacts on the environment and the society of some economic sectors, such as energy, water, transport, agriculture, etc. Once the status has been established, the relevant ministries for agriculture, water management and forestry should propose an action plan and present it at the meetings (at least 2) with stakeholders and send them to the entity governments for adoption.

<i>Funding estimate: 60,000 KM (50,000 KM for status analysis and development of action plans, and 10,000 KM for meetings) for 2019</i>	
National Target	5. By 2020, prepare and implement sustainable management programs for all fishing waters (fisheries basis)
Measures	5.1. Draft programs for sustainable management of all fishing waters
	<p>The fisheries bases are expert studies on how to manage certain fishing areas and as such they are the basis for the sustainable management of fishing waters, or fish stock, fish habitats, etc. The funding for the implementation of this measure should be provided through the budgets of line ministries, users of fishing waters and from international sources/funds. In parallel with the implementation of the financial structure, it is essential that the relevant ministries for agriculture, water management and forestry announce a competition for service providers for development of these programs so that in those cases where there are no fisheries bases at all, or where they are outdated, the work should start as soon as possible. Drafting of a program for the sustainable management of fishing waters should include catching fish on the ground (trawls and standing networks, generator sets for catching fish, etc.), an assessment of the species and quantities of fish, the water quality (field and laboratory testing of water), fish diseases (field and laboratory tests), etc.</p> <p><i>Funding estimate: 2,000,000 KM for the costs of development of the program for sustainable management of all fishing waters on the territory of BiH for the period of 2015-2017</i></p>
	5.2. Implementation of programs for sustainable management of all fishing waters
	<p>The implementation of the program for the sustainable management of fishing waters of BiH (Measure 5.1.) includes improving the Fish Guard Service (more employed guards, additional training and development of employed guards), restricting fishing of endangered and endemic species, especially during spawning, ranching with indigenous commercially significant fish species in terms of preserving genetic diversity (in conjunction with Aichi Target 13 - aquatic genetic resources), continuous monitoring of water quality and the health state of fish, etc., on the basis of which to strengthen the implementation mechanisms not only for the fisheries bases but also the Law on Fisheries, i.e. freshwater fishing on the territory of both entities and the BD. The institutions responsible for implementing the program for sustainable management of fishing waters are the ministries of agriculture, water management and forestry.</p> <p><i>Funding estimate: 1,000,000 KM for the costs for implementation of the program for sustainable management of all fishing waters in BiH in the period of 2018-2020</i></p>
National Target	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)
Measures	6.1. Map areas and determine commercially significant species for ranching and breeding
	<p>The implementation of these measures requires from the competent ministries for agriculture, forestry and water management to appoint the members of the expert team from the government sector, scientific research and professional institutions/agencies and the NGO sector, who will professionally perform the mapping of areas in order to attain prosperity (sustainable development) of all sectoral policies. According to scientific bases, an expert team shall be formed to determine areas for ranching, breeding with certain species and quantities.</p> <p><i>Funding estimate: 300,000 KM is needed for organization of regular meetings, adoption of the work plan, assignments and duties for all members of the team for 2017</i></p>
	6.2. Prepare and implement strategies for development of aquaculture and ranching of commercially significant species
	<p>Development of strategies at the entity level for the implementation of this measure is a basic requirement for any activities related to the development of aquaculture and ranching of important species. Strategies are also the basis for the implementation of projects and provision of funds by domestic and international institutions. This measure is associated with Measure 6.1., which involves the appointment of members of an expert team. The same team of experts should be involved in developing of strategies and should nominate a person on behalf of the competent institutions who will lead the entire process of drafting, will organize inter-sectoral workshops and roundtables, as well as the activities for preparation and adoption of strategies for the development of aquaculture and ranching of commercially important species. The institutions responsible for the implementation of the strategy are ministries for agriculture, water management and forestry.</p> <p><i>Funding estimate: 250,000 KM for 2019</i></p>

National Target	7. By 2020, certify all state-owned forests in BiH
Measures	7.1. Passage/adoption of the Law on Forestry of FBiH
	Forests and forest lands are of special interest for the FBiH. Given that forests are an asset that benefit of the society, as well as an important ecosystem and an ideal habitat for numerous wildlife, it is necessary to pass/adopt the Law on Forestry in the FBiH, because this will enable the same conditions for the preservation and protection of forests, enhance their ecological functions, ensure planning in forestry and forest management, strengthen the commercial functions, and allow for financing of recovery and improvement of the state of forests in the FBiH. The law is to be adopted by the FBiH Government upon the proposal from the FMAWMF. <i>Funding estimate: /</i>
	7.2. Secure financial resources and involve companies accredited for certification
	More than 50 % of state forests are certified in BiH. Sources of funding so far have mostly been only logging companies, competent cantonal ministries, and other international organizations (e.g. World Bank, IKEA). Logging companies retain firms accredited for certification through selecting the most favorable bids through international competition. Besides the 60,000-70,000 KM for certification, about 20,000 KM should also be allocated for a workshop on the certification process and methodology, and a workshop on the identification and mapping of high protection value forests (HCVF) for company employees. During the certification process, it is also necessary to have 10,000 KM for a HCVF workshop for other participants who need to express their opinions and interests on the subsequent management of HCVF. This budget should be provided by logging companies with the help of the relevant ministries and sectors/departments at the entity, district and cantonal levels in charge of for agriculture, water management and forestry. <i>Funding estimate: 100,000 KM for the whole certification process per one location/company</i>
	7.3. Ensure controls during the certification implementation process itself
	An accredited certification firm shall conduct the certification process in three steps: 1) pre-audit, 2) main audit, and 3) certificate awarding. The pre-audit includes the field visits of appraisers, who assess every segment of the company and list everything that needs to be fixed by the time of the main audit. The main audit includes the appraiser checking whether what they have described in the pre-audit has been accomplished, and they cite what has not been accomplished under corrective measures that need to be completed until the next control within one year. The last step is the certification award, i.e. the administrative procedure without field visits. In addition, during the period pending the main audit the company itself may organize internal meetings or meetings with advisors experienced in Forest Stewardship Council (FSC) certification in order to meet the requirements from the pre-audit in the best manner as soon as possible. <i>Funding estimate: the funding has been indicated upon in Measure 7.2.</i>
	7.4. Develop forest certification schedule plans
	The logging company will move forward with certification once it has secured the funding defined in Measure 7.2. The certification schedule depends on the capacity of employees to verify each of the nine FSC certificate principles and to make them in compliance with the FSC criteria. The more incompliances there are, the more time is needed for harmonization. The process mainly takes from one to two years. According to the certification action plan drafted in the very beginning and supplemented after the pre-audit, it can be concluded how much time it will take to obtain the certification. <i>Funding estimate: 10,000 KM per certificate</i>
National Target	8. By 2020, establish and develop a system for sustainable agricultural production, especially organic and integral production, and conservation and breeding of indigenous species
Measures	8.1. Adopt the Law on Organic Food Production of Food in FBiH
	Organic production is an effort to enhance agriculture by eliminating all ingredients harmful to humans and environment. The products that come from such farming possess a certificate and are marked as „organic products“. The Law on Organic Food Production in the FBiH is necessary because it would regulate food production using organic production methods. The Law is to be adopted by the FBiH Government upon the proposal of FMAWMF. <i>Funding estimate: /</i>

8.2. Analyze the current status and market in the area of organic and integral production	
<p>As organic farming is gaining in importance, a series of activities are planned under this measure. First of all, through relevant state institutions (e.g. statistics) it is necessary to obtain the indicators on the quantities and types of manufactured goods and the number of certified farms engaged in organic production. These activities will be carried out in the framework of the Study Analysis of the Current State of Organic and Integral Production in BiH, which should be created by a team of experts nominated by the relevant ministries of agriculture, water management and forestry at the entity level and BD levels. Questionnaires, phone calls and e-mails are to be used to carry out the process of surveying individuals, institutions, legal entities and others, with pre-defined questions. After completion of the survey, the team of experts will statistically process the whole sample and pass the conclusions based on the results. These activities require a period of about one year.</p> <p><i>Funding estimate: 50,000 KM for 2016</i></p>	
8.3. Select potential agencies for certification of organic and integral production	
<p>In accordance with laws, the ministries responsible for agriculture, water management and forestry shall announce a public competition and select the most favorable agency with specified characteristics for the implementation and management of the entire certification process at the entity and BD levels. The timeline for the implementation of these measures is six months. The selected agency for certification of organic production will explore the number of manufacturers, the type of production, the extent of the quantities, as well as the areas intended for organic production. In cooperation to the relevant ministries for agriculture, water management and forestry, the staff of the accredited agency will make a selection of farms according to standardized criteria. After having had an insight into the registers and through the agricultural counseling services at the entity and BD levels, the accredited agency will select potential producers who wish to undergo the certification. For the purpose of implementation of this measure, the expert team established referred to Measure 8.2. will establish a methodology for field visits and for sampling production, sampling of soils, etc., in order to obtain accurate results from the (laboratory) analyses as the basis for certification. One farm will require the period of one year for the implementation of this measure.</p> <p><i>Funding estimate: 5,000 KM for the selection of the certification agency; 10,000 KM per one farm for certificate awarding</i></p>	
8.4. Continually increase incentives and subsidies for organic and integral production, and for <i>in situ on farm</i> breeding of indigenous species	
<p>Given that the competent ministries of agriculture, water management and forestry (at the cantonal and entity levels) within their systems include services dealing with issues related to increasing incentives and subsidies for organic and integral production, and for <i>in situ on farm</i> growing of indigenous plant and animal species, this measure may be implemented under the temporal and financial line of work of the competent ministries. It is necessary to increase the incentives and subsidies for this domain every year, in addition to the course of activities defined in Measure 3.2.</p> <p><i>Funding estimate: /</i></p>	
8.5. Draft the action plan for development of organic and integral agricultural production in BiH	
<p>The implementation of this measure is in compliance with Measures 8.1. and 8.2., where in arrangement with the MoFTER, the established team of experts shall organize 4 or more meetings and 3 workshops with stakeholders, where it shall present the current status and market in the domain of organic and integral production, and shall develop the Action Plan for BiH. The Action Plan shall assign duties and obligations as per individual activities to the designated institutions/organizations, the timelines for implementation of specific activities, as well as the potential sources of funding at local and international levels.</p> <p><i>Funding estimate: 65,000 KM (30,000 KM for drafting of the Action Plan; 35,000 KM for meetings and workshops) for 2019</i></p>	
National Target	9. By 2020, establish a system for treatment of industrial and utility wastewaters and monitoring of pesticide and fertilizer consumption
Measures	9.1. Establish the system for prioritization in construction of the largest and most significant treatment facilities
<p>The prioritization in building systems for the largest and most significant pollutants, the ones that directly affect the precious and sensitive ecosystems, contributes to protection of human health and environment in general. Based on the records from existing pollutant registers at the entity and BD levels, in line with the objectives of water strategies in BiH, the competent ministries of agriculture, water management and forestry, jointly with agencies for water basins, need to nominate an expert team of 10 members. It is necessary that the same expert team should organize 3 meetings in order to define criteria for prioritization, establish the work plan and the responsibilities for implementation of this measure.</p>	

<i>Funding estimate: 15,000 KM for 2016</i>	
9.2. Establish wastewater quality monitoring and form databases	
<p>Continuous monitoring of watercourses that are recipients of wastewater from industrial and municipal wastewaters is a legal obligation in order to prevent and protect human health, including overall biological diversity. Monitoring of water quality, ecological state of surface waters and ground waters is currently implemented by agencies in charge of water basins and public health departments, however this is not enough. The monitoring of wastewater quality should be carried out by the expert team identified under Measure 9.1. The same expert team should organize meetings (about 8) on an annual basis in order to determine which parameters need to be monitored, at which locations to monitor wastewaters, and to adopt an action plan that will define the regional (sensitive locations) coverage of the state with a network of monitoring sites. Also, it is important for the expert team to establish a database which will be available on the websites of the entity ministries of agriculture, water management and forestry, or on the websites of the agencies for water basins.</p> <p><i>Funding estimate: 40,000 KM for meetings; 20,000 KM for creation of the database for 2019</i></p>	
9.3. Analyze the types and quantities of pesticides and fertilizers used	
<p>It is not known today what amounts and types of pesticides and fertilizers are used for agricultural production in BiH, and under this measure a series of activities are planned. First of all, through relevant state institutions (e.g. statistics, institutes for agriculture, customs services), it is necessary to obtain the indicators on the quantities and types of imported products, as well as the data on domestic production. These activities will be carried out in the framework of the study, which will provide an overview of the current situation, and is to be completed by the expert team established as referred to in Measure 16.1. Questionnaires, phone calls and e-mails can be used to conduct the process of surveying individuals, institutions, legal entities, etc. After the completion of surveys, the expert team shall statistically process the whole sample and pass conclusions based on the results. For these activities, the expert team should organize 4 meetings annually.</p> <p><i>Funding estimate: 65,000 KM (45,000 KM for drafting of the study; 20,000 KM for meetings) for 2016</i></p>	
9.4. Establishment of the system for monitoring of pesticides, fertilizers and soil fertility	
<p>The successful implementation of this measure requires the expert team established as referred to in Measure 16.1. to hold 3 meetings in order to establish which parameters are monitored and which locations are monitored, and to pass an activity plan to define the regional (sensitive locations) coverage of the state with a soil monitoring network. In addition to the aforementioned activities, the expert team shall establish databases that will be available on the websites of the entity ministries of agriculture, water management and forestry.</p> <p><i>Funding estimate: 15,000 KM for meetings; 20,000 KM for creation of the database, for 2018</i></p>	
National Target	10. By 2018, prepare strategies for invasive species
Measures	10.1. Identification of species and populations of invasive animals, plants and fungi, and formation of databases
<p>The successful implementation of the established national target requires that the expert team appointed by the relevant ministries for protection of environment identifies the species and populations of invasive species of animals, plants and fungi in BiH and the intensity and pathways for the spread of these species. Based on the results, the expert team will establish databases on invasive species that will be available on the websites of the entity ministries for protection of environment. Successful implementation of this measure involves literary and field research with the aim of identifying and determination of invasive species of plants and fungi and adequate analytical and statistical processing of data on invasive species, the state of their populations, numbers, areal, etc., with appropriate statistical and software programs for database development. Activities for the implementation of these measures are reflected in the application of standard research methods in order to obtain adequate data, which in addition to identifying the presence of invasive species also include the assessment of the population status, its areal, etc. This measure involves the use of appropriate computer programs, databases, mapping, etc.</p> <p><i>Funding estimate: 400,000 KM for 2016</i></p>	
10.2. Preparation of strategy for invasive species	
<p>Based on the identification of species and populations of invasive animals, plants and fungi, this measure involves the development of strategies for invasive species at the entity level by an expert team referred to Measure 10.1. The very purpose of the strategy is to reduce the negative effects exhibited by invasive</p>	

	species and to prevent intentional or unintentional introduction of invasive species and their control. Under this strategy, in addition to analysis of data on invasive species, the expert team will also define the method to control the entry points and the paths of spreading of invasive species. <i>Funding estimate: 100,000 KM for 2017</i>
	10.3. Formation of the system for monitoring and definition of methods for control of spread of invasive species
	Identification of the existing invasive species and determining the condition of their populations are the basis for the preparation of strategies and for the establishment of a system for monitoring and determination of methods and paths for spreading of invasive species. The expert team referred to in Measure 10.1. should propose a framework for coordination and comprehensive approach to control of invasive species and define methods to prevent the spread of some invasive species. Methods and ways of preventing the spread should be tailored to the very biology and ecology of the species, and will vary depending on the type and the possibility of using certain methods. Accordingly, the expert team will organize 4 consultative meetings with stakeholders and, if necessary, make appropriate action plans for specific invasive species. <i>Funding estimate: 400,000 KM for 2018</i>
National Target	11. By 2020, map and urgently protect the specific biological diversity of BiH (canyon, mountain, alpine and wetland ecosystems, karst fields and alluvial plains) in compliance with the applicable spatial planning documents
Measures	11.1. Prepare the analysis (including mapping) of planned protected areas
	Mapping of the specific biological diversity of BiH, as well as mapping of the whole territory, will give provide a complete database on the numbers and types of coded habitats, and their area size. This measure requires coordinated action in order to protect nature and expand the size of protected areas. Activities to do in order to implement this measure are the following: a) relevant spatial planning ministries are required to prepare an analysis of the planned protected areas in spatial plans (related to measure 2.3.), and b) the working group established as referred to in measure 16.1. is required to prepare the information on the GAP analysis and to develop the document. Under these activities, it is necessary to organize four consultative meetings. <i>Funding estimate: 35,000 KM (40,000 KM for document drafting; 20,000 KM for organization of meetings) for 2016</i>
	11.2. Start procedures for establishment of protected areas planned in spatial plans, and monitor their progress
	In order to protect nature, it is necessary to change the state of protected areas from "areas of special interest" into "protected areas". The main objective of this measure is to coordinate and lobby with the relevant sectors for the establishment of protected areas. The activities that need to be conducted aimed at implementation of this measure are as follows: a) at appropriate administrative levels, the decision to launch the procedure needs to be passed; b) a public invitation needs to be issued for valorization of natural resources; c) valorization projects need to be implemented; d) laws on protected areas need to be issued; and e) plans for management of protected areas need to be prepared. This measure is related to the measures referred to in 2.1. and 2.3. <i>Funding estimate: 1.000,000 KM for the period of 2017-2020</i>
	11.3. Establishment or appointment of existing institutions to manage the protected area
	Establishment of Public Enterprises (PE), which will run and sustainably manage the protected areas, represents a kind of security in protection of natural and cultural values, as well as economic starting up of local communities. The implementation of this measure requires the competent ministries for protection of environment to appoint an expert team that will represent members from relevant government and non-governmental institutions/organizations at various administrative levels. The established expert team needs to prepare an action plan with the timeline of action and to prepare the necessary processes and documentation to start the registration and functioning of the PEs. <i>Funding estimate: 500,000 KM for 2020</i>
National Target	12. By 2020, complete the inventory of: (i) flora, fauna and fungi in BiH; (ii) ecosystems and types of habitats in BiH
Measures	12.1. Conduct the inventory of ecosystems and types of habitats in BiH
	Inventory of ecosystems and habitat types in BiH is necessary because the available data significantly differ and are not complete. Implementation of this measure is necessary because the conversion of habitats is one of the manners in which biological diversity is disrupted. As a first step, it is necessary that the

	<p>competent ministries for protection of environment in cooperation with the MoFTER appoint an expert team that will implement these measures. It is necessary that the expert team systematizes the existing data and integrates them in a single document, and implements appropriate field research that would identify habitats and ecosystems and perform their mapping. The inventory methodology involves mapping and marking of certain types of ecosystems and habitats and the corresponding processing in GIS in order to create the database.</p> <p><i>Funding estimate: 600,000 KM for 2018</i></p>
	<p>12.2. Conduct the inventory for flora, fauna and fungi in BiH</p> <p>Inventory of flora, fauna and fungi in BiH is necessary because the data of this type available are incomplete, segmented, and very often there is disagreement in the reference materials about the numbers of specific taxa in BiH. Completion of this list is of great importance not only for achieving of the established goal, but also in terms of biological diversity in general. In order to implement this measure, the expert team referred to in Measure 12.1. needs to systematize the existing data and integrate them into a single document, and to perform appropriate field research in order to identify the species that are assumed to be located on the territory of BiH, which are not mentioned in the existing documents. The inventory methodology involves standard methods of literature review, field research and the application of specific methods, depending on the species researched, GPS devices and other accessories adapted to the type of research.</p> <p><i>Funding estimate: 900,000 KM for 2020</i></p>
National Target	13. By 2020, develop the red books of plants, animals and fungi, and adopt action plans for protection of the most endangered taxa
Measures	13.1. Identify the endangered species and their localities
	<p>Identification of endangered species and their habitats is necessary because according to adopted and red lists, and according to international organizations, a number of species are classified into different categories of threat. In this regard, the identification of endangered species that have a narrow areal of presence is one of the basic preconditions for adequate protection and preservation. The expert team referred to Measure 12.1. will be responsible for the identification of endangered species, and for appropriate field research that, in addition to identification, also involve determining the state of the population, the number trends, and direct and indirect pressures to which the population is subjected in a given habitat. The methodology for research and determination of endangered species will depend on the type and sites of research.</p> <p><i>Funding estimate: 600,000 KM for 2018</i></p>
	13.2. Form the <i>in situ</i> and <i>ex situ</i> protection of endangered species
	<p>This measure requires that after the identification of endangered species and their populations, the expert team referred to in Measure 12.1. adopts appropriate recommendations for the protection of endangered species in order to preserve them. Activities include protection of species in their natural habitats in application of appropriate measures, which would reduce direct and indirect pressures that threaten the species, as well as creation of conditions for the protection of species even outside of its natural environment (through various forms of <i>ex situ</i> protection) in order to preserve them, and if necessary, so that they could be reintroduced into their natural habitats. Thus, this measure also involves the procedures for formal legal protection and adoption of appropriate legal solutions by the relevant ministries for protection of environment that will enable the formation of <i>ex situ</i> and <i>in situ</i> forms of protection. The methodology used for <i>in situ</i> and <i>ex situ</i> depends on the types of conservation, species and localities.</p> <p><i>Funding estimate: 400,000 KM for 2019</i></p>
	13.3. Completion, adoption and implementation of action plans and red books
	<p>Red books are the basis for undertaking adequate measures and creation of action plans and programs to protect the endangered species. The drafting of red books and action plans for protection is of great importance, because they include the lists of endangered species in particular areas, the analysis of the vulnerability degrees and the causes that have led to this, and the recommendations for monitoring of the population status. The expert team referred to in Measure 12.1. should undertake the following activities: updating of the existing red lists, conducting research according to the parameters for assessment of vulnerability, and eventually providing the measures for the conservation of endangered species. Based on the results of identification of endangered species and their localities and the measures to protect these species, the expert team should prescribe the action plans for protection and develop the red books.</p>

	<i>Funding estimate: 400,000 KM for 2020</i>
National Target	14. By 2020, prepare and implement <i>in situ</i> and <i>ex situ</i> programs for protection of domestic varieties, breeds and their animal relatives, including their inventory and establishment of indigenoussness parameters
Measures	14.1. Identification and evaluation of the state of existing indigenous genetic resources in BiH
	Due to the fact that in BiH there is no database of existing indigenous genetic resources, the first step in implementing this national target involves formation of an expert team by the relevant ministries for agriculture, water management and forestry, protection of environment and the genetic resources institute. The expert team collects the available materials and creates a database on plant and animal indigenous genetic resources. This database should include lists of species or varieties and breeds of domestic plants and animals, as well as and their wild relatives. Evaluation of the state of their populations should be shown through data on the size of populations, spatial distribution with the accompanying maps of their distribution, methods of cultivation and conservation, etc. <i>Funding estimate: 40,000 KM for 2018</i>
	14.2. Improvement of existing and drafting of new laws and bylaws dealing with genetic resources issues
	In order to implement this national target as successfully as possible, it is necessary to improve the legal framework pertaining to sustainable management of genetic resources. The expert team referred to in Measure 14.1. shall deal with this activity, in cooperation with other interested parties, of course having in mind the EU legislation in the given domain. Currently, the Law on Genetic Resources of the RS is being drafted, while a similar activity is yet to be undertaken at the FBiH level (as a separate law or bylaw, or a supplement of some other law, e.g. the Law on Agriculture or the Law on Cattle Breeding, or on plant seed materials). Also, it is necessary to develop the rulebooks on incentives for conservation of plant and animal genetic resources, which would directly contribute to the implementation of Measure 14.4. as well. <i>Funding estimate: /</i>
	14.3. Drafting and implementation of programs for sustainable use of genetic resources
	In order to establish a planned approach to solution of the problem involving protection and sustainable use of genetic resources in BiH, the expert team referred to Measure 14.1. should develop programs for sustainable management of genetic resources. The programs involve data on capacities and the past levels of genetic resources research in BiH, legal and institutional frameworks, causes of threat and trends for changes in their status, methodology of conservation (<i>in situ</i> and <i>ex situ</i> protection), the benefits from their use and conservation for the population and environment, etc. <i>Funding estimate: 50,000 KM for 2017</i>
	14.4. Favoring of agricultural practice based on breeding of indigenous domesticated plant varieties and breeds of domestic animals
	One of the most efficient methods for conservation of plant and animal genetic resources is the <i>in situ</i> protection, or their cultivation exactly in such areas in which they had been generated, or those that they have been best adapted to. Intensification of agricultural production, including the development of rural areas based on favoring the cultivation of indigenous species of plants and animal breeds, needs to be ensured through use of incentive measures, integration of the mentioned cultures and their products into rural tourism supply (related to traditional knowledge and practices), production with geographic origin etc. This measure is related to Measure 3.2. and contributes to Measures 18.1. and 18.2., and the institutions responsible for its implementation are the competent ministries for agriculture, water management and forestry. <i>Funding estimate: 2,000,000 KM for the period of 2016-2020</i>
National 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
Measures	15.1. Secure human and technical capacities for assessment of ecosystem services in BiH
	Ecosystem services have so far not been mapped or evaluated in BiH, nor are human or technical capacities for mapping and evaluation of ecosystem services sufficient at relevant institutions. The implementation of this measure requires that the competent ministries for protection of environment, in cooperation with the ministries of agriculture, water management and forestry, establish an expert team. MoFTER shall organize 4 training sessions for the expert team (members from the sector of environmental protection, water management and forestry) prior to completion of the status analysis of ecosystem services

	<p>(described in Measure 15.2.). This measure is directly related to Measures 15.2. and 2.1. <i>Funding estimate:</i> 20,000 KM for organization of training sessions; the other costs are shown in Measures 15.2. and 2.1.</p>
	<p>15.2. Complete the analysis of the state of ecosystem services in BiH</p>
	<p>As stated under Measure 2.1, four groups of ecosystem services have not been evaluated or analyzed in BiH: supply, regulatory, cultural and support services. This measure involves that the expert team referred to in Measure 15.1.: a) conducts field visits and social research, b) singles out a group of ecosystems that provide essential services for the life of the citizens of BiH, and c) makes an assessment of the state of such ecosystems. This measure is directly related to Measures 15.1. and 2.1. <i>Funding estimate:</i> 350,000 KM for the period of 2018-2019</p>
	<p>15.3. Strengthen the environmental permit mechanism and supervisory inspection</p>
	<p>In order for the ecosystem services to be maintained and preserved, it is necessary as follows: (i) to strengthen the environmental permit mechanism and supervisory inspection in terms of the relevant laws integrating and implementing the punitive provisions for those who disrupt the services (the competent ministries for protection of environment in cooperation with the relevant inspections), (ii) to increase human capacities at supervisory inspections (the competent ministries for protection of environment), and (iii) to organize training sessions for professional improvement and strengthening of the inspectorate (the competent ministries for protection of environment). The relevant activities for implementation of this measure include the following activities that need to be conducted by the ministries in charge of protection of environment: a) analysis of all laws pertaining to the use of nature in the segment of „supervision“; b) as needed, prepare amendments to the Law on Nature Protection, and c) strengthen inspection services. <i>Funding estimate:</i> 200,000 KM per annum</p>
National Target	<p>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 %</p>
Measures	<p>16.1. Establish cooperation and synergy among the relevant institutions</p>
	<p>Cross-sector approach in nature management is not developed and it is necessary to integrate biological diversity into other sectors. The relevant activities for implementation of this measure include: a) formation of a working group for coordination of all sectors (e.g. environmental protection, water management, agriculture, forestry, spatial planning, energy, mining and industry) at the level of the BiH Council of Ministers, and b) preparation of instructions (publication) for integration of biological diversity values into other sectors, i.e. strategies and plans, as well as instructions for monitoring of their implementation, including organization of regular meetings. <i>Funding estimate:</i> 50,000 KM for the period of 2016-2020</p>
	<p>16.2. Secure funding and other capacities for restoration of lakes and existing flood forests, and implement the restoration measures</p>
	<p>After long-term exploitation of ore resources in BiH, new water bodies have been created on the sites of strip-mines. There are more than 100 of them today in BiH. The lakes convert into wetlands gradually but very slowly. If this succession is supported and accelerated, these areas will have the role of actual wetlands (preservation of wetland biological diversity, migratory birds, carbon absorption, etc.). In addition, flood forests have been degraded through construction of roads and other infrastructure, and river banks have been compromised. The implementation of this measure requires the implementation of the following activities: a) establish an expert team and develop the work plan (MoFTER in cooperation with the competent ministries for protection of environment, spatial planning, agriculture, water management and forestry, energy, industry and mining), and b) prepare the application and secure funding for projects involving restoration of lakes and forests (the expert team). This measure also contributes to Measures 1.2. and 20.1. <i>Funding estimate:</i> 1,000,000 KM for the period of 2016-2020</p>
	<p>16.3. Conduct forestation of degraded forest ecosystems with indigenous species</p>
	<p>Strengthening of forest ecosystem functions is of essential importance to the BiH society, and to adaptation to climate change. In the post-war period, forestation drives have not been conducted to the necessary extent. The lack of funding is frequently related to purchase of seedlings, some of which are imported. Although some local capacities are in place, it is needed to intensify the cultivation and planning of indigenous species of trees. The implementation</p>

	<p>of this measure requires the following activities: a) prepare the application and secure funding for forestation projects (contributes to Measures 1.2. and 20.1.), and b) stimulate public for forestation of degraded forest ecosystems through promotional materials. The aforementioned activities should be implemented by the expert team referred to Measure 16.1.</p> <p><i>Funding estimate: 1,500,000 KM for the period of 2017-2020</i></p>
	<p>16.4. Secure funding for increase of urban green areas</p> <p>The quality of life in urban environment is today linked to activity involving greening of cities. On the other side, the pressure from construction and urbanization on the existing green areas is very strong, and there is the need for a planned approach to this issue. This involves interconnecting the various administrative levels in vertical or horizontal directions, and development of the consultative process in decision-making. The implementation of this measure requires the following activities: a) prepare the application and secure funding for projects to increase the green urban areas (contributes to Measures 1.2. and 20.1.) by the expert team referred to in Measure 16.1., and b) develop capacities of utility companies for sustainable management of green areas in cooperation with the competent ministries for protection of environment, agriculture, water management and forestry. This measure is also related to Measure 16.3.</p> <p><i>Funding estimate: 2,000,000 KM for 2018</i></p>
National Target	<p>17. By 2018, prepare the legislation and establish the conditions for ratification and implementation of the Nagoya Protocol</p>
Measures	<p>17.1. Harmonize domestic legislation with the Nagoya Protocol requirements</p> <p>The ratification process also entails the process of implementation of the Protocol. In order to facilitate its implementation, it is necessary to prepare, propose and conduct the process of adopting the law on the conditions for the use of genetic resources of BiH. The law that governs this matter for the time being does not exist in the national legislation. It is therefore necessary for MoFTER, in cooperation with the ministries of environmental protection, agriculture, water management and forestry: a) to establish a working group for the preparation of the law; b) to provide funding for the work of the working group; and c) to identify the institutions that will be responsible for implementation of the law and of the Protocol. At the same time, it is also necessary to develop the activities aimed at spreading awareness of the genetic resources of BiH (scientific research and professional institutions/agencies). It is necessary to conduct this activity primarily in the sectors which are based on the use of these resources, such as the pharmaceutical industry, forestry, agriculture, trade, etc., through workshops and promotional materials.</p> <p><i>Funding estimate: 75,000 KM for 2018</i></p>
	<p>17.2. Ratify the Protocol</p> <p>Given the importance of cross-border movement and use of genetic resources of BiH, and the commercial and/or any other type of profit arising from this, the signing and ratification of the Nagoya Protocol need to be one of the priority targets of BiH. The significance of the Protocol is the obligation of the beneficiary to use the genetic resources in BiH under informed consent and under mutually agreed conditions. In order for the conditions to be created for further development of the local legislation in terms of this Protocol, it is first necessary that BiH officially accedes the Protocol. In those terms, as the relevant state-level ministry, and in line with the Law on the Procedure for Execution and Enforcement of International Agreements (Official Bulletin of BiH, no. 29/2000), MoFTER needs to start the initiative for the ratification process at the BiH Council of Ministers level, and to lead the ratification process until its finalization.</p> <p><i>Funding estimate: /</i></p>
National Target	<p>18. By 2017, establish centers for preservation and implementation of traditional knowledge and practices, particularly in rural areas of interest</p>
Measures	<p>18.1. Document traditional knowledge and practices for sustainable use of biological diversity</p> <p>In the post-war period, the territory of BiH is characterized by migration of people from rural to urban areas. The consequence of this process is a huge loss of traditional knowledge and practices related to sustainable use of biological diversity. It is rightfully considered that this knowledge and practices are related mainly to rural areas, and smaller population of older age groups inhabit them today. It is necessary to document, as soon as possible, the still existing</p>

	<p>knowledge and practices today. In order to achieve this, it is first necessary to form a team of experts from the relevant ministries for protection of environment, agriculture, water management and forestry, in cooperation with the Food Safety Agency of BiH. The expert team should: a) carry out strategic research of traditional knowledge and practices in rural areas, b) prepare the corresponding database of this knowledge, c) prepare a database of resources used in the traditional manner, d) prepare publications to spread awareness about the value of traditional knowledge and practices, and e) identify centers for the implementation of traditional knowledge and practices in BiH.</p> <p><i>Funding estimate: 500,000 KM for the period of 2015-2016</i></p>
	<p>18.2. Establish monitoring of traditional knowledge and practices</p> <p>Following the researching, documenting and preparing the database on traditional knowledge and practices for sustainable use of biological diversity in BiH, the expert team referred to Measure 18.1. should identify appropriate methods for monitoring the state of traditional knowledge and practices; and establish monitoring mechanisms for traditional knowledge and practices.</p> <p><i>Funding estimate: 100,000 KM for the period of 2016</i></p>
National Target	<p>19. By 2020, strengthen the role of the scientific research and expert institutions, NGO sector and media including improvement of scientific technologies</p>
Measures	<p>19.1. Ensure maintenance of the CHM website</p> <p>The CHM mechanism is a requirement of the CBD which encompasses effective information services and other appropriate measures to promote and facilitate scientific and technical cooperation, knowledge sharing, information exchange, as well as establishing and operating networks for customers and partners. This measure includes: (i) the promotion of the CHM website in BiH, (ii) development of a database of all NGOs and research institutions in the domain of biological diversity, (iii) development of a database of experts, (iv) establishment of a forum for data exchange, (v) development of a manual for the use of CHM website, and (vi) organization of seminars on the functioning and use of the CHM website for all stakeholders. These activities should be implemented by the CHM NFP in BiH, to be nominated by FMET.</p> <p><i>Funding estimate: 50,000 KM per annum</i></p>
	<p>19.2. Organization of symposia/conferences in the domain of conservation of biological diversity</p> <p>In addition to the CHM, this measure contributes significantly to the exchange of knowledge and experiences among all parties and partners in the field of nature protection, especially scientific research and professional institutions. During the preparation of NBSAP BiH (2015-2020), it was observed that there are many new research studies and data in the field of biological and landscape diversity that are hardly available or not available at all. The objective of this measure is, through the exchange of knowledge and experiences of domestic and international parties and partners, to apply good practices and strengthen cooperation, especially the cross-border one, as well as to promote scientific research institutions and motivate individuals to publish their scientific achievements and research results. This measure involves the organization of symposia/conferences in the domain of nature protection each year by the MoFTER, in cooperation with the relevant ministries in charge of environmental protection. The symposia/conferences should be held for several days and be divided thematically according to the global strategic goals of the CBD. The symposia/conferences would be promoted through the CHM website.</p> <p><i>Funding estimate: 30,000 KM per annum</i></p>
	<p>19.3. Enhancement of scientific technologies</p> <p>This measure implies that the ministries responsible for protection of environment, agriculture, water management and forestry should form a group of experts/technicians who will: a) analyze the current situation and identify deficiencies/needs in the domain of scientific technology laboratories and institutes; b) develop the prioritization list for scientific technologies; and c) develop a plan of activities for the provision of funding, i.e. for investment into scientific technology, including consultative meetings. This measures should be in accordance with the Scientific Technology Development Plan - the Implementation Plan (Chapter 5).</p> <p><i>Funding estimate: 80,000 KM per annum</i></p>
National Target	<p>20. By 2017, prepare and adopt the strategy for mobilization of financial resources for conservation of biological diversity</p>

20.1. Prepare and adopt the strategy for mobilization of financial resources	
	<p>The more effective implementation of the NBSAP BiH (2015-2020) and the Strategic Plan 2011-2020 requires as a first step to prepare the strategy for mobilization of financial resources. The strategy needs to analyze the current situation (estimated funding allocations from local and international sources for the domain of biological diversity over the past 5 years, identification of donors and sponsors), to make the assessment of the resources available for the implementation of the national targets/measures for biological diversity by 2020, to identify indicators, create an action plan (all in accordance with the Resource Mobilization Plan – Implementation Plan shown in Chapter 5), and to state the method for implementation and supervision of the use of the funding. This measure is also supported by Measures 1.2., 1.3., 3.2., 7.2., 8.4., 16.2., and 16.4. In the process for preparation of the strategy, which is the responsibility of the Ministry of Finance and Treasury of BiH in cooperation with the MoFTER, it is necessary to hold 3 meetings with all stakeholders at state, entity and international levels, while the Council of Ministers of BiH is responsible for the adoption of the strategy.</p> <p><i>Funding estimate: 55,000 KM (40,000 for drafting of the Strategy; 15,000 for meetings) for 2017</i></p>
National Target	21. By 2020, establish and strengthen cooperation for improved protection and sustainable use of biological diversity in the countries of the West Balkans
21.1. Holding of annual meetings between NFPs and scientific community representatives on potential cross-border projects	
	<p>During the parallel process of drafting the NBSAP document in the West Balkans countries, a total of two meetings were held with the NFP's, coordinators and representatives of implementation agencies. The goal of the meeting was based on exchange of activities, knowledge and good practices in the process of drafting the NBSAP document. In order to continue this process, it is necessary to hold regional meetings 3 times per year with the NFPs and representatives of the scientific community. Each meeting would be held at another place, i.e. in a different West Balkans country, and would be organized by the NFPs. The purpose of the meetings is to strengthen regional cooperation, establish the work plan, discuss potential cross-border projects and apply for funding that aim at protection and sustainable use of biological diversity.</p> <p><i>Funding estimate: 15,000 KM per annum for consultative meetings</i></p>
21.2. Exchange of information, data and good practices in the domain of biological diversity management	
	<p>In addition to meetings, it is very important to establish, maintain and exchange new information and data related to biological diversity among the representatives of the scientific community in the West Balkans countries, aimed at protection and sustainable use of biological diversity. This measure can be implemented through the CHM website (via implementation of Measure 19.1.) and through holding of symposia/conferences (via implementation of Measure 19.2.).</p> <p><i>Funding estimate: noted under Measures 19.1. and 19.2.</i></p>

5. IMPLEMENTATION PLANS FOR THE NBSAP BiH (2015-2020)

Implementation plans serve as tools or mechanisms for the successful implementation of the NBSAP document. In accordance with the recommendations from the module package²⁵ containing the guidelines for preparing the NBSAP, developed by the CBD Secretariat, 4 principal plans have been made for the implementation of the NBSAP BiH (2015-2020):

1. Communication Plan;
2. Capacity Development Plan;
3. Scientific Technology Development Plan;
4. Resource Mobilization Plan.

Each of the aforementioned implementation plans has been explained in detail in the continuation of the text.

5.1. Communication Plan

5.1.1. Introduction

The CBD recognizes that human beings are a major factor in changing the state of nature. The causes of environmental problems and possibilities for their resolution depend on the perceptions, attitudes and behaviors of people, which is closely related to values, preferences and beliefs of these people about the world and their environment. Communication plays a key role in shaping people's perceptions of the nature and role of man in nature, as well as in making certain decisions, policies and programs.

Many parties have ratified the CBD and prepared the NBSAP document in order to preserve the values and ensure sustainable use of biological diversity. The implementation of this document requires cooperation among many sectors, various organizations and individuals, and networks dealing with various issues related to biological diversity. All of this points to the fact that biological diversity is a multidisciplinary issue. Achieving this kind of cooperation requires a strategic approach and the use of appropriate means of communication, education and public awareness raising. Therefore, the Strategic Plan 2011-2020 sets Aichi Target 1, the focus of which is raising public awareness of the values of biological diversity.

The CEPA Program has also arisen from Aichi Target 1, as a CBD program adopted at COP-6. The most important role of the CEPA Program is to support the development of the CEPA Strategy and communication tools on important issues of biological diversity at national and global levels, and to assist in the development and implementation of the Communication Plan.

The issue of biological diversity must become a priority at national and local levels in order to allow for placing in action of the NBSAP measures. In this connection, until the CEPA Strategy has been passed, the Communication Plan shall have a key role.

²⁵ A set of modules for capacity strengthening for development of the NBSAP is available on the official CBD webpage (www.cbd.int/nbsap/training/default.shtml)

The Communication Plan affects all potential participants, directing them to the good cooperation that aims to meet all national targets in biological diversity conservation. This type of Plan includes all levels of government and stakeholders whose support is essential for effective implementation of the NBSAP measures at the local, national and international levels. It also includes measures aimed e.g. at the education of children in primary and secondary schools, small businesses in the field of interest, government officials in various departments, as well as representatives of various sectors. The main impact on individual institutions, ministries and different levels of government is exactly accomplished through communication between these levels.

If the NBSAP document is not well communicated, broadly released and explained to decision makers, managers, civil society or the public, priority issues including the defined measures of the NBSAP will not be implemented in an appropriate manner. Therefore, only through effective communication the NBSAP issues, as well as the national reports to the CBD, will feature prominently in the decision-making process as essential priorities in the country.

5.1.2. Status Analysis and Problem Identification

This chapter identifies the problems in the area of communication between institutions and organizations through cross-sectional analysis of the state of the NBSAP BiH (2015-2020), the Fifth National Report of BiH to the CBD (2014) and the lessons learned in the development and adoption of the NBSAP BiH (2008-2015).

The first and generally the biggest challenge in the process of development of the NBSAP BiH (2015-2020) and in the creation of the Fifth National Report of BiH to the CBD (2014) were the high quality and reliable data as the main input and starting point for these two documents, but they were also key for communication of priority issues in the NBSAP BiH (2015-2020).

Another problem identified was the lack of awareness of the seriousness of the problem of biological diversity conservation at all levels, primarily among decision makers. The best indicator of this is an almost 3- year long process of adopting the NBSAP BiH (2008-2015), i.e. the time from the development of the document to its coming into force.

Biological diversity is not sufficiently integrated into policies, programs, plans and activities of other sectors. Also, there is no adequate integration or exchange of information among numerous agencies, institutions and organizations, which is a particular problem, especially when it comes to the availability of relevant data, etc.

Research studies concerning the level of public awareness on biological diversity issues in BiH have not been implemented, nor are there any concrete data that could refer to it.

5.1.3. Priority Issues, Targets and Measures in the Implementation of the Communication Plan

Priority Issues

Bearing in mind that the NBSAP BiH (2015-2020) has defined 21 national targets for biological diversity and a series of measures to be implemented in order to accomplish them, and bearing in mind the different themes of the objectives set forth, as well as their connections and interdependence, the priority issues have been determined for communication in the NBSAP BiH (2015-2020).

Priority issues for communication of the NBSAP BiH (2015-2020) have originated from the targets, and they are fundamental issues that affect the implementation of the defined measures. Successful communication of these issues provides a significant contribution to the implementation of the NBSAP BiH (2015-2020) and the fulfillment of the requirements and obligations under the CBD and the Strategic Plan 2011-2020.

The priority issues for communication recognized in the NBSAP BiH (2015-2020) are:

1. Prioritization of biological diversity issues and significance of the measures in the NBSAP BiH (2015-2020) through communication, education and public awareness raising;
2. Valorization of ecosystems and their services, and prioritization of nature protection issues accompanied with urgent protection and increased percentage of the protected natural areas in BiH;
3. Integration of the biological diversity values into other sectors, i.e. sectoral strategies, programs, plans, etc.

Targets and Implementation Measures

In order to smoothly and successfully implement the NBSAP BiH (2015-2020), i.e. the measures envisaged in this document, the Communication Plan has been drafted that supports communication, education and raising awareness of the values of biological diversity and helping create a positive attitude and perception in terms of biological diversity with all stakeholders, as well as the prioritization of biological diversity at all levels.

In order to accomplish this goal, it is necessary as follows:

- Inform and involve various target groups into biological diversity issues and priorities in this domain,
- Create a positive attitude towards and perception of the NBSAP BiH (2015-2020) and its measures among all target groups at all levels,
- Encourage dialogue, strengthen cooperation and find the best solutions for implementation of the measures in NBSAP BiH (2015-2020).

The principles of the Communication Plan are:

- transparency,
- participation,

- creation of understandable, sensible and informative messages,
- communication begins with listening – stimulation of debating and exchange of opinions and attitudes,
- differentiated communication (various communication channels and tools for different target groups),
- „go locally“ – decentralized communication,
- use of modern communication tools,
- more planning and coordination,
- communication from the very beginning of the decision making process,
- building and maintenance of the partnership network on biological diversity issues in BiH, and in particular establishment and maintenance of cross-border cooperation and partnerships.

The NBSAP BiH (2015-2020) logo must be visibly shown on all materials produced by the implementer or partner in the implementation of the Communication Plan.

5.1.4. Monitoring

For all priority issues of the NBSAP BiH (2015-2020) determined in this Communication Plan, it is necessary to regularly monitor the implementation of communication activities, which includes:

- Keeping of records on media inquiries and on activities conducted under the NBSAP BiH (2015-2020) as well as media announcements (which media has announced the news, when, at which hour/on which page), the number of news repetitions (for the TV and radio), photocopies of the news or clips (for the TV and radio),
- Sorting and keeping of all news announced (regardless of the format – electronic or hardcopy) in the databases and file folders,
- Development and regular updating of the table with information on announcements and activities reported in the media (the table needs to contain the following attributes: date, type and name of the media, and a brief description of the contents),
- Surveying of all the target groups envisaged in the Communication Plan (at least twice during the implementation of the NBSAP BiH (2015-2020)) in order to do the analysis and comparisons. The surveys may be Internet surveys available on the CHM website or distributed via social media, questionnaires handed out at meetings with stakeholders and decision makers, etc.

5.1.5. Communication Plan Matrix

Table 32: Communication Plan Matrix

Priority Issue	Target Group	Key Message for Communication	Tools	Partners
Prioritization of biological diversity issues and significance of the measures in NBSAP BiH (2015-2020) through education and public awareness raising	Broader public Children and youth Government representatives and decision makers at all levels Representatives of the sectors relevant to the domain of biological diversity	Biological diversity is of extraordinary significance for BiH and its population and therefore its status must be improved or at least conserved	<ul style="list-style-type: none"> ▪ CHM website ▪ Social network accounts (Facebook, Instagram, Twitter, etc.) ▪ Newsletters for raising of awareness on the CBD, Strategic Plan (2011-2020), NBSAP BiH (2015-2020) and biological diversity in general ▪ Representatives and statements/conferences/press releases ▪ Events – Biodiversity World Day (22 May) and other events ▪ Publications on biological diversity in BiH available in a number of languages ▪ Information centers within relevant institutions, organizations and protected areas ▪ 14 representatives for close and constant cooperation with municipalities (a total of 141 municipalities), schools, local media, etc. ▪ Especially designed posters /infographics for primary and secondary schools ▪ Documentary movies or video-clips available on Internet websites on biological diversity in BiH ▪ Contact-center – „green telephone“ – for biological diversity information exchange 	Non-governmental sector Media Public enterprises managing the protected areas Cantonal ministries in the nature protection sector Scientific research institutions
Valorization of ecosystems and their services, and prioritization of nature protection issues accompanied with urgent protection and increased percentage of protected natural areas in BiH	Government representatives and decision makers at all levels Broader public	Protection of nature and extraordinary ecosystems and their services has be a priority in BiH, and the most efficient way for protection are protected natural areas	<ul style="list-style-type: none"> ▪ Publications on ecosystem services and their protection ▪ Newsletters for raising of awareness on the protected areas in BiH ▪ Round tables with representatives of governments and decision makers 	Public enterprises managing the protected areas Other ministries in the nature protection domain (entity and cantonal) Municipalities Scientific research institutions Non-governmental sector
Integration of biological diversity values into other sectors, i.e. sectoral strategies, programs, plans, etc.	Representatives of the sectors relevant to the domain of biological diversity	Biological diversity issues need to be integrated into sectoral strategies at all levels, and the targets of NBSAP BiH (2015-2020) need to be considered when establishing sectoral targets	<ul style="list-style-type: none"> ▪ CHM website ▪ Newsletters for raising of awareness on the CBD, Strategic Plan (2011-2020), NBSAP BiH (2015-2020) and biological diversity in general ▪ Participation in the process of adoption of sectoral strategies 	Other ministries in the nature protection domain (entity and cantonal) Municipalities Non-governmental sector

5.2. Capacity Development Plan

5.2.1. Introduction

The NBSAP BiH (2015-2020) is a comprehensive document that presents the biological values of the country, and guidelines for the protection, conservation and sustainable use of natural resources. The specific constitutional order of BiH has resulted in difficult adoption and implementation of certain documents at both the national and sub-national levels of the government. In terms of the implementation of the NBSAP BiH (2015-2020) it is necessary to ensure the development of human, institutional, legal and technological capacity, which allows for planning and managing of a more representative system of protected areas and biological diversity conservation in BiH. So, in order to successfully implement the NBSAP BiH (2015-2020), it is necessary to draft the Capacity Development Plan, including the assessment of necessary human and technical resources, and the method of their mobilization.

The drafting of the Capacity Development Plan is needed in order to achieve all of the targets set out in the NBSAP BiH (2015-2020), particularly those contained in the Strategic Plan 2011-2020 (Strategic Goal E), which reads: "Implementation of the CBD should be strengthened through participatory planning, knowledge management and capacity building". In addition to the implementation of the measures for achieving the targets that are under this strategic goal, the achievement of other targets too requires the implementation of the measures and activities related to capacity building and development, appointments of institutions in charge of coordination and harmonization of national legislation for the implementation of the Nagoya Protocol at all levels, etc.

The Capacity Development Plan presents the current situation and identifies the problems in capacity development, and proposes the measures to expand and improve the existing capacity in order to successfully implement the NBSAP BiH (2015-2020).

5.2.2. Status Analysis and Problem Identification

National Capacity Self-Assessment in BiH

In January 2012 the document titled "National Capacity Self-Assessment in BiH (NCSA)", which aimed to identify, through a consultative process led by the government, the priorities and needs for capacity building in order to achieve adequate protection of the environment at the global level.

The result of the implementation process, after fifteen months of intensive work, is a document that contains an analysis of the status and availability of existing capacities, and provides an overview of the need for additional capacity on each thematic area (Convention), including an overview of priorities, constraints and opportunities for capacity building, as well as an activity plan - Action Plan for establishment of the necessary capacity. The NCSA in BiH served as a basis for formulating the Capacity Development Plan.

Capacity Building and Levels of Capacity Analysis

The term "capacity building" is used in the sense of all activities that improve the ability of individuals, institutions and the whole system in terms of completing tasks and functions in an efficient, effective and sustainable way. Capacity analysis and capacity building are implemented at multiple levels - individual, institutional and systemic:

- *At an individual level* – the capacities that are the subject of analysis include the ability of individuals that are involved or should be involved in meeting the CBD requirements. Capacity building at this level is done through staff education and training, management improvements (staff motivation) and similar activities. The aim is to increase individual abilities in management and environmental protection for individuals working independently, within an organization or society as a whole;
- *At an institutional level* – capacities pertain to the general organization of activities and functional capacity of institutions and organizations. Institutional capacities include human, administrative, financial and technical resources. Capacity building at the institutional level aims to improve the organizational structure and increase cooperation among groups or sectors within an institution or organization;
- *Systemic capacity level* is reflected in the functioning conditions of institutions and organizations, as well as their interactions. This level includes political, legal and economic frameworks, resources on a systemic level, public support and coordination.

The Capacity Development Plan covers all of the three levels, but at the institutional level it does not include the financial, informational and technical resources that are the subject of other implementation plans, such as the Scientific Technology Development Plan and the Resource Mobilization Plan. Therefore, the Capacity Development Plan is focused on the first two levels, while at the system level it covers mainly the legal and institutional frameworks.

Assessment of Existing Capacities

In accordance with the constitutional system of BiH, the competencies in the domain of environmental protection are defined at the level of the state, entities, BD and 10 cantons. Thus designed system hinders the flow of information in horizontal and vertical directions, which is one of the main problems in this sector. The nature and environmental protection issues are primarily the issues of sectoral policies, which further complicates the very process of planning, implementation and monitoring of all activities involving the protection of nature and environment. The lack of a central database system extremely hinders adequate work in this sector.

In BiH, there is no professional institution in charge of the issues of evaluation and reevaluation of natural values and heritage, or the development of legislative and institutional frameworks for sustainable management. The existing professional and scientific institutions (universities, centers, institutes, agencies) and state administration bodies are not sufficiently networked in order to provide adequate protection and improve the level of biological diversity conservation.

This problem also occurs at the entity level and at the level of cantons (in the FBiH). At the entity level (FBiH and RS) there are no professional institutions to perform professional tasks for the

ministries. The implementation of the entity-level Nature Protection Laws is not possible without expert institutions and without adequate coordination between the different administrative levels in both entities.

Assessment of Human Resources

In most institutions in BiH, there is no sufficient employed expert staff involved in conservation of biological diversity, which complicates the process of implementation of activities that needs to respond to world trends in this area.

- I. In **BiH**, under Article 9 of the Law on Ministries and Other Bodies of BiH (Official Gazette of BiH, no. 5/03, 42/03, 26/04, 42/04, 45/06, 88/07, 35/09, 59/09 and 103/09), defining of policies, basic principles, coordinating activities and harmonizing plans of the entity authorities and institutions at the international level in the fields of agriculture, energy, environmental protection, development and use of natural resources and tourism is within the responsibility of the MoFTER. Within the MoFTER, the Sector for Energy, Natural Resources and Environmental Protection, with its six departments, has 34 employees, and within the Department of Environmental Protection – 9. The National Museum of BiH (closed to the public since 2012 due to lack of funds and currently the state of this institution is unresolved) has a total of 5 employees (one ornithologist, 1 entomologist, 2 botanists and 1 horticulturist).

- II. In the **FBiH**, according to the Law on Federal Ministries and Other Bodies of the Federal Administration (Official Gazette of the FBiH, no. 58/02, 19/03, 38/05, 2/06, 8/06 and 61/06) the institutions in charge of passing, application and implementation of laws and policies in the area of environment and nature protection are shown in Table 33.

Table 33: Number of Employees at the Competent Institutions of the FBiH in the Domain of Nature and Environment Protection

Name of Institution	Number of Employees at the institution
Federal Ministry of Environment and Tourism	48
Federal Ministry of Agriculture, Water Management and Forestry	98
Federal Hydrometeorological Institute	96
Federal Institute for Agripedology	31
Agency for the Sava River Basin	63
Agency for the Adriatic Sea Basin	30
Environmental Protection Fund	15
National Park „Una“ Public Enterprise	15
Federal Administration for Inspections	149
TOTAL	545

At the level of the cantons in the FBiH, the competent institutions are the cantonal ministries and competent public enterprises for passing, application and implementation of laws and policies in the domain of environment. The total number of employees at all of the cantonal ministries is 107, however, the exact number of employees at public enterprises is not known.

- III. In the **RS**, in accordance with the Law on Republic Administration (Official Gazette of the RS, no. 118/08, 11/09, 74/10 and 24/12), the domain of nature and environment protection falls in the scope of work of a number of administration bodies, as shown in Table 34.

Table 34: Number of Employees at the Competent Institutions of the RS in the Domain of Nature and Environment Protection

Name of Institution	Number of Employees at the institution
Ministry for Physical Planning, Civil Engineering and Ecology	32
Ministry of Agriculture, Forestry and Waters	70
Ministry of Industry, Energy and Mining	66
Ministry of Health and Social Protection	47
Public Institution "Vode Srpske"	43
Republic Hydrometeorological Institute	64
Agency for Forests	13
Republic Institute for Geological Research	11
Republic Institute for Standardization and Metrology	8
Republic Administration for Inspections	318
Republic Institute for Protection of Cultural, Historical and Natural Heritage/Ministry of Education and Culture	25
Environmental Protection and Energy Efficiency Fund	25
TOTAL	722

- III. In the **BD BiH**, pursuant to the Law on Public Administration of the BD (Official Gazette of the BD, no. 19/07), the Department for Spatial Planning and Legal Property Affairs of the Government of the BD BiH bears the administrative competency in the domain of environmental protection, and 4 employees work on environmental issues. The inspectorate of the Government of BD has 1 employed inspector for environmental protection.

The above stated leads to the conclusion that there are a large number of employees in BiH who are directly or indirectly involved in the issues of environment and nature protection, provided that the previous analysis of the FBiH and the RS the data at the municipal levels are lacking. However, the expert staff are employed at various institutions, which in general do not possess capacities and as such, the entire system is inefficient and scattered.

Existing Needs and Plans for Development and Strengthening of Staffing Capacities

Information on existing plans for the development and strengthening of human capacity can be found in the BiH Council of Ministers' document titled "Responses to the List of EU Questions - Chapter 27 Environment" (2012). At the state level, the MoFTER includes a total of eight sectors, and in the Sector for Natural Resources, Energy and Environment there are several departments that coordinate specific activities in the domain of water and environmental protection. The Environmental Protection Department coordinates this area, while the Department for Water Resources coordinates the activities in the domain of water. In the coming period, activities are planned to amend the Rulebook on the Internal Organization of MoFTER, where the sector for the protection of the environment would be formed, which would have at least 4 sectors, of which one would be dealing with issues of collecting and reporting environmental data to EEA, which currently does not exist.

With regards to the strengthening of capacities at the individual level, there are no legal provisions governing the obligations for training of civil servants, especially in the domain of environmental protection. However, the Law on Civil Service in the Institutions of BiH (Official Gazette of BiH, no. 19/02), Article 49, defines the issue of expert education and training. Also, the training of employees, which is partly supported by the international scientific and professional institutions, opens the possibility of training and professional development for different areas of environmental protection and biological diversity conservation (e.g. JICA, SIDA, various programs of other countries, bilateral and multilateral TAIEX seminars, MTEC trainings, ReSPA seminars, UNDP seminars, WBIF seminars, IPA Twinning seminars, etc.). A significant portion of the training for the servants has been carried out through the EU IPA projects.

In addition, in the veterinary field in BiH, on the basis of the Veterinary Law in BiH (BiH Official Gazette, no. 34/02), official veterinarians must periodically be trained and conduct the prescribed verifications of knowledge according to the program prepared by the competent authorities of the entities and BD BiH. The training also pertains to the domain of environmental protection, which includes the procedures, conditions and measures to be undertaken during the breeding, keeping, treatment and protection of animal health; during processing, re-processing, storage and transport of products of animal origin and utilization of carcasses, offal, inedible by-products of slaughter and animal waste materials, with the purpose of preventing pollution of the environment.

The competent institutions of the RS in general need to fill vacancies and strengthen the professional skills of personnel, in accordance with the valid systematization, but this is conditioned by the available budget funding. Professional training of existing staff is done through the implementation of projects and seminars within the framework of projects funded by the EU (e.g. IPA, TAIEX), and by other bilateral donors. Strengthening the administrative capacity has been recognized as the need by the competent institutions in the field of environmental protection, especially in the context of the obligations related to EU integration. The adopted rulebooks on the organization and systematization of the aforementioned institutions (Table 34) plan for an increase in the number of employees, and the vacancies are filled in accordance with the staffing plan of the RS Government and according the planned funds in the RS budget for each year.

The Law on Civil Servants of the RS (Official Gazette of RS, no. 79/05, 81/05, 83/05, 64/07, 67/07, 116/08, 104/09 and 99/14) defines that a civil servant has the right and duty to attend training for professional development and capacitation for the needs of the administrative bodies, and the funding for the training shall be provided in the budget of the administrative bodies. Upon the proposal of the Agency for State Administration of RS, responsible for the training of civil servants in the RS, the RS Government adopts the Strategy for the training and development of civil servants for a period of at least three years. In accordance with the Strategy, the Agency adopts an annual program for the training of civil servants and is responsible for its implementation, and administrative bodies adopt their annual training programs in accordance with it and the available budget amounts.

With regard to training, the Law on Environmental Protection of the RS (Official Gazette of RS, no. 71/12) the necessity of education is defined in the domain of environmental protection. In this regard, the MPPCEE RS, in cooperation with the Ministry of Education and Culture and the Ministry

of Science and Technology, develops and implements the annual educational plans in the domain of environmental protection, which promote education and public awareness of environmental protection in the regular curricula and extracurricular programs. In the coming period, training for civil servants in this domain is necessary as well as a larger number of employees, in order to fulfill the legal obligations and to establish a more efficient institutional system in terms of biological diversity conservation and in terms of the CBD implementation.

In the FBiH, special legislative or budgetary provisions relating to the training of civil servants in the domain of environment do not exist, but this is regulated by the Civil Service Agency of FBiH for all civil servants in the FBiH. There are certain training sessions at the state level in relation to the general European integration issues, through the Directorate for European Integration of BiH, wherein training sessions related to environmental issues occur.

Besides the need for training and education in the environmental protection sector that would also touch upon issues of biological diversity conservation, it is also necessary to strengthen the existing institutional framework. It is necessary to establish the Federal Institute for Nature Protection as prescribed by the Law on Nature Protection of the FBiH (Official Gazette of the FBiH, no. 66/13), with appropriate equipment, hiring and training of new professional staff.

In the BD either, there are no special training programs in the domain of environmental protection and biological diversity, which would facilitate the implementation of the CBD. The legal and budgetary provisions relating to the training of civil servants are defined in the Labor Law of the BD (Official Gazette of the BD BiH, no. 19/06, 19/07, 31/14, 25/08, 20/13) and the Law on Civil Service in Administrative Bodies of the BD (Official Gazette of the BD BiH, no. 28/06, 29/06). It is planned to strengthen administrative capacity in all areas through the EU integration process, with the assistance of international institutions and agencies involved in environmental protection.

5.2.3. Priority Issues, Targets and Measures for Implementation of the Capacity Development Plan

Priority Issues

Priority issues for the implementation of the Capacity Development Plan in the NBSAP BiH (2015-2020) stemmed from the set targets and identified measures. In order to achieve the CBD targets and the targets arising from the NBSAP BiH (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 connection, it is necessary to place focus on certain priority issues, such as:

1. Prioritization of biological diversity issues and the significance of NBSAP BiH (2015-2020) through the establishment of new staff and strengthening of human resources in the existing professional and academic institutions,
2. Securing of financial resources for the implementation of the NBSAP BiH (2015-2020) and capacity building in all institutions in the domain of environmental protection,
3. Strengthening of the existing capacities in higher education,
4. Strengthening of the scientific and technical research in the domain of nature protection, according to the priority issues, and the creation of databases.

Implementation Targets and Measures

The analysis presented in the previous section indicated upon the need to strengthen the capacity of institutions in BiH if they want to successfully implement the targets arising from the CBD.

It is necessary to develop and strengthen the administrative structure at all levels because 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 (centers, institutes, agencies, and public administration bodies) for adequate protection and sustainable management of biological diversity. In this regard, a special focus in capacity development should also include the networking of institutions and the creation of a functional framework for the implementation of environmental conventions.

The Capacity Development Plan sets the main targets to be achieved in the coming period for the successful implementation of the CBD, other international environmental agreements, as well as domestic laws.

In view of strengthening the institutional framework and human resources it is necessary to:

- Establish institutions that are professionally involved in the comprehensive protection issues and other activities in connection with nature, primarily from the Federal Institute for Nature Protection, which is provided for under Article 189 of the Law on Nature Protection (Official Gazette of FBiH, no. 16/13);
- Strengthen the capacity of the Republic Institute for Cultural, Historical and Natural Heritage of the RS;
- Strengthen the staffing capacity of the departments responsible for nature protection within relevant ministries at all levels of government;
- Establish and strengthen municipal inspection services for the protection of nature;
- Improve and strengthen cooperation and coordination of professional and scientific institutions (universities, centers, institutes, agencies, and public administration bodies) including their networking;
- Improve vertical and horizontal cooperation of all institutions dealing with environmental issues and biological diversity, while enhancing inter-sectoral cooperation;
- Strengthen the institutional framework for the application and implementation of international environmental agreements;
- Provide and project training sessions in the environmental sector for the employees in institutions dealing with environmental issues.

5.2.4. Monitoring

The smooth and successful implementation of the priority issues identified in the Capacity Development Plan includes an effective attitude towards nature and natural resources on the part of all institutions that in a certain way participate in these issues. In order to ensure the successful implementation of the Capacity Development Plan, it is necessary to monitor its implementation, which includes:

- Development of a database for monitoring the capacity status at the institutional and system levels,
- Establishment of an information flow system for the collected data,
- Annual analysis of the capacity status, with an indication of the need for its strengthening,
- Monitoring of horizontal and vertical cooperation between authorities, in cooperation with expert and scientific institutions,
- Evaluation of the environmental awareness levels among employees of the institutions from the environment and biological diversity sectors,
- Monitoring the availability of data from the environment and biological diversity sector,
- Monitoring of cross-border cooperation,
- The evaluation and comparison of data related to human capacity and the implementation of the targets from the NBSAP BiH (2015-2020).

5.2.5. Capacity Development Plan Matrix

Table 35: Capacity Development Plan Matrix

Priority Issue	Target Group	Tools	Partners
Prioritization of biological diversity issues and significance of NBSAP BiH (2015-2020) through establishment of new and strengthening of existing human resources in professional and scientific institutions	Government representatives and decision makers at all government levels Representatives of relevant sectors for biological diversity issues	<ul style="list-style-type: none"> ▪ Workshops ▪ Round tables ▪ Public debates ▪ Legal framework 	Government institutions at all levels of jurisdiction Educational institutions Non-governmental sector Media
Securing of funding for the needs of implementation of NBSAP BiH (2015-2020) and strengthening of capacities (human, institutional, legal and technological)	Government representatives and decision makers at all levels Government institutions at all levels of jurisdiction	<ul style="list-style-type: none"> ▪ Grants ▪ Budgets ▪ ODA funding ▪ Credit funds 	Educational institutions International institutions Non-governmental sector
Strengthening of existing capacities in higher education and other educational institutions	Educational institutions Representatives of relevant sectors for biological diversity issues	<ul style="list-style-type: none"> ▪ Workshops ▪ Round tables ▪ Legal framework ▪ Education programs 	Relevant Government institutions at all levels of jurisdiction Non-governmental sector Media
Strengthening of scientific/professional research in the domain of nature protection by priority issues and formation of databases	Educational institutions Government representatives and decision makers at all levels	<ul style="list-style-type: none"> ▪ Workshops ▪ Round tables ▪ Written materials ▪ Publications on nature protection and biological diversity 	Government institutions at all levels of jurisdiction Educational institutions Non-governmental sector

5.3. Scientific Technology Development Plan

5.3.1. Introduction

Scientific technologies play a significant role in meeting various human needs and are used for different purposes, and thus exert certain direct and indirect impacts on biological diversity. In order to ensure successful implementation of the NBSAP BiH (2015-2020), in accordance with the defined priority national targets and measures for their implementation, it is necessary to point out certain scientific technologies on the application of which it directly depends how effectively the national targets set forth can be implemented in practice, ensuring the implementation of the NBSAP BiH (2015-2020).

Due to wartime events that affected BiH, there has been stagnation in the development of the whole country, and thus a delay in the development of scientific potentials, human resources, scientific and research infrastructure and scientific technology. Today, the majority of research resources are located at higher education institutions, the industrial research is at a low level, and practically almost all scientific and research development institutes in the country have disappeared. This negative trend has also been present in recent years, specifically resulting from the global economic crisis, especially having in mind that for the purposes of science, including the development and implementation of scientific technology, BiH allocates less than 0.1 of GDP (Strategy for Development of Science in BiH 2010-2015, 2009). Unlike developed countries (e.g., in the US, state funding accounts for 11.1 % of the total funds allocated for scientific purposes, in Japan this is 8.3 %, in Denmark 6.7 %, in Ireland 6.3 %, etc.), in BiH most of these funds are earmarked by the state (over 80 %), while the business sector and others account for less than 20 % (Strategy for Development of Science in BiH 2010-2015, 2009).

Scientific technologies are closely related to research and collection of new data regarding biological diversity, as well as to further monitoring of the state of biological diversity and the implementation of the NBSAP BiH (2015-2020). As a country that has accepted the objectives of the CBD, BiH has an obligation to monitor the situation and to continuously inform the CBD Secretariat on biological diversity trends through various documents (national reports, national strategies, etc.). For all these reasons, it is very important that scientific and technical capacities in BiH dealing with biological diversity issues be able to easily and effectively obtain the updated data, share and compare information and knowledge, not only at the BiH state level but also at the international level.

Data obtained through scientific research are the basis of biological diversity protection and nature conservation. Therefore, their planning and introduction of new technologies need to have this information as the basis. In this connection, improving conditions for research through the purchase of new equipment, ensuring of adequate space, training of professional staff, etc., is one of the priorities that significantly contributes to biological diversity protection. At the same time, along with the improvement of the conditions for scientific research, plans should be developed in order to enable the employment of young professionals in this domain.

5.3.2. Status Analysis and Problem Identification

One of the main problems singled out during the work on NBSAP BiH (2015-2020), as well as in the preparation of the Fifth National Report of BiH to the CBD (2014), is the lack of high-quality, valid, and in particular more recent data required for a wide range of thematic units in relation to the identification of the situation in BiH according to Aichi Targets, of the data needed to monitor the state of biological diversity in general, and of the data needed to evaluate the implementation of NBSAP BiH (2015-2020).

The Expert Team involved on developing the NBSAP BiH (2015-2020.) has established:

- The lack of data (most frequently due to the lack of recent research, works, publications, symposia, etc., related to biological diversity),
- Unavailability of existing data, lack of integration and application of various data classification and processing criteria, depending on various sources (faculties, institutes, ministries, scientific professionals),
- Questionable data quality (in some cases, the expert team perceived illogicalities and contradictions in the data collected),
- Lack of an adequate database.

The data currently available in BiH do not provide sufficient information necessary for a serious analysis of the status and trends of units identified in the documents.

The problem of the lack, unavailability and quality of data stems from the fact that in BiH 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, or at least for provision of information on where the data can be found. These data are not collected neither by the statistical services in the entities nor by the state-level agency.

The largest amount of data on biological diversity is located within higher education institutions (scientific faculties, agricultural and forestry faculties, etc.), as well as institutes and agencies that deal with biological diversity issues.

On the other hand, in order for the research in this area and the results obtained in this research to be accepted and competitive at a global level, it is necessary to improve human resources (education, training, seminars, conferences, symposia, etc.) and scientific technologies (modernization of existing and introduction of new, more modern and efficient technology solutions). However, none of the above can be undertaken without a serious financial support not only from the state, but also from the private sector, foreign investors, donors, and other appropriate sources.

5.3.3. Priority Issues, Targets and Implementation Measures for the Scientific Technology Development Plan

Priority Issues

The priority issues for the purpose of introducing new or improving old technologies identified in the NBSAP BiH (2015-2020) are:

Inventorying of genetic, species and ecosystem biological diversity components,
Conservation of genetic diversity (of resources) particularly through *ex situ* protection methods,
Mapping and evaluation of ecosystems and their services,
Control of introduction of invasive species, including methods and technologies that enable their monitoring, control and prevent their spreading.

Targets and Implementation Measures

The assessment of needs for scientific technologies is concerned primarily with the identification of existing gaps and emerging needs in this area, in order to address priority issues of the NBSAP BiH (2015-2020). In order to reach this goal, it is necessary to implement specific activities:

- **Creation of databases** – Through formation of primarily adequate databases, various elements related to the state of biological diversity, the factors that threaten it etc. should be made transparent, sorted, integrated in one place, easily accessible and comparable (data standardization in accordance with international standards) to the same category of data, within the spatial and temporal context.
- **Use of efficient mechanisms for data exchange** – It is very important that scientific and expert capacities (individuals and institutions) in BiH, who in the framework of their activities and research deal with issues of biological diversity, can easily and efficiently share and compare information and knowledge not only at the BiH level but also at the international level. This type of communication is enabled through various websites, such as the CHM BiH, which is part of a global network for information exchange, established by the CBD Secretariat.
- **Introduction of modern technologies to map ecosystems and their valuations** - As one of the pressing national targets, habitat mapping is set forth. Achieving of this goal is possible through the implementation of modern software and hardware solutions contained in the GIS and remote sensing technologies that enable the creation of detailed and accurate images of habitats and ecosystems in BiH.
- **Introduction of *ex situ* methods for the conservation of genetic resources** - Given that one of the key national targets for biological diversity related to the conservation of genetic resources (in particular animal ones, for which currently there is virtually no protection model), the modern technologies of *ex situ* conservation of these resources (cryopreservation of embryos, male and female sexual cells, fertilized egg cells, DNA, somatic cells, etc.) are what BiH lacks and what would allow for long-term preservation of endangered plant and animal genetic resources.
- **Controlled introduction of invasive species** - Because invasive species are identified as one of the factors compromising biological diversity, the identification of these species and the adoption of a strategy for invasive species have been set forth as one of the national targets.

The identification of invasive species and the activities undertaken in order to establish their control include a set of different measures and activities: taxonomic determination of species, habitat mapping, analysis of risk from introduction of invasive species, monitoring and control of the introduction and response to imported species, and measures for prevention of their spreading.

The successful implementation of the targets set in the NBSAP BiH (2015-2020) also includes the introduction of technologies that will improve the quality of basic environmental components. Given that the protection of these components is included in the environmental strategies and other sectoral strategies, data on biological diversity will be available in these documents as well.

The principles relating to the Scientific Technology Development Plan are:

- exchange of knowledge,
- exchange of scientific technology,
- transparency (publicly available information),
- standardization (comparable data),
- education (staff trained in the use of modern scientific technology),
- financial support (planned and ongoing).

5-3-4. Monitoring

In order to monitor progress in respect of the introduction of new and improvement of older technology solutions for the needs of the study and protection of biological diversity of BiH, it necessary to plan, organize and continuously monitor the situation and report to the scientific and general public to that effect. In this regard, in accordance with the priority targets set forth, the line ministries - the Ministry of Science and Technology of the RS and Federal Ministry of Education and Science, or any other nominated institutions/organizations for this purpose should monitor:

- published data from scientific research regarding biological diversity (scientific journals, web sites, portals, symposia, conferences, workshops, etc.),
- status and availability of data (all valid data should be located in modern databases regularly maintained and updated for this purpose by the nominated institutions – the data should be available to the scientific and general public),
- the state of mapping of ecosystems and habitats (number, type and quality of maps),
- implementation of the *ex situ* method for protection of indigenous genetic resources,
- inventory and state of introduced invasive species (database, implementation of technology solutions that aim to control populations, eradication, etc.).

5.3.5. Scientific Technology Development Plan Matrix

Table 36: Scientific Technology Development Plan Matrix

Priority issues	Target group	Tools	Partners
Inventory of genetic, species and ecosystem biological diversity components		Information technology	
Mapping and valorization of ecosystems and their services	Government representatives and decision makers at all levels	GIS and remote sensing technology	Government institutions at all levels of jurisdiction
Conservation of genetic diversity (resources), particularly using the <i>ex situ</i> protection method	Representatives of relevant sectors for biological diversity issues Scientific and broader public	Cryoconservation	Educational institutions Scientific research community International institutions Non-governmental sector
Control of introduction of invasive species		Information and technologies related to control of invasive species Laws	

5.4. Resource Mobilization Plan

5.4.1. Introduction

Ecosystem services are useful products of biological diversity for both the environment and humans. The benefits result from services involving support, supply, and regulation, as well as from the cultural aspects of nature.

In commercial terms, the benefits are divided into those that have a utilization value and those that do not. Utilization value may be obtained directly from the consumption of biological diversity (e.g. food, timber and firewood, tourism, recreation), indirectly (e.g. water treatment, soil conservation, flood protection, cultural and spiritual values of nature), or through potential values (e.g. possible future uses of some genetic materials). In contrast to the above, the services involving provision of habitat, circulation of matter, or mineral elements and other services that help the functioning of the ecosystem itself bear no useful values to humans.

Due to the increasing demand and consumption of natural resources, and because of other direct and indirect pressures on the environment, the benefits of biological diversity are reduced along with its loss.

The above shows that immediate and urgent action is necessary in order to preserve nature - biological diversity. Since this action requires substantial financial resources, it is necessary to ensure their mobilization at both international and national levels.

5.4.2. The CBD Financial Mechanism

The international funding mechanism for conservation and sustainable use of biological diversity is provided by the Memorandum of Understanding between the GEF and the CBD established in the UN CBD COP Decision III/8.

On the basis of the mentioned Decision, the GEF is an institution that is a financial mechanism for the implementation of the CBD in the Member States. The GEF provides funding for projects related to biological diversity, in accordance with the instructions received from the COP.

COP Decision XI/5 contains a four-year framework (2014-2018) for priority programs and analysis of the effectiveness of the financial mechanism. This four-year framework for GEF action takes into account primarily the following circumstances:

- Strategic Plan presents a general framework for the implementation of the CBD in this decade;
- GEF Sixth Biological Diversity Strategy envisages that Aichi Targets represent a flexible base, which countries can adapt to their needs, according to their own circumstances and priorities, or the NBSAP BiH (2015-2020);
- GEF Sixth Biological Diversity Strategy also envisages priority for those nationally proposed projects that could provide a high level of synergy in achieving more specific national targets.

5.4.3. The Strategy for Financing the CBD Implementation in BiH

During the previous nine-year cycle of CBD implementation, BiH has prepared its first strategic document for the conservation and sustainable use of biological diversity. The preparation and adoption process of the document NBSAP BiH (2008-2015) lasted for several years. The document was adopted by the Council of Ministers of BiH in June 2011.

Given that the implementation of NBSAP requires specific financial resources, it is necessary to point out the following facts regarding the NBSAP BiH (2008-2015):

- Due to the late adoption of the document in relation to the new Strategic Plan (2011-2020), no space, time or resources have been secured in BiH for a systemic implementation of this document;
- The document represents a good framework for the preparation of the entity strategies for the protection and sustainable use of nature in BiH.

The NBSAP BiH (2008-2015) also contains an action plan with an estimate of the funds required for the implementation of projects to protect and preserve nature.

The NBSAP BiH (2015-2020) includes an approach that is more closely oriented towards the mobilization of resources necessary for achieving the national targets than the approach used in preparing the NBSAP BiH (2008-2015). This is a result of increased public awareness of the necessity for financial investments in biological diversity, but also of increased local knowledge about international trends in CBD implementation.

5.4.4. State in the Domain of Financing of Protection and Sustainable Use of Biological Diversity in BiH

Despite the NBSAP BiH (2008-2015) adopted at the state level, in BiH there is no unified approach in creating the financial basis for the protection and sustainable use of biological diversity. Financing of strategic projects related to biological diversity in BiH takes place as follows:

- **FBiH:** The Environmental Protection Strategy of the FBiH is prepared for the period of 2008-2018. One component of this Strategy is the Strategy for the Nature Protection, in which five strategic targets have been defined. One of them is "*Establishment of financial mechanisms for the sustainable management of biological and geological diversity*", with the objective of "*Establishing a permanent flow budget allocations for the Protection of Nature and Natural Heritage of the FBiH.*" The total funding needed for achieving the identified targets from the Strategy for the Nature Protection are estimated at around 35 million KM. The FMET annually prepares and submits a proposed program for expenditure of funds with allocation criteria in accordance with the Action Plan of Strategy for Environmental Protection of the FBiH 2008-2018, adopted by the Government of FBiH. Average annual spending on conservation of biological diversity is 1 million KM. The funds are mainly allocated for the existing protected areas. The funds from 2014 were significantly reduced due to redirection of resources for flood relief. The Nature Protection Law of the FBiH establishes the need to preserve endangered biological diversity through financial and other incentives and benefits, tax and customs exemptions and favorable loans for protective

actions and concession fees. The funds for the protection of natural values, the financial and other incentives are provided in the budget of the FBiH Government and the EF FBiH. In addition, under this Law, the cantonal budgets provide funds for the protection of natural values designated by the cantons.

- **RS:** The Nature Protection Strategy of the RS (2011) is well aligned with the NBSAP BiH (2008-2015). In considering the financing of biological diversity, the greatest attention has been paid to the financing of protected areas. The main source of financing is the EPEEF RS, established as a legal entity with public authorities, whose rights, obligations and responsibilities are established by the Law on the Fund and Financing of Environmental Protection of the RS (Official Gazette of the RS, no. 117/11 and 63/14), the Statute of the Fund and other regulations. The Strategy, among others, establishes the strategic goal of "*Establishment of financial mechanisms for the sustainable management of biological and geological diversity*". In order to achieve this goal, four measures have been prescribed: (i) the mobilization of resources for strengthening of institutional framework, (ii) development of financial mechanisms, (iii) engaging the Fund's resources for expanded reproduction of forests, and (iv) entering into long-term contracts with gas, water, transport sectors, etc. The funds for the implementation of this goal from the Strategy are not estimated in the Action Plan. The strategy was adopted without the Action Plan, which has affected the level of implementation of the measures. The Nature Protection Law of the RS requires the preparation of reports on the state of the environment every two years by the competent MPPCEE RS, which needs to include data on the use of funds for nature protection.
- **BD:** The Environmental Protection Strategy of the BD (2013-2023) has been prepared and it is in the approval process. Part of this Strategy is the Strategy for Nature Protection, which is well aligned with the NBSAP BiH (2008-2015). The Strategy for Nature Protection of the BD stipulates 10 measures, including inventory, preparation of the Red List, establishment of monitoring, cooperation with sectors, and control of urbanization, etc. 11 concrete projects were proposed to be funded from the budget of the BD. The Fund for Environmental Protection of the BD has not yet been established.

5.4.5. Revenues and Beneficiaries of the Funds for Environmental Protection

In the FBiH and RS, funds for environmental protection have been established aimed at raising of resources, stimulating and financing the preparation, implementation and development of programs, projects and similar activities in the domain of conservation, sustainable use, protection and improvement of the environment and renewable energy.

The EF FBiH was established by the Law on the Fund for Environmental Protection of the FBiH (Official Gazette of the FBiH, no. 33/03), and according to Article 18, of this Law, the revenues of the EF FBiH are secured from:

- Fees paid by environment polluters,
- Fees paid by users of environment,
- Special fees for environment paid at each registration of motor vehicles.

The revenues for the EF FBiH are secured from:

- Funds generated from international bilateral and multilateral cooperation, and in-country cooperation on joint programs, projects and similar activities in the domain of environment protection,
- Budget of the Federation,
- Bank loans,
- Funds from loans and funds borrowed from other legal entities or financial institutions,
- Donor funding and other forms of support,
- Operations of the Fund (fees for services provided, payments on interest, principal, etc.),
- Other funding sources established in separate laws, regulations or agreements.

On the other hand, the EPEEF RS was established in the Law on the Fund and Financing of Environmental Protection of the RS (Official Gazette of the RS, no. 117/11 and 63/14), and pursuant to Article 17 of this Law, the financing of the Fund, environmental protection, energy efficiency and renewable energy sources are provided from the following specific purpose funding sources:

- Fees paid by environment polluters,
- Fees for burdening of environment with waste,
- Water protection fees paid by owners of vehicles using oil or oil derivatives in accordance with the Law on Waters (Official Gazette of RS, no. 50/06 and 92/09),
- Funds from international programs, projects and other activities in the domain of environmental protection, energy efficiency and renewable energy sources,
- Contributions, donations, grants and assistance and other sources in accordance with the Law.

The funds for environmental protection established in the FBiH and RS work, among other things, towards improvement of the flow of information and public access to information. Thus, among others, the EPEEF RS prepared a document entitled "Review of Activities Under Programs and Projects Funded by the Environmental Protection and Energy Efficiency Fund of the RS - Activities Conducted During 2010" (2011), which provides the data on: the name of the legal entity, the title of the project, the authorized person, project coordinator, address and contact telephone number, description of the activities and budget, as well as photos for each project.

The reports of the EF FBiH provides the analyses of the activities conducted. Based on the report "Analysis of Statistical Data (2012)" on the projects implemented in the Federation; there is evidently sufficient diversity of applicants in the category of approved projects.

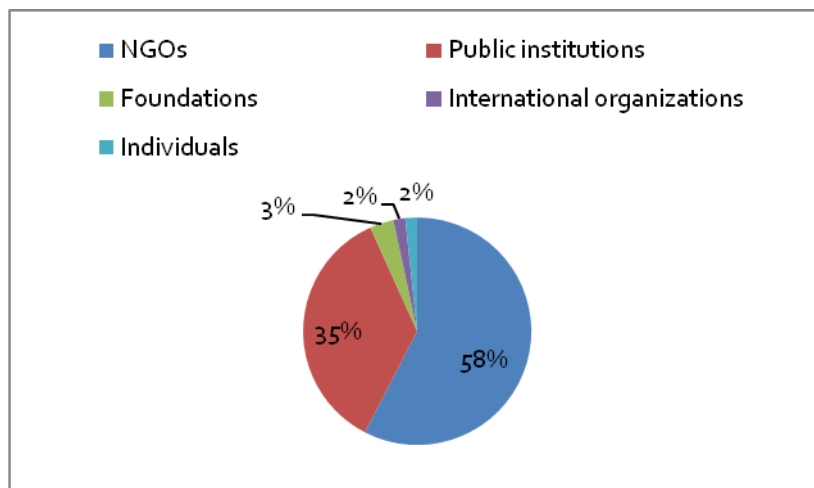


Chart 20: Overview of the Number of Applications Approved by Types of Beneficiaries in the FBiH
Source: Environmental Protection Fund of the FBiH

Table 37: Average Rating by Evaluators Based on Application (Project) Criteria in the FBiH that Have Not Satisfied the Expert Analysis

Criteria of the committee for expert analysis and rating of the invitation	Average rating by evaluators
Preparation of the project, program or similar activities	0.62
Degree of favorable effects on environment	0.66
Quality of the technological solution offered	0.70
Degree of threat to environment	0.69
Financial capacity of the fund beneficiary for investment and return of funds, if the return of funds has been agreed	0.70

Source: Environmental Protection Fund of the FBiH

The criteria for expert evaluation of applications are defined by the FBiH Rulebook on the Criteria for Evaluation of Applications for Funding, or Programs, Projects and Similar Activities (Official Gazette of the FBiH, no. 73/10).

According to the Rulebook, the criteria and methodologies for evaluation are not developed in terms of better and priority support to the targets identified in the adopted strategic documents for biological diversity (Table 37). The result is the following example: according to the Decision on the Selection of Beneficiaries of the Fund's Resources (no. UO-12-45-3/2013), total funds awarded for projects amounted to 2.26 million KM. Of the total allocated 1.18 million KM for 26 projects under Lot II (Projects and Studies Aimed at Meeting the Targets from the Environmental Protection Strategy of the FBiH 2008-2018), for component II.4 (Studies and Project for Protection and Conservation of Biological and Landscape Diversity) only three projects were approved with a total value of 55,000 KM. Data shows disproportionately small allocations for the fulfillment of the targets under one of the components of the Environmental Protection Strategy of the FBiH 2008-2018.

The causes of this situation should be looked for more deeply. Specifically, the legislation that treats subcomponent of environment (water, air, etc.) does not clearly define the financial mechanisms that would ensure systematic funding of biological diversity. In the case of funds from water fees, the EF FBiH disposes only with 15 % of water fees, while according to the Law on Waters, it

exclusively places them through public calls for water protection projects (indirectly and for water biological diversity). When it comes to fees payable on registration of motor vehicles, 70 % of the funds are made available to the cantons, which should finance environmental protection and biological diversity conservation projects, and 30 % of the funding is placed by the EF FBiH through public calls for projects of interest to the FBiH.

For the time being, the EF FBiH is not enough to finance all environmental components in a satisfactory manner. Therefore, the law should clearly define the obligations of the funds at different administrative levels in the FBiH. The EF FBiH should have clear responsibilities for projects of broader interest (e.g. developing strategies, plans, studies, financing projects of the entity significance), while the cantons and municipalities should execute the responsibilities of financing specific projects, from environmental fees. It would also be useful to establish the obligation to report on the activities conducted at the level of the cantons.

In the report "Analysis of Applicants and Beneficiaries of the Funding from the EF FBiH (2012)", it can be observed that at allocation of funding sufficient account is taken of territorial representation of the applicants. In its Chapter "Common Measures to Improve the Preparation and Execution of Projects," the report clearly states that there is a need for education on how to apply successfully and how to implement environmental projects.

5.4.6. Potential International Sources of Funding for Conservation and Sustainable Use of Biological Diversity in BiH

The priorities outlined in the NBSAP BiH (2008-2015) and in three of the aforementioned strategies (RS, FBiH and DB), as well as the reaching of targets set forth in the NBSAP BiH (2015-2020), require substantial financial resources. It will not be possible to provide for a large part of these funds through the budget of public institutions in BiH. However, a significant portion of the funds to finance the protection and sustainable use of biological diversity in BiH can be obtained from international development organizations, funds and financial institutions (Annex 3).

Loan Funds

The funding for attainment of the identified targets can be secured through credit lines for appropriate projects and programs with the following financial institutions:

- **European Bank for Recovery and Development (EBRD)** which was established with the aim of giving support to the countries of Eastern and Central Europe and the Mediterranean countries facing the problems of transition economies. In addition to restructuring and expansion of the local private sector and strengthening links with broader regional markets, the EBRD in BiH focuses on promoting efficient and sustainable use of resources through direct financing of energy efficiency improvements and use of resources in the private and public sectors, restructuring projects and commercialization of municipal utilities, and projects of construction and reconstruction of utilities and transport infrastructure;
- **International Bank for Recovery and Development (IBRD)** and **International Development Association (IDA)**, as an integral part of the World Bank, provide loans to developing countries (IBRD) and to the poorest countries (IDA). During the past four years,

BiH has used funding from IDA and IBRD, but since the beginning of fiscal 2015, BiH ends with the possibility of use of IDA funds, and will continue to use the IBRD funding for the implementation of its development priorities. IBRD aims to reduce poverty based on the principles of sustainable development, particularly through the development of self-sustaining businesses. The World Bank's portfolio in BiH includes projects which contribute to the environmentally sustainable use of resources and are aimed at improving the management and use of natural resources, and ensuring environmental sustainability through green project implementation and cleaner production. The Project "Second Solid Waste Management" is supporting development of new sanitary landfills and municipal waste management in the region that will improve environmental management. Furthermore, the World Bank in BiH has funded the construction or reconstruction of nine facilities for wastewater treatment through three different projects: the Sarajevo Waste Water Project, Neretva and Trebišnjica Management Project, and Water Quality Protection Project. In addition, the World Bank plans to support sustainable forest and landscape management through the recently approved GEF project;

- **International Financial Corporation (IFC)** is also part of the World Bank Group. It is the largest global development institution focused exclusively on the private sector development in developing countries. In these countries, the corporation helps companies and financial institutions in creating jobs, generating tax income, improving management methods, while meeting environmental conditions and contributing to the local community. IFC's strategy in BiH is to finance projects in strategic sectors essential for long-term sustainable development of the country, with a focus on: (i) the financial sector with particular emphasis on SMEs and lending for energy efficiency, (ii) climate change, including investment in infrastructure and energy sector, (iii) agribusiness with a focus on retail and food production, (iv) the value added in manufacturing, (v) business infrastructure with a focus on logistics and distribution, (vi) utility infrastructure and waste management, and (vii) health and education;
- **Multilateral Investment Guarantee Agency (MIGA)** is also a member of the World Bank Group. The mission of this institution is to promote foreign direct investment in developing countries. The aim is the country's economic growth, while reducing poverty and improving living conditions. MIGA's strategy is the development of interests of foreign investors in countries where there are operational barriers, the impact of conflicts, complex environment that involves deep environmental and social analysis, etc. MIGA aims to develop and increase business confidence through the insurance market in order to increase the safety of investors. MIGA supports investments that meet high social and environmental standards;
- **European Investment Bank (EIB)** is one of the largest international financial institutions in the Western Balkans, where it has been active since 1977. Continuing its support for reconstruction and modernization projects for regional and municipal networks of basic infrastructure (transport, energy and environment), in the forthcoming period, the EIB intends to increase its assistance to the private sector, and to the health and education domains;
- **KfW Development Bank (KfW)**, on behalf of the Federal Government of Germany, supports the social and economic changes in the countries of Eastern and Southeastern Europe. KfW funds projects for modernization and expansion of infrastructure needed for economic progress, including the improvement of drinking water supply and sewerage system, and a

modern methods for waste management. In addition, KfW supports secure and sustainable energy supply using environmentally friendly renewable energy sources.

Grants

As previously noted, the main financial mechanism for the implementation of the CBD is the GEF. The GEF is a partnership between 183 countries with international institutions, civil society and the private sector, which aims to work together on environmental issues. In addition to the CBD, the GEF serves as the financial mechanism of the UNFCCC, the Stockholm Convention, the UNCCD, the Convention of Minamata and the Montreal Protocol. Therefore, the GEF provides developing countries and countries with economies in transition the funds necessary for the conservation of biological diversity, adaptation to and mitigation of climate change, sustainable management of forests, preventing soil degradation, preventing damage to the ozone layer, chemical management and protection of international waters.

After accession to the GEF, BiH has been granted a total of 14 national and 19 regional projects. Total funding approved for national projects in BiH is \$ 27,784,898. The following table shows the allocation of funds approved for BiH during GEF₄ distribution.

Table 38: GEF₄ Funding for BiH

Focal Area	GEF-4 Indicative allocation	Allocation used	Remaining allocations for programming
Biological diversity	3,800,000	1,050,000	2,750,000
Climate change	3,300,000	1,063,540	2,236,460

Source: Country Profile for Bosnia – Herzegovina, GEF²⁶

The funds were received for the Project "Forest and Mountain Protected Areas". The Project was carried out by IBRD as the implementing agency, but the funds were not spent in an effective and appropriate manner in the FBiH and RS.

The utilization of funds for implementation of the CBD in BiH during GEF₅ distribution is shown in the following table.

Table 39: GEF₅ Funding for BiH

Focal Area	STAR GEF-5 Indicative allocation	Allocation used	Remaining allocations for programming
Biological diversity	1,500,000	0	1,500,000
Climate change	2,770,000	2,173,230	596,772
Soil degradation	660,000	2,756,720	-2,096,720

Source: Country Profile for Bosnia – Herzegovina, GEF²⁷

²⁶Link: www.thegef.org/gef/country_profile/BA

²⁷Link: www.thegef.org/gef/country_profile/BA

The above data clearly shows that funding for biological diversity has not at all been used, and that it was directed towards the implementation by the UNCCD.

Given the process of European integration, the European policies for biological diversity carry a major significance for BiH. It should be noted that the EU biological diversity policy is fully harmonized with the global level policies, and with the decisions taken by the CBD COP.

After the signing of the Stabilization and Association Agreement (2008), BiH has enjoyed the state of potential candidate for EU membership. The Agreement on Access to IPA assistance/funds has also been signed. The IPA consists of five components:

- Transition and institution building assistance;
- Cross-border cooperation;
- Regional development;
- Human capacity development;
- Rural development.

As a potential candidate for EU membership, BiH is entitled to assistance for projects related to the first two components. After initially well used resources in both components, which also had direct and indirect impacts on biological diversity in BiH, the utilization of IPA funds for the period of 2007-2011 was 91.6 million (Responses to the List of EU Questions - Chapter 27; Environment, 2012).

The plans for use of IPA II funds are currently stalled due to lack of political will and agreement within BiH. The conditions for continuation of the process are: an established effective EU coordination mechanism in the country and adopted state-level sectoral strategies, especially those that are related to investment needs.

The IPA Project which is directly related to the environmental sector in BiH was implemented under the title of "Strengthening Institutions for Environmental Protection and Preparation for Pre-Accession Funds". The Project was completed in November 2014. The main goal of the Project was to contribute to environmentally sustainable economic development, bringing BiH closed to EU environmental standards through the strengthening of administrative structures and encouraging the approximation to the requirements of the EU environmental protection acquis.

Besides the aforementioned global and European funds for environment, certain government agencies for development and aid, as well as foundations, should be noted, including: SIDA, USAID, MAVVA, etc.

In addition to these sources, it should also be noted that BiH is one of the beneficiaries of significant ODA funds. ODA funds include loans on favorable repayment terms and donations from DAC OECD countries. Given that these are donor funds intended for development, there is an increased worldwide questioning of their quality and contribution to environmental protection. The ODA funds allocated for BiH are shown in Aichi Target 20.

5.4.7. Assessment of Efficiency of the Existing Model for Financing of Biological Diversity in BiH

From the previously analyzed data, one can conclude that in BiH the capacities to mobilize available resources for conservation and sustainable use of biological diversity are not developed. This fact is true when it comes to mobilizing domestic resources (funding from the funds for environmental protection in the FBiH and RS, and the Environmental Protection Fund of the BD, which has yet to be established), and when it comes to mobilizing international funding for biological diversity (GEF funds, IPA funds and funds from other potential sources). It should be noted here that:

- There is no coordinated activity or structures put in charge to monitor the state of financing in the field of conservation and sustainable use of nature;
- The funding available from domestic and foreign sources is very poorly correlated with the priorities identified in the strategic documents on biological diversity in BiH.

No needs assessment has been done in BiH, but there has neither been an estimate of the funds that have already been invested in the conservation and sustainable use of biological diversity. The following aspects should be noted:

- The publicity of data on the funding in the domain of biological diversity is not sufficient. This fact is especially true for indirect funding, which may affect the situation in the field of biological diversity, such as funding by project activities in the sectors of agriculture, water management, forestry, electric power, transportation, etc. Data on directly invested funding through funds are more readily available. However, there is no analysis of the efficiency in fund investment, and also no monitoring to show the potential benefits of investment to the state of biological diversity;
- Financing of biological diversity and nature in BiH is not equally positioned with the demands from other sectors in the allocation of budget resources;
- There has been no debate held about new models to mobilize funding for the conservation and sustainable use of biological diversity;
- There has been no preliminary report prepared on the state of financial resources for biological diversity in BiH (Decision UNEP/CBD/COP/11/14).

5.4.8. Mobilization of Resources for Financing of Biological Diversity in BiH by 2020

Aichi Target 20 reads as follows: "By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Mobilization of Financial Resources, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties".

As is clear from the analysis presented in the previous chapters and from practice, BiH has a hard mission ahead to create ways to secure resources for the conservation and sustainable use of biological diversity. Given the current state of financing in the domain of biological diversity in BiH, this task involves two activities to be carried out simultaneously, namely:

- Capacity building for resource mobilization,
- Resource mobilization.

The basic steps of BiH in mobilizing resources for biological diversity are:

1. We shall get organized!

The main problem in financing biological diversity BiH is coordination and organization. Given that achieving the targets identified in the NBSAP BiH (2015-2020) requires significant financial resources, the first step is self-organizing.

Jointly with the Ministry of Finance and Treasury of BiH and the entity ministries in charge of environmental protection, MoFTER BiH should have the leading, coordinating role, under the organized activity for mobilization of resources for biological diversity. In reference to this, it is needed to:

- Elect membership (December 2015);
- Hold the First Joint Session (February 2016);
- Prepare the joint work plan (March 2016).

2. We shall make a cost assessment!

In previous chapters it was emphasized that in BiH it is very difficult to obtain information about existing financial resources for conservation and sustainable use of nature. The situation is even more uncertain if we add to the current difficulties the need finance the measures necessary for achieving the targets set out in this document, especially when one considers that all starting points (e.g. capacity, sources of financing, amount of funding, competencies, etc.) are not and cannot as yet be completely defined.

The coordination role of MoFTER BiH jointly with the Ministry of Finance and Treasury of BiH and the entity ministries in charge of environmental protection, supported by the knowledge of the nature preservation and protection process, needs to result in improved organization in terms of approaching towards funding of biological diversity in BiH. For this purpose, it is needed to:

- Hold the Second Joint Session and establish a cost assessment working group in which representatives of Entity ministries (and BD Government) in the field of environment, finance, agriculture, water management and forestry, as well as representatives of environmental protection funds will be appointed (April 2016);
- Complete the cost assessment for the implementation of the NBSAP BiH (2015-2020) to be prepared by the established working group (April – May 2016).

3. We shall set the main targets!

After the preparation of the cost assessment, the further organization in funding of biological diversity in BiH should involve the most responsible structures, including:

- Governments of the entities and the BD (ministries of environment, ministries of finance, ministries of agriculture, water management and forestry, etc.),
- Directors of the funds for environmental protection,
- MoFTER,
- UNDP, UNEP, EC.

Due to the extreme complexity of administrative competencies in BiH, it is essential to conduct a detailed discussion at a high political level on the possibilities of financing biological diversity from domestic funding sources. In order to achieve this, it is necessary to hold a meeting of the structures in charge of financing biological diversity in BiH using domestic resources (May, 2016).

At the meeting, it is necessary to identify those measures in the NBSAP BiH (2015-2020) that can be financed using domestic funding. The conclusions of the meeting should include:

- guidance to the funds for environmental protection on the selection of projects to be funded,
- guidance for planning the budget for the period 2016-2020,
- guidance for selection of priorities in the preparation of applications for foreign sources of funding.

The conclusions of the meeting should be made publicly available on the websites of the funds for environmental protection and ministries.

4. We shall take on a strategic approach towards long-term increase of resources for biological diversity!

BiH needs to implement a broad discussion on the Strategy for Mobilization of Financial Resources. The discussion should include all stakeholders, including representatives of the governments at different levels, representatives of scientific institutions, representatives of civic associations, and the economic sector and educational institutions involved.

Funding for the preparation of the Strategy for Mobilization of Financial Resources should be a priority for the country. The process of preparation of this document should include:

- Assessment of budgetary and foreign funds that are made available annually for the protection and sustainable use of biological diversity, for the period of 2010-2014;
- Plan for inclusion of biological diversity into sectoral policies;
- Review of existing and discussion of potential fees to be charged for the impacts on biological diversity and its use;
- Review of existing and discussion of potential payments/fees for ecosystem services (e.g. use of wood resources, water supply, flood protection, regulatory role of protected areas, hydropower, etc.);
- Review of existing incentives with the assessment of their impacts on biological diversity;
- Discussion on potential incentives with favorable impacts on biological diversity;
- Development of permanent capacity to mobilize financial resources for biological diversity;
- Plan to assess the value of ecosystems (natural capital) of BiH;
- Plan for mobilization of funding for the period of 2016-2020 and beyond.

Under the preparation of the Strategy for Mobilization of Financial Resources, it is necessary to:

- Secure funding for the preparation of the Strategy (activity of the established working group) (October, 2015 – March, 2016);

- Select the holders for the preparation of the Strategy (activity of the established working group) (March – June, 2016);
- Draft the Strategy document including the appropriate consultative process (selected holder for the preparation) (July, 2016 – January, 2017);
- Seek the consent of the entity governments for the Strategy, and adopt the Strategy at the level of the BiH Council of Ministers (June, 2017).

5.4.9. Monitoring of Implementation of the Resource Mobilization Plan

An annual report should be made on the implementation of the Resource Mobilization Plan. The report should be submitted as information for the entity governments and allow its public availability on the websites of funds for environmental protection and ministries.

6. CONCLUSIONS AND RECOMMENDATIONS

In view of nature management in BiH, it is necessary to point out three issues the addressing of which needs to be started.

1. **Coordination issue.** One of the most prominent problems in the optimization of addressing the issue of management of different social trends and resources in BiH 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 problem 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 are in charge), but today there is an increasing need to establish mechanisms for the sustainable use of biological diversity. In terms of this, it should be noted that the domain of biological diversity management delves deep into the economic and commercial sectors, such as forestry, agriculture, water management, energy and others. One can therefore say that the problem of coordinated nature management in BiH has two aspects: horizontal (linking with the sectors) and vertical (coordination of work at different levels).

Recommendation: The body that can have a coordinating role in management of biological diversity in BiH, FMET in agreement with the MPPCEE RS and MoFTER BiH, needs to coordinate its own activities with the provisions of the NBSAP BiH (2015-2020) and prepare its own work plan. The work plan should be based on: (a) the inclusion of biological diversity concerns into policies of the economic sectors in BiH at the highest level of management, and (b) the initiation of coordination activities among the different levels of management, in order to achieve the national targets set out in the NBSAP BiH (2015- 2020).

2. **Communication issue.** In close connection with the issue of coordinated action for the conservation and sustainable use of biological diversity is the issue of communication, which is an indispensable prerequisite for the success of any activity. The issue of communication includes the establishment and implementation of procedures for reporting on the activities carried out, specifically from the lower to higher administrative levels. In addition, the issue of communication also includes public access to information about the domain of nature in BiH. Communication and awareness problems related to the issues of biological diversity

management in BiH are certainly related to inadequate flow and exchange of information and poor coordination between the relevant institutions. Therefore, it is very difficult to acquire a unique picture of the state of nature in BiH, on the state of its individual components, on the pressures on biological diversity in BiH and on the existing processes and mechanisms for its conservation.

Recommendation: In addition to the measures already given aimed at the preparation of the CEPA Strategy, the procedure should also be launched for reporting on the data about the activities for preservation and sustainable management of the nature in BiH, which needs to define the data (report) submission period, the contents and format of the reports and the communication scheme with the contact persons from each institution. In order to facilitate the flow of information that will be publicly available, it is necessary to optimally use the CHM BiH as a base for relevant information on the biological diversity in BiH and as the first source of information for citizens, NGOs, businesses, international institutions and all other components of the society. CHM management should be in the direct jurisdiction of the NFP of CHM.

- 3. Issue of financial resources for conservation and sustainable use of biological diversity in BiH.** This issue is of essential importance for the further development of activities to implement the NBSAP BiH (2015-2020). Although there are no conducted professional research studies, through analysis of the available domestic and foreign sources of funding it can be concluded that the capacity of BiH to ensure the use of these funds is insufficient. Each measure identified under the NBSAP BiH (2015-2020) requires certain investments, and for most of them the resources are not secured. It should be noted that the two previous issues (coordination and communication) have major effects on the state of the financial resources necessary for the responsible management of nature and natural resources in BiH.
Recommendation: The established working group (defined in section 5.4.8.) must draw the attention of the public, particularly that of the decision makers, onto the burning issues involving management of biological diversity. Therefore this working group needs to clearly position itself as a responsible structure in the issues related to activities involving the management of nature and natural resources in BiH. In addition to the positioning, through preparation of its proper reports, the working group needs to ensure communication with decision makers. Addressing of the issues related to coordination and communication of the working group with the relevant society structures shall open up the opportunities for strategic resolution of the issue of management of biological diversity from local and foreign sources.

Finally, it should be noted that the implementation of the NBSAP BiH (2015-2020) does not depend solely on financial resources. Since the implementation of the NBSAP BiH (2015-2020) is part of the overall Strategic Plan (2012-2020) of the CBD, thus it is also based on the same ideas. The NBSAP BiH (2015-2020) requires the involvement of a large number of stakeholders, and therefore it is necessary to ensure its comprehensive presentation and promotion to all structures of the society. While doing so, the public involvement in the implementation of the NBSAP BiH (2015-2020) may not be left only to the familiar forms (participation in workshops, a small number of non-governmental organizations) and the familiar positions (inability to change for the better), but it is necessary to develop and raise public awareness about the rights and obligations towards the nature in BiH.

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8. ANNEXES

Annex 1 – List of Global Strategic Goals and Aichi Targets for the Period of 2011-2020

STRATEGIC GOAL A: Address the underlying causes of biological diversity loss by mainstreaming biological diversity across government and society	
Aichi Target 1	By 2020, at the latest, people are aware of the values of biological diversity and the steps they can take to conserve and use it sustainably.
Aichi Target 2	By 2020, at the latest, biological diversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.
Aichi Target 3	By 2020, at the latest, incentives, including subsidies, harmful to biological diversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biological diversity are developed and applied, consistent and in harmony with the CBD and other relevant international obligations, taking into account national socio economic conditions.
Aichi Target 4	By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.
STRATEGIC GOAL B: Reduce the direct pressures on biological diversity and promote sustainable use	
Aichi Target 5	By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.
Aichi Target 6	By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.
Aichi Target 7	By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biological diversity.
Aichi Target 8	By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biological diversity.
Aichi Target 9	By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.
Aichi Target 10	By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.
STRATEGIC GOAL C: Improve the state of biological diversity by safeguarding ecosystems, species and genetic diversity	
Aichi Target 11	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biological diversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.
Aichi Target 12	By 2020 the extinction of known threatened species has been prevented and their conservation state of, particularly of those most in decline, has been improved and sustained.
Aichi Target 13	By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.
STRATEGIC GOAL D: Enhance the benefits to all from biological diversity and ecosystem services	
Aichi Target 14	By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.
Aichi Target 15	By 2020, ecosystem resilience and the contribution of biological diversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 % of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating

	desertification.
Aichi Target 16	By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.
STRATEGIC GOAL E: Enhance implementation through participatory planning, knowledge management and capacity building	
Aichi Target 17	By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biological diversity strategy and action plan.
Aichi Target 18	By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biological diversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the CBD with the full and effective participation of indigenous and local communities, at all relevant levels.
Aichi Target 19	By 2020, knowledge, the science base and technologies relating to biological diversity, its values, functioning, state of and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.
Aichi Target 20	By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biological Diversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Mobilization of Financial Resources, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

ANNEX 2 – Key Terms in Biological Diversity

Abiotic Structure – includes physical and chemical factors present in the environment that affect living organisms and ecosystem functioning.

Agro-Biological Diversity – constitutes diversity within agricultural systems, and includes a variety of animals, plants and micro-organisms necessary to maintain the functions of agri- ecosystems, their structure, processes and security of food production.

Aquaculture – the cultivation of aquatic organisms such as fish, crabs, shellfish and seaweed, through bio-manipulation of the life cycle of cultured organisms and environmental conditions. Includes the control of reproduction and growth and the elimination of the causes of natural mortality.

Allelopathy – the influence that one species exerts on other species through production of chemical compounds that usually have a negative impact on growth, development and reproduction. Species use this strategy in order to improve their chances of survival in nature.

Allochthonous Species – a non-native (foreign) species that naturally did not inhabit a particular biological system of an area, but has arrived there through intentional or non-intentional introduction.

Anemochory – dissemination of diaspora (spores, seeds, fruits) by way of wind.

Moorlands – specific biogenocenoses and wetlands with abundant mosses and other plants, in which the production of organic matter in oxygen free conditions is much greater than the consumption, and where organic compounds (carbon) are accumulated in large quantities.

Deforestation – constitutes a long-term or permanent loss of forest cover and conversion of forests and forest lands for other purposes.

Denitrification – a chemical process in which nitrite and nitrate nitrogen under the influence of denitrifying bacteria becomes available in free nitrogen or nitrogen oxides.

Desertification – the process of soil degradation (mostly by human activities) in arid, semi-arid and arid but semi-wet areas.

Domestication – inclusion of organic wild species completely or partially into the cultural community of people. Domestication is a process that is far more complex than just a domestication, because it leaves a lasting change in the behavior of the organisms, and changes in the phenotype or even genotype of the domesticated species.

Ecosystem Services – benefits for humans arising from ecosystems.

Eutrophication – a natural process of increasing the primary organic production in ecosystems.

Gene Pool – totality of genes in a population, group of populations or species.

Indicator – the representative value of an observed case quantifying the information by aggregating various, discrete and periodic measurements into a single numerically represented value.

Introduction – intentional or non-intentional introduction of new species into nature, i.e. into a specific area which this species has not inhabited before.

Invasive Species – a non-native (allochthonous, foreign, exotic, introduced or imported) species of plants, animals and fungi originating from other flora and zoogeographic areas, which in the process of competition suppresses native gene pool by winning the available ecological niches.

Cryoconservation – conservation of plant materials using the method of freezing.

Nitrification - ammonia oxidation in nitric acid under the influence (nitrification) bacteria; one of the processes in the cycling of nitrogen in nature.

Nutrients – substances necessary for organisms to live and grow, used in the metabolism of the organism and introduced from the environment. Nutrients are used for the formation and regeneration of tissues, regulation of body processes and as a source of energy. Nutrient input methods vary; while animals and unicellular organisms consume food and digest it using the digestive system, most plants bring in nutrients directly from the soil through the roots or from the atmosphere.

Restoration – reestablishment or recovery.

Taxa – groups of related organisms which by their degree of kinship may be classified into taxonomic categories: species, genera, families, orders, grades, classes, generations, sections, kingdoms, domains and others.

ANNEX 3 – List of Organizations/Sponsors in the Domain of Biological Diversity

Name of Organization/Sponsor	URL
Critical Ecosystem Protection Fund	www.cepf.net
EU Thematic Program on Environment and Sustainable Management of Natural Resources including Energy	www.welcomeurope.com/european-funds/enrtp-thematic-programme-environment-sustainable-management-of-natural-resources-including-energy-601+501.html#tab=onglet_details
Food and Agriculture Organization of the UN	www.fao.org
French Global Environment Facility	www.ffem.fr
Global Water Partnership	www.gwp.org
International Climate Initiative	www.international-climate-initiative.com
International Food Policy Research Institute	www.ifpri.org
International Union for Conservation of Nature	www.iucn.org
International Water Resources Association	www.iwra.org
Japan Bank for International Cooperation	www.jbic.go.jp
Japan International Research Center for Agriculture Sciences	www.jircas.affrc.go.jp
National Fish and Wildlife Foundation	www.nfwf.org
RAMSAR	www.ramsar.org
Rothamsted International	www.rothamsted-international.org
Swiss Agency for Development and Cooperation	www.eda.admin.ch
United Nations Development Program	www.undp.org
United Nations Education, Scientific and Cultural Organization	http://en.unesco.org
United Nations Environment Program	www.unep.org
United States for Agency for International Development	www.usaid.gov
World Fish Center	www.worldfishcenter.org
World Wildlife Fund	www.panda.org