

# **ACTION PROGRAMME**

**TO COMBAT LAND DEGRADATION  
AND MITIGATE THE EFFECTS OF DROUGHT  
IN BOSNIA AND HERZEGOVINA**





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## IMPRESSUM

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TO COMBAT LAND DEGRADATION AND  
MITIGATE THE EFFECTS OF DROUGHT  
IN BOSNIA AND HERZEGOVINA



Global Environment  
Facility



UNEP

## BASIC INFORMATION

<b>Project title</b>	Support to Bosnia and Herzegovina for Development of Action Programmes aligned to the UNCCD 10-Year Strategy and Reporting Process under UNCCD
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# List of Acronyms

AADT	Average Annual Daily Traffic
AI	Aridity Index
AP	Action Programme
BAT	Best Available Techniques
BD	Brcko District
BHMAC	Mine Action Centre
BiH	Bosnia and Herzegovina
CARDS	Assistance for Reconstruction, Development and Stabilization
CBD	Convention on Biological Diversity
CLC	Capacitive Level Sensor
COP	Convention of Parties
CORINE	Coordination of Information on the Environment
DLDD	Desertification, Land Degradation and Drought
DMCSEE	Drought Management Centre for South-East Europe
DPSIR	Driving forces, pressures, states, impacts, responses
DFI	Direct Foreign Investments
EEA	European Environmental Agency
EPA	European Partnership Agreement
EU	European Union
FAO	Food and Agriculture Organization
FBiH	Federation of Bosnia and Herzegovina
FSC	Forest Stewardship Council - Global non-profit organization dedicated to promotion of responsible forest management and certification
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GM	Global Mechanism
IFS	Integrated Financial Strategy
IPA	Instrument for Pre-Accession Assistance
IUCN	International Union for Conservation of Nature and Natural Resources
LEAP	Local Environmental Action Plan
MIFF	Multi-Annual Indicative Financial Framework
MIPD	Multi-Annual Indicative Planning Document

MoFTER	Ministry of Foreign Trade and Economic Relations of BiH
NCB	National Coordination Board
NCSA	National Capacity Self-Assessment
NEAP	National Environmental Action Plan
NFP	National Focal Point
NGO	Non-Governmental Organization
NMVOC	Non-Methane Volatile Organic Compounds
ODA	Official Development Assistance
P/PET	Precipitation/Potential Evapotranspiration
PAH	Polycyclic aromatic hydrocarbons
PAM	Pedology, Agrochemistry and Melioration
PCB	Polychlorinated Biphenyl
PE	Public Enterprise
PET	Potential Evapotranspiration
PRTR	Pollutant Release and Transfer Register
RAP	Regional Action Plan
RS	Republika Srpska
SLM	Sustainable Land Management
SOTER	Soil and Terrain Database
SPI	Standardized Precipitation Index
SR BiH	Socialist Republic of Bosnia and Herzegovina
SRAP	Sub-Regional Action Program
TPES	Total Primary Energy Supply
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDAF	United Nations Development Assistance Framework
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordinance
WMO	World Meteorological Organization



# 1 BACKGROUND OF AP DEVELOPMENT



The Project “Support to Bosnia and Herzegovina for Development of Action Programmes in compliance with the UNCCD 10-Year Strategy and Reporting Process under UNCCD” was initiated through joint efforts of the Ministry of Foreign Trade and Economic Relations of BiH, GEF Focal Policy and Operational Point, RS Ministry of Agriculture Forestry and Water Management, Focal BiH Ministry for the United Nations Convention to Combat Desertification (UNCCD), National UNCCD focal point for BiH and UNEP Vienna Office, with the view of developing an Action Programme (AP) for BiH. The Project is financed by GEF, while the RS Ministry of Agriculture, Forestry and Water Management was responsible for coordination of project activities through the National UNCCD focal point.

The aim of this Project is to provide support to BiH in formulating the first Action Programme (AP) in compliance with the 10-year Strategy, to contribute to enhanced planning and implementation of the Convention at the country level. Such enhanced planning and monitoring of the implementation will on the other hand lead to a more efficient decision making process in the area of desertification, land degradation and draughts (DLDD) and sustainable management of land issues in BiH.

The Project comprises two components:

- A. Development of the AP in line with the 10-Year Strategy for integration into individual Government sectors in BiH (at entity and BD level)
- B. Reporting and Review Process related within the framework of the Fifth Reporting and Review Process under the UNCCD Secretariat



## 2 EXECUTIVE SUMMARY





**I**n addition to UNFCCC and UNCBD, UNCCD is the third Rio Convention and currently the only multilateral environmental agreement designed to address land problems at the global level. So far, the UNCCD Convention has been ratified by 186 countries. Out of that number, 140 countries are affected by the land desertification/degradation process. Parties to the convention commit to undertake two important activities, development of action programmes (AP) and their implementation, and regular reporting to the UNCCD Secretariat.

The goal of the Convention is to ensure a long-lasting commitment of the States Signatories through a legally binding document. To the countries not affected by the desertification/land degradation, it ensures an international framework for work in partnership with industrialized countries in the implementation of their respective national programmes and measures. Parties to the UNCCD Parties adopted the 10-Year Strategy to enhance the implementation of the Convention (2008-2018.). By the Decision, Parties are invited to implement the Strategy in accordance with their respective priorities, including harmonization of action programmes and other relevant activities related to UNCCD implementation.

The UNCCD 10-Year Strategy has strategic and operational goals. The strategic goals address issues such as population growth, condition of the ecosystem, global benefits and benefits of the ecosystem, mobilization of resources through building partnerships. The operative goals mainly address awareness of land degradation and desertification, policy framework at both global and national levels, application of science, human and financial resources for the implementation of Sustainable Land Management (SLM).

SLM is typically defined as knowledge based on a blend of technologies, policies and practice which comprises soil, water, biodiversity and environmental issues, in order to meet the growing demand for food, and simultaneously to preserve the ecosystem functions and life on the Earth.

In order to ensure smooth implementation of the Convention, 5 Annexes were adopted with the aim of regulating the reporting from national, sub-regional and regional levels for every region. BiH is a member of the Annex 5. The interest of priority policies at the national and local levels in land degradation is rather poor. Such poor interest of the official policy adversely affects the interest among individual donors in SLM issues. This very often largely hampers the mobilization of required investments from relevant institutions and donors.

In the post-war period BiH has faced numerous social, economic and environmental problems among which the land degradation stands out as one of the most crucial ones. Land use in BiH is affected by inadequate and unsound planning practices of resource utilization. In most cases, loss of agricultural land is caused by unplanned construction of residential and industrial facilities and infrastructure, unreasonable exploitation of mineral raw materials and excessive erosion caused by deforestation and inadequate treatment of steep slopes.

Supported by invaluable financial assistance of GEF, provided through UNEP, BiH started the development of its first AP which will be adopted in an identical form at the level of both the entity and national parliaments and governments, and will be implemented as a common document at BiH level.

The development and implementation of the first BiH AP, which should be in line with the UNCCD 10-Year Strategy, and contribute to a better planning and monitoring of the implementation of UNCCD at the national level. Such improved planning will on the other hand lead to a more efficient decision making process related to issues such as desertification, land degradation and draughts (DLDD) and sustainable management of land issues in BiH.

APs are developed through a participatory approach involving various stakeholders, including also relevant non-governmental organizations, academic institutions and local

communities. APs specify practical steps and measures to be undertaken in combating desertification in specific ecosystems.

The purpose of APs development and regular reporting requirement is to ensure a long-term commitment of State parties to the UNCCD requirements regarding sustainable land management with regard to all forms of actions and at all levels in the framework of a legal process and legally binding documents at the national level. Parts of the Earth affected by land degradation have been provided with an international legal framework for operations in cooperation with donors, mostly industrially developed countries, and access to funds in the implementation of APs, and programmes and measures this documents contains. The international institutions which monitor this problem area, consider AP as the only relevant document for deciding on the allocation of assistance for rehabilitation and dealing with consequences of land degradation. The Convention is a very powerful instrument for sustainable management of natural resources as well as for ensuring a long term external assistance.

The purpose of UNCCD as well as this strategic document (BiH AP) is to identify facts and processes which cause land degradation, and to establish a management system and adopt legislation which will prevent or minimise such damages. One of the strategic objectives of both UNCCD and AP, is to maintain the land degradation at zero level, in other words further degradation and rehabilitation processes must be balanced.

As a full-fledged party to UNCCD, BiH is required to ensure the implementation of the 10-year strategy in its strategic and planning documents both at the national and lower administrative levels (entities, cantons, municipalities).

The strategic goals will guide the actions of all stakeholders and partners, including in raising the level of political will, while achievement of these long-term goals leads to a solution of the land degradation problem in BiH.

Environmental protection in BiH is mainly based on implementation of regulatory rather than economic instruments. Due to the fact that this is a society still in the transition process, economic instruments are slowly emerging, and the funds collected based on environmental protection are partially allocated to improvements in this field, but the situation is still not satisfactory. Both entities have undertaken a series of important activities by now (introduction of obligatory ecological permits; compensations; tax incentives for environmentally friendly products, technologies and services; fees for environmental degradation according to the "polluter pays" principle; and monitoring the state of the environment), but on the other hand, economic instruments for environmental protection have not been sufficiently integrated in policy yet. As priorities, BiH identified water resources, air and waste management, and only partially land, which is perceived as an unlimited resource.

Over the past period BiH received a substantial international financial assistance to address environmental issues and improve the environment protection. Programmes and instruments from which BiH withdrew funds varied in different stages.

Given that land is the inseparable part of the environment, all future measures focused on its protection should also take care of other environmental aspects, namely they should focus on comprehensive implementation of environmental actions that appreciate inter-relationships between the issue of desertification and other environmental aspects (climate change, biodiversity, quality and protection of water, reduced emissions, waste disposal, etc.).

For the purpose of monitoring the state of the environment and impacts that some production sectors make on the environment through their respective undertakings and operations, various models have been developed over the past several decades, trying, through certain indicators, to establish an efficient system of monitoring and assessing the state of environment but also of the implementation of activities that lead toward a more positive, sustainable manner of environment management. UNCCD defined two

types of indicators based on which all parties are required to provide feedback to the UNCCD Secretariat: progress and reporting indicators. UNCCD progress indicators provide information on progress in achievement of long term benefits for population living in areas affected by land degradation and draught, affected ecosystems and global environment. Mandatory reporting process with reporting indicators related to the land condition at the national level is based on the Decision 3/COP 8 from 2008, when all participating countries adopted the 10-year strategic plan and framework in order to boost the implementation of UNCCD. Based on the specified foundations and national interests, BiH should make efforts to develop National List of Indicators, the aim of which would be establishment of a single data collection and processing system. The National List of Indicators will ensure flow and long-term supply of data necessary for the process of reporting toward international acts (conventions and protocols), and will ensure necessary foundations for the governments in BiH to make valid decisions related to the sustainable development policy.

UNCCD also encourages the Parties to address in their APs the impact of land degradation on social and economic processes, including development of relevant institutional capacities and legislation, promotion and awareness campaigns, education and science development, defining of relevant sector policies, public engagement in all major decision making processes, as well as creation of synergy with other conventions relevant for land degradation through development of a strategic plan with proposed measures.

Strategic and operative objectives identified in this AP are in compliance with the basic commitments and objectives of UNCCD, more specifically the objectives of the UNCCD Strategy. Proposed measures to deal with the land degradation issue in BiH set out in this AP should be realized until 2018, as the UNCCD Strategy requires, under the understanding that some programme goals and measures shall continue over a prolonged period of time, especially the monitoring and reporting process. After this period expires, BH AP will be harmonized with future objectives and commitments of UNCCD.

Without active participation of scientific and technical institutions, application of new technologies and knowledge which advance on a daily basis at the global level, the implementation of AP is not possible. A public and political dialog on this problem area is therefore called upon as well as support to research projects aimed at achievement of ultimate goals of AP and, UNCCD Strategy until 2018 as such.



## 3 INTRODUCTION



### 3.1 UNCCD AND APs

Land degradation means the reduction, or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity of land. Various forms of land degradation processes and pressures have taken root in almost all countries worldwide primarily due to unviable manner of exploitation in the biomass production, land use change, and different forms of destruction and permanent loss of fertile land. Land degradation processes manifested in different ways, such as reduction of yielding crops and productivity of natural pastures, etc. Moreover, degradation takes place in areas under crops or irrigated grass communities, forests and forest land as a consequence of exploitation and use by humans. International community, and UN in particular, is increasingly concerned over the fact that land has become one of the limiting factors for the development of 21st century civilization given the ever increasing population growth and ever shrinking of fertile land for production of sufficient resources needed for human existence.

Desertification is a form of land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climate changes and human activities. On the other hand, desert is a natural condition, and humans have sought to adapt the desert areas (lands) to suit their purposes.

UNCCD emerged at the Earth Summit (United Nations Conference on Environment and Development) that took place in Rio de Janeiro in 1992, where a consensus was reached regarding the adoption of Agenda 21 that speaks about social and economic dimensions, conservation and management of resources for development and about the manner in which the role of stakeholders can be strengthened and how the identified measures could be implemented. Representatives of African countries asked for inclusion of the desertification, land degradation and drought issue into the United Nations Framework Convention on Climate Change (UNFCCC). However, the Pacific countries felt that UNFCCC was already quite elaborate and that such a serious issue required a serious and specific attention. It was decided that a new convention should be dedicated to the issue of combating desertification and mitigating the effects of drought and this resulted in adoption of UNCCD in Paris on 17 June 1994. The First Conference of the Parties (COP) took place in October 1997 and the last one in September 2013. COP sessions take place every two years. So far, the UNCCD Convention has been ratified by 186 countries. Out of that number, 140 countries are affected by the land desertification/degradation process.

In order to ensure smooth implementation of the Convention, 5 Annexes were adopted with the aim of regulating the reporting from national, sub-regional and regional levels for every region.: Annex 1 for Africa; Annex 2 for Asia; Annex 3 for Latin America and the Caribbean; Annex 4 for Northern Mediterranean; and Annex 5 for Central and Eastern Europe. although, following the accession to the Convention, it firstly belonged to Annex 4.

UNCCD entered into force on 26th December 1996 and since then it has provided the international community with a framework for sustainable development and management of its land resources. The goal of the Convention is to ensure a long-lasting commitment of the States Signatories through a legally binding document. To the countries not affected by the desertification/land degradation, it ensures an international framework for work in partnership with industrialized countries in the implementation of their respective national programmes and measures. The Convention is a very powerful instrument for sustainable management of natural resources as well as for ensuring a long term external assistance.

The Convention is based on a principle that the solutions to the problems of desertification, land degradation and drought should come from the population affected, with support and partnership of other relevant actors, both local and international. However, technical measures alone cannot win the battle against desertification or land degradation. Efforts to combat desertification and land degradation should be integral part of national development strategies. National programme of measures must define long-term strategies and priorities along with necessary legal and institutional framework.

Pursuant to the Decision 3/COP 8, in the year of 2007, the UNCCD Parties adopted the 10-Year Strategy to enhance the implementation of the Convention (2008-2018.). By the Decision, Parties are invited to implement the Strategy in accordance with their respective priorities, including harmonization of action programmes and other relevant activities related to UNCCD implementation.

APs constitute a key instrument for implementation of UNCCD. They are often supported by action programmes at sub-regional (SRAP) and regional (RAP) level.

APs are developed through a participatory approach involving various stakeholders, including also relevant non-governmental organizations, academic institutions and local communities. APs specify practical steps and measures to be undertaken in combating desertification in specific ecosystems.

The purpose of APs is to identify the factors that contribute to land degradation as well as practical measures needed to curb it and mitigate the effects of drought. AP should establish adequate roles of government, local communities and land users as well as necessary and available resources. Among other things, AP also

- a) develops a long-term strategy to curb land degradation and mitigate the effects of drought as well as an implementation plan, and it is integrated in the national sustainable development policies;
- b) enables alterations to address any changes that may occur and, at the local level, it is flexible enough to deal with various socio-economic, biological and geo-physical conditions;
- c) pays specific attention to implementation of preventive measures for un-degraded or slightly degraded land;
- d) improves national climatological and hydro-meteorological capacities and drought-related early warning resources;
- e) promotes policies and strengthening of institutional framework that develop partnership-based cooperation and coordination between donors, governments at all levels, local population and community, and facilitates public access to adequate information and technology;
- f) ensures effective participation of non-governmental institutions and local population, both men and women, beneficiaries of the resources in particular, including farmers and stockbreeders and organizations representing them, in policy planning and decision-making processes as well as in the implementation and review of APs at the local, national and regional levels; and
- g) requires regular reviews and reports on their implementation.

AP to combat land desertification/degradation describes general guidelines and mechanisms that should be taken into consideration in the future. At the same time, AP does not state concrete measures that should be undertaken in every specific case, as many of them require a consistent scientific review.

## 3.2 UNCCD STRATEGY AND STRATEGIC OBJECTIVES

Developed as a result of the Rio Summit, the United Nations Convention to Combat Desertification (UNCCD) is a unique instrument that has brought attention to land degradation in the dry lands where some of the most vulnerable ecosystems and people in the world exist. Ten years after its coming into force, the UNCCD benefits from universal membership and is increasingly recognized as an instrument which can make a lasting contribution to the achievement of sustainable development and poverty reduction globally.



### UNCCD Strategy Vision

The goal is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability.

As a full-fledged UNCCD member, BiH took the commitment to ensure implementation of the Strategic Plan and Framework to Enhance the Implementation of the UNCCD 2008-2018, in its strategic and planning documents, both at the state level and the lower levels of its administrative organization (entities, cantons and municipalities).

The “strategic objectives” listed below will guide the actions of all the UNCCD stakeholders and partners in the period 2008 – 2018, including the enhancement of political will. The achievement of these long-term objectives will contribute to the above vision. The expected impacts are the long-term effects of the strategic objectives.

- **Strategic objective 1:** To improve the living conditions of affected populations
- **Strategic objective 2:** To improve the condition of affected ecosystems
- **Strategic objective 3:** To generate global benefits through effective implementation of the UNCCD
- **Strategic objective 4:** To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors

The “operational objectives” listed below will guide the actions of short and medium term effects of all the UNCCD stakeholders and partners supporting the achievement of the above vision and strategic objectives. The results/outcomes are short and medium term effects of the operational objectives.

- A. Operational objective 1:** Advocacy, awareness raising and education
- B. Operational objective 2:** Policy framework
- C. Operational objective 3:** Science, technology and knowledge
- D. Operational objective 4:** Capacity-building
- E. Operational objective 5:** Financing and technology transfer

In this regard, each Party is required to submit annual reports to show its contribution to the achievement of the Convention objectives through the implementation of AP. For the reporting purposes, there is a defined set of performance indicators (Annex 5), whereas the specificity of BiH will be considered from the perspective of reporting.

## 3.3 UNCCD IMPLEMENTATION IN BIH

In the post-war period BiH has faced numerous social, economic and environmental problems among which the land degradation stands out as one of the most crucial ones. Land use in BiH is affected by inadequate and unsound planning practices of resource utilization. In most cases, loss of agricultural land is caused by unplanned construction of residential and industrial facilities and infrastructure, unreasonable exploitation of mineral raw materials and excessive erosion caused by deforestation and inadequate treatment of steep slopes.

The most important issues related to the topic of land management in BiH are specified by the 2012 National Capacity Self-Assessment. Primary goals defined by the NCSA include institutional strengthening for improved land management and reduction of land

degradation while the development of AP is just one of the first measures for achieving those goals.

Pursuant to a decision of the BiH Parliamentary Assembly, Bosnia and Herzegovina acceded the United Nations Convention to Combat Desertification (UNCCD) on 26th August 2002 and became its full-fledged Party on 26th November 2002.

Since then, a number of significant steps have been taken with the view of implementing the Convention but, to date, BiH has never had its Action Programme (AP) as part of meeting its commitments under the Convention.

In 2007, BiH submitted its First UNCCD National Report which was a result of joint efforts of seven state institutions. The 4th National Report was submitted in 2010, while the preparations for creating an institutional framework for the 5th National report are underway.

The need of developing AP to combat land degradation and to integrate it into the National Development Strategy, Poverty Reduction Strategy Paper and other UNCCD related strategies and documents was pointed out in the First National Report on the Implementation of UNCCD in BiH, as one of the urgent measures for solving the land degradation issues.





## 4 METHODOLOGY



**T**he Project „Support to Bosnia and Herzegovina for Development of Action Programmes in compliance with the UNCCD 10-Year Strategy and Reporting Process under UNCCD” was implemented in BiH in accordance with the methodology suggested in a set of UNCCD guidelines. The Methodology consists of 10 simple and practical steps that should be taken in order to successfully develop a AP and align it with UNCCD 10-Year Strategy. (Annex 1)

Pursuant to the above mentioned guidelines, the project framework is defined on several levels, both in terms of project management and project implementation, and it is implemented through two components:

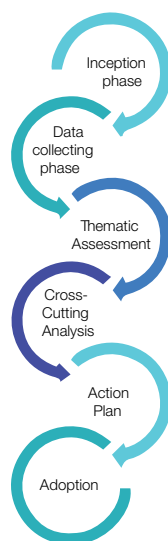
- A.** Development of the AP in line with the 10-Year Strategy
- B.** Reporting and Review Process

## AP DEVELOPMENT PROCESS

In accordance with the UNCCD Secretariat guidelines and 10 practical steps for the implementation of AP, AP development had 5 phases. The next steps are AP adoption at the national level and its public dissemination.

- 1 Inception** – organization of the administrative, management and advisory arrangements for the Project and preparation of a work plan ;  
The inception phase included formation of a team of experts hired for the purpose of AP development, preparation of a work plan and proposed AP contents and formation of work groups.
- 2 Data collecting phase** – complete situation analysis, an “inventory” of the existing data and completed activities;  
In addition to data collection, this phase included a successful completion of an analysis and assessment of political, institutional, financial and socio-economic triggers of land degradation and obstacles for sustainable land management, which were used as a basis for a review of land pressures by sectors.
- 3 Thematic Assessments** – evaluation and analysis of commitments arising out of the international agreement and the activities carried out by BiH so far under the Convention;  
This phase included assessment and analysis of present commitments of BiH under UNCCD.
- 4 Cross-Cutting Analysis** – assessment of capacities, needs and possibilities in relation to the duties of defined priority thematic areas;  
This phase assessed institutional, scientific, human and legislative resources/ capacities for land management.
- 5 Action Plan** – relies on estimates given by thematic assessments and cross-cutting analyses for the purpose of identification of capacity development plans and activities that are necessary in accordance with the Strategic and Operative Objectives of the 10-year UNCCD Strategy.  
The established pressures on land by sectors, and cross-cutting analysis were used to develop an action plan. The Action Plan indicates defined priorities in the area of sustainable land management, and possible sources of funding for defined actions and measures.
- 6 AP Adoption** – after AP has been reviewed by relevant stakeholders, it should be submitted for adoption, firstly at the entity level, by the RS Government and FBiH Government, and subsequently by the Council of Ministers of BiH.

*Chart 1:  
Schematic overview of the  
AP development process,  
by stages*



The Action Plan Implementation will establish the basis for UNCCD reporting and thus facilitate achievement of the basic objectives defined in the UNCCD Strategy.

## IMPLEMENTATION STRUCTURE

The role of UNEP, as an Implementing Agency of GEF, was to enable supervision over the Project in order to ensure that conditions and criteria of GEF are met and that the Project achieves its goals and accomplishes the expected outcomes in an efficient and effective manner. UNEP reported to GEF Secretariat about the progress made by the Project on the basis of the defined project activities and deadlines. In order to ensure general harmonization with the Convention process, UNEP worked closely, through the executive agency - UNCCD Focal Ministry of Agriculture, Forestry and Water Management of RS, with the UNCCD Secretariat and GM through the BiH National Focal Point.

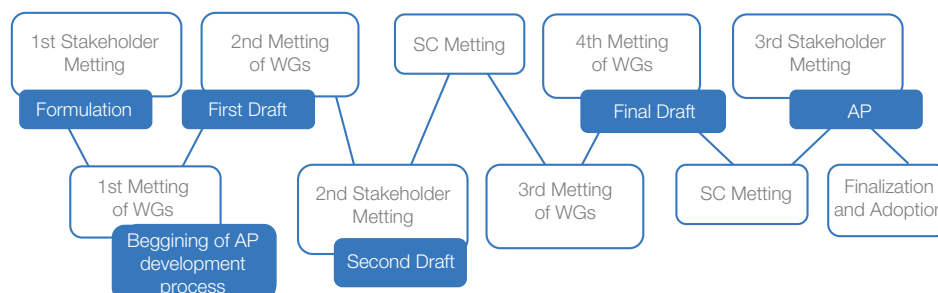
The RS Ministry of Agriculture, Forestry and Water Management, as an executive body, supported the Board of Experts, through coordination of necessary activities at the national level and ensured capacity development for the national team.

The National Coordination Body (NCB) representatives of various stakeholders such as government institutions, non-governmental and civil society organizations, a broad range of resource beneficiaries, academia and private sector, in accordance with the complex and interdisciplinary nature of desertification and other forms of land degradation and its diverse effects. NCB coordinated interdisciplinary and inter-ministerial efforts to initiate the implementation of UNCCD activities within the framework of national strategies of BiH and commitments under the Convention.

The Steering Committee of the Project „Support to Bosnia and Herzegovina for Development of Action Programmes in compliance with the UNCCD 10-Year Strategy and Reporting Process under UNCCD“ (PSC) of included representatives of the respective entity Ministries of environment, Ministry of Foreign Trade and Economic Relations of BiH and the entities' Funds for Environment Protection. PSC supervised the work of the hired Team of Experts throughout, reviewed and approved the Work Plan, monitored the developments and deadlines for certain activities, provided its contribution to workshop planning and organization, ensuring elaborate consultations with all relevant stakeholders (government and non-governmental) during the entire AP development process.

As for the AP preparation, the Project hired two Coordinators for the AP development process, who monitored the Project activities and had the roles of implementation supervisors at the AP development level. In addition to the two Coordinators, a local coordination body, in form of civil society association, was engaged and it had the task to provide technical assistance for the Project implementation activities.

For the purpose of developing the AP, and based on the identified general content of the AP, five key experts were engaged and they were responsible for the development of individual chapters. The experts came from various fields relevant for the land related issues. Fiver working Groups were formed with 5 to 7 members on average, while the experts had the roles of the WG Leaders.



*Chart 2:  
Activities in AP  
development*

The Working Groups comprised representatives of the relevant institutions in BiH. Their role was to finalize the AP contents with the leaders of the groups, to consider issues and approaches in resolving identified problems, and to enable the group leaders access to public information available in the in their respective institutions, and to contribute to the overall AP development process.

Four meetings of Working Groups were organized in the course of the AP development process and they were attended by the AP Development Coordinators, Representatives of UNEP Vienna and BiH Offices, representatives of tech assistance organization, as well as members of the five Working Groups. The schedule of the Working Groups meetings was adjusted to the planned Project outcomes and results. In addition to the WG meetings, and for the purpose of enabling an insight into the document design and content, three public consultations were conducted. Two of those activities were carried out in synergy with the implementation of the project 'Support to BiH for the Revision of the National Biodiversity Strategies and Action Plans', the development of the Fifth National Report to the Convention on Biological Diversity (CBD), and participation of all relevant stakeholders recognized in the fields of land protection and biodiversity. Two meetings of the Steering Committee were held for the purpose of monitoring the course of the project implementation process. These meetings were also used for the presentation of progress report and draft documents, and involved consultations regarding the strategic decisions related to the implementation of Project activities.

All Project activities were implemented in accordance with the Plan of Activities, while the schedule and timeline of activities were adjusted to the needs and requirements of experts who took part in the AP development process.



## 5 GENERAL DATA ON THE COUNTRY





## 5.1 ADMINISTRATIVE ORGANIZATION OF BIH

BiH is a sovereign state with parliamentary state organization and decentralized political and administrative structure. It is regulated by the Dayton Agreement and consists of three separate administrative units: the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District of Bosnia and Herzegovina. FBiH comprises 10 cantons and cantons have municipalities. FBiH has 79 municipalities. While the RS administrative structure includes 62 municipalities. The town Brčko is a special administrative unit, a district. Municipalities and towns with local self-governance are the lowest level of the political and territorial structure of BiH. The towns are (Banja Luka, Doboj, Bijeljina, Pale and Trebinje). The last level of political and territorial distribution in BiH consists of municipalities and towns, where local self-governance is exercised. The following places in BiH have the 'town status': Banja Luka, Bihać, Istočno Sarajevo, Jajce, Mostar, Sarajevo, Zenica, Bijeljina, Doboj, Prijedor and Trebinje.

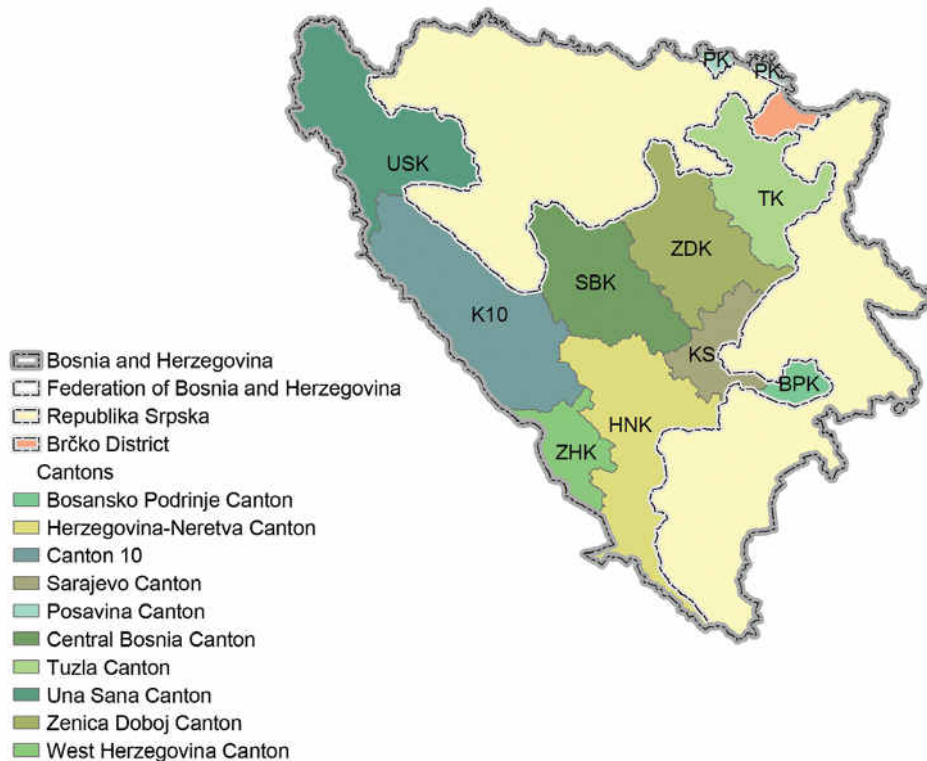
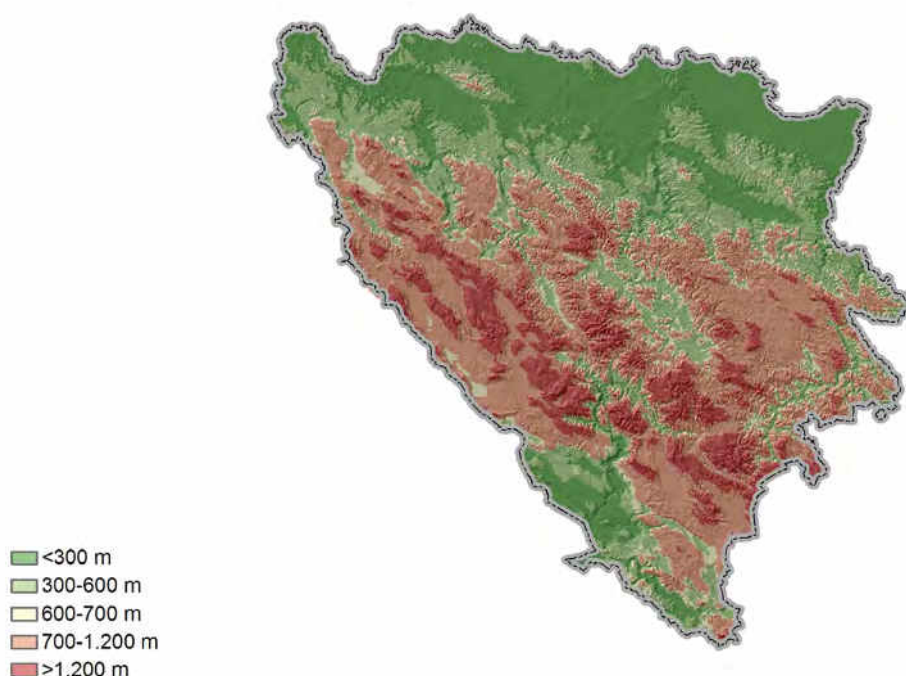


Figure 1:  
Administrative  
organization of BiH

## 5.2 GEOGRAPHY AND RELIEF

BiH is a South-East European country that geographically belongs to the Adriatic and Black Sea basin, that is, to the group of Mediterranean and Danube basins' countries. It is located in the central part of the Balkan Peninsula, between latitudes 42° 26' and 45° 15' North and longitudes 15° 45' and 19° 41' East. It covers 51.209,2 km<sup>2</sup>. The total area amounts to 51.197 km<sup>2</sup> of land and 12,2 km<sup>2</sup> of sea). Total length of the BiH border is 1.537 km. The longest part of the border is the one with the Republic of Croatia (on the north, west and south-west - 931 km), while on the east and south BiH has joint borders with the Republic of Serbia (357 km) and Montenegro (249 km). The longest section of the BiH border is of natural origin and it consists of the rivers Drina, Sava and Una as well as mountains such as Dinara. To the north, BiH has access to the Sava River and to the south to the Adriatic Sea, at Neum. BiH has about 20 km of coastal land belonging to the Municipality of Neum.

Figure 2:  
Relief in BiH



BiH is mainly mountainous with lowlands along big rivers. Of the total land area, 5% are lowlands, 24% hills, 42% mountains and 29% karst areas. Going from north towards the south, lowlands gradually turn into broad hillsides at an altitude of 200 to 600 meters a.s.l.m, and into mountainous region. Areas up to 500 a.s.l.m are mostly represented in the northern and southern part of BiH and along the valleys of Una, Sava, Vrbas, Bosna, Drina, Spreča and Neretva Rivers. The largest portion of territory is taken by Dinarides or part of Dinaric Alps mountain chain stretching from west towards east and strewn with numerous rivers. Herzegovina consists of mountainous (high) and Adriatic (low) Herzegovina that has access to the Adriatic Sea through a narrow belt between Neum and Klek peninsula. Important are also the fields, that is, the plateaus, stretching along the biggest Bosnian rivers (Una, Vrbas, Bosna and Drina) from south towards north, or, in the case of Neretva River, from north towards south. Specific forms in the landscape are huge karst fields (karst valleys) in the southwestern parts of BiH. There are 50 of them and the most significant ones are Livanjsko, Popovo field, Duvanjsko, Gatačko, and Nevesinjsko field.

### 5.3 CLIMATE

Given the specific geographical position and relief, the climate in Bosnia and Herzegovina is quite complex and three different climate belts may be distinguished, with more or less emphasized borders<sup>1</sup>:

1. In the south-west - Mediterranean, that is, maritime climate,
2. In central part of the country – Continental-mountain, that is, Alpine climate, and
3. In the Northern BiH – Moderate continental, that is, Central European climate.

In south-west parts of BiH, due to the vicinity of Adriatic Sea, which in winter periods radiate heat accumulated in summer, the average January temperatures are high (from 3 to 5°C), while summers are dry and hot (absolute maximum temperatures go up to 45°C). Average annual amount of precipitation varies from 1.000 to 2.000 l/m<sup>2</sup>, whereas the average yearly temperature is between 12 to 15°C. At this area snow is rare but not impossible phenomenon.

<sup>1</sup> Federal Hydro-meteorological Institute of BiH, 2013.



The central parts of BiH have continental-mountain climate of Alpine type. The main characteristics of this type of climate are severe winters (absolute minimum temperatures from -24 to -34°C), while summers are warm (absolute maximum temperatures go from 30 to 36°C). Average yearly amount of precipitation is from 1.000 to 1.200 l/m<sup>2</sup>. Snowfalls are abundant especially at higher points.

The northern part of the country has moderate continental climate with quite sharp winters and warm summers but, in relation to Alpine region, diameters between winter and summer temperatures are smaller. The warmest areas are at the northeast, while average temperatures decrease toward southwest, going along the river valleys towards the central belt. Average yearly amount of precipitation ranges from 700 to 1.100 l/m<sup>2</sup>. Snow precipitations are also represented but to a smaller extent than in the central parts of the country.

Depending on altitude above sea level, in addition to these climate zones, there are also some interim zones. It is therefore fair to say that there are areas with moderate continental climate of pre-mountain type, areas of Mediterranean climate of pre-mountain type, etc.

## 5.4 LAND RESOURCES

The total area of agricultural land in BiH is about 2.158.271,4 ha while forest land takes about 2.795.090,0 ha. According to 1991 survey data, 89% of the total arable land is privately owned, while 11% is public property. However, if we include pastures to the total arable area, this proportion will change and the private property accounts for 70,13 % and public land for 29,87%. Significant share of pastures are publicly owned land.<sup>2</sup> In percentages, the distribution of agricultural land is as follows: FBiH: 53,08%, Republika Srpska: 45,47%, and Brčko District of BiH: 1,45% out of total agricultural holdings in BiH. The total surfaces of agricultural land in the Federation of BiH and Republika Srpska are quite similar but their structure is very different. Namely, out of the total arable land in BiH, 57,94% is in RS, 39,42% in FBiH, and 2,63% u BD. The share of pastures is significantly bigger in FBiH (72,22%) than in RS (27,66%). In addition, according to statistical data, 90,84% vineyards are in FBiH.

There are considerable differences when it comes to the total agricultural land per capita in FBiH (0,48 ha) and RS (0,74 ha). Namely, the share of ploughed fields and gardens per capita in the FBiH is 0,17 ha, which is below the European average and the average of all neighbouring countries. To this end, the situation of agricultural land in RS is much more favourable as it has 0,44 ha of ploughed field surfaces per capita<sup>3</sup>.

Structure of land surfaces	BiH	FBiH	RS	DB BiH
Ploughed fields and gardens	1.004.931,0	396.182,0	582.270,0	26.479,0
Orchards	99.389,6	43.978,0	52.191,6	3.220,0
Vineyards	5.603,5	5.090,0	513,5	*0,0 <sup>5</sup>
Meadows	460.166,3	275.516,0	183.815,3	835,0
Pastures	588.181,0	424.794,0	162.662,0	725,0
Total	2.158.271,4	1.145.560,0	981.452,4	31.259,0
Forests	2.795.090,0	1.522.886,0	1.272.204,0	*0,0

Table 1:  
Structure of land surfaces  
in BiH (2012)<sup>4</sup>

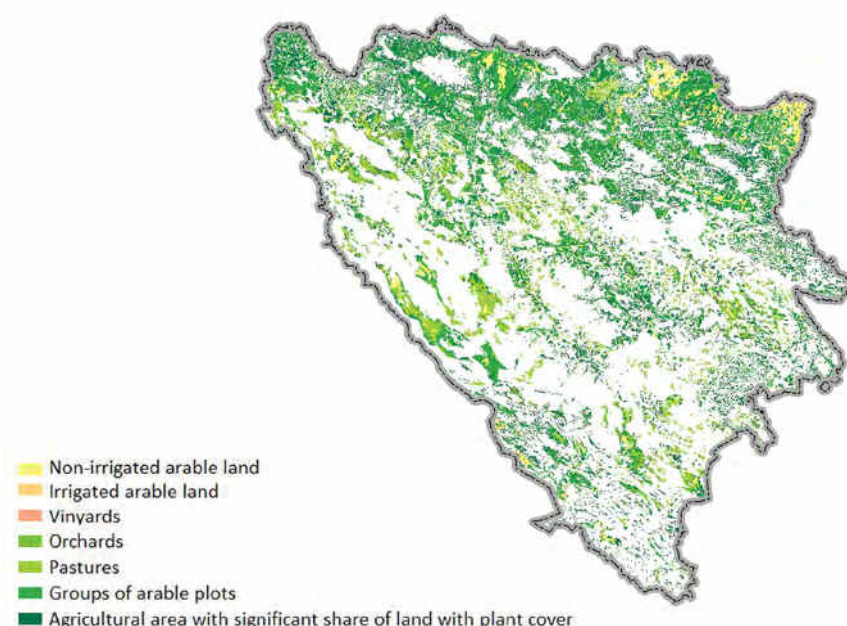
<sup>2</sup> Lists containing statistics about surfaces, cadastral income, number of households, plots and deeds by sectors from 1991 of the Republic Administration for Geodetic and Property Issues Sarajevo

<sup>3</sup> Preliminary results of the BiH 2013 Census on Population, Households and Dwellings were used for the calculation.

<sup>4</sup> Agency for Statistics of BiH, 2012.

<sup>5</sup> \*not significant

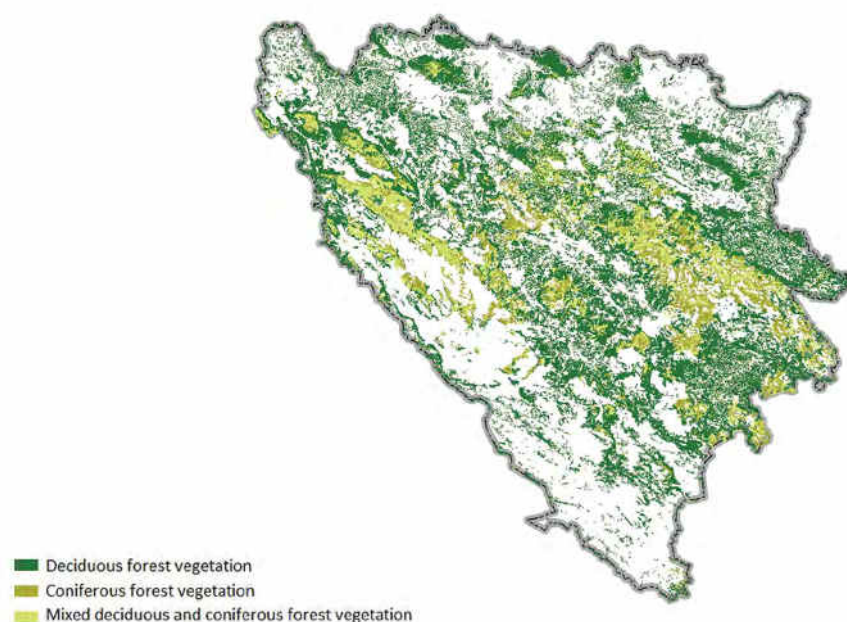
**Figure 3:**  
Agricultural land in BiH  
(Source: CORINE 2006,  
Faculty of Agriculture and  
Food Sciences, Institute  
for PAM)



## 5.5 FOREST RESOURCES

Given the fact that forests in BiH cover more than half of its territory (about 53%), they are undoubtedly a highly important natural resource that has a major role in sustaining a high level of biological diversity, prevention of erosion, mitigation of effects of climate changes as well as in other issues of importance for the local and general community. High and coppice coniferous and deciduous forests prevail, while the most common type of deciduous trees is beech (*Fagus spp.*), which makes almost 40% compared to the distribution of all types, while oak (*Quercus spp.*) covers around 20%. Spruce and fir, which may be found at higher altitudes and that grow on steep grounds, account for an additional 20% of the forest cover in BiH<sup>6</sup>. In BiH, 80% of forests are in public ownership. No statistics have been kept currently at the state level and, therefore, this study must use the available data, which are quite questionable, until the Second National Forest Inventory data become available.

**Figure 4:**  
Forest cover in BiH  
(Source: CORINE 2006,  
Faculty of Agriculture and  
Food Sciences, Institute  
for PAM)



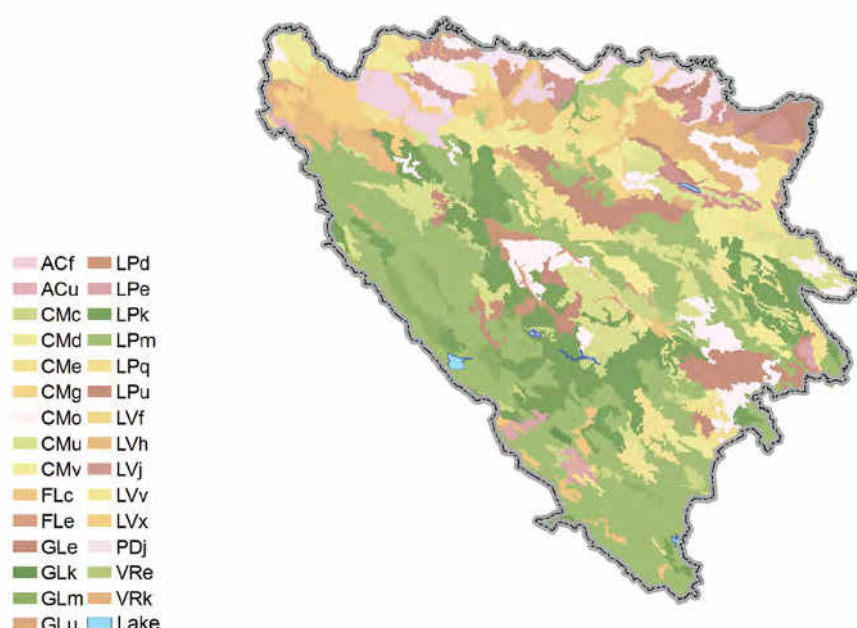
6 State of the Environment Report of BiH, 2012.

## 5.6 GEOLOGY

Geological and petrographic composition of the soil in BiH is the result of a long geological history that saw formation of diverse rocks (magmatic, sedimentary, metamagmatic and many other interim forms), while both the water and land area were home to the development of various flora and fauna species. Palaeozoic, Mesozoic and Cenozoic periods can be observed in the territory of BiH. Huge rock complexes show the regularity in the spatial distribution. Thus, the biggest masses of carbonate rocks are connected to the southwest parts (External Dinarides) while flysch ophiolitic complex is linked to central and northern parts (Internal Dinarides). The southwest border of the Sutjeska-Sarajevo-Banjaluca-Bosanska Krupa flysch zone is actually the border between the Internal Dinarides on the northeast and the External Dinarides on the southwest. In some parts of the Internal Dinarides, from flysch ophiolitic complexes, Palaeozoic carbonate compounds appear in complex tectonic relations, mostly like pulled over the internal units.

### 5.6.1 TYPES OF SOILS IN BIH

In view of a blend of pedogenetic factors, auto-morph and hydro-morph soils developed in the territory of BiH, Auto-morph soils account for 86%, and hydro-morph for 14% of total surface of BiH.



*Figure 5:*  
Dominant types of  
soil according to FAO  
Classification  
(Source: SOTER, FAO)

According to data of the Federal Institute for Agropedology, the most widespread is calcimelanosol (Cambic soil on limestone and dolomites, appears at the only or dominant type of soil in 21,45% of surfaces in BiH), and Dystric Cambisols (acid brown soil, 17,71%) and kalcocambisol (brown soil on limestone, 17,15%). As for hydro-morph class, the most common is Fluvisol (4,02%). Majority of soils/lands developed in the territory of BiH has a shallow solum and low plant and nutritional soil potential. Of the total surface of land resources, the high quality soils account for 15,16%, moderate quality 22,03%, while the rest is classified as low quality (32,36%), that is, very low quality (30,45%) soils.

Table 2:  
Capability soil classes  
in BiH<sup>7</sup>

Capability soil classes in BiH	Surface	
	ha	%
High quality soils of I, II and III class	774.907	15,16
Moderate quality soils of IVa and IVb class,	1.126.520	22,03
Low quality soils of V and VI class	1.654.616	32,36
Very low quality soils of VII and VIII class	1.556.857	30,45

The main characteristics of soils in BiH are:

- Acid soils make up about 1/3 of the land in BiH,
- Low content of humus,
- Low content of the most important fertilizer nutrients,
- Soils are generally shallow,
- Approximately 14% of the territory contains excess water,
- Inadequate care for improving the fertility,
- Individual land lots are small and fragmented,
- Erosion is a problem, especially on terrain with slopes<sup>8</sup>.

## 5.7 WATER RESOURCES

In hydrological terms, Bosnia and Herzegovina is a very rich country with numerous surface and underground watercourses. BiH river courses belong to the Black Sea and Adriatic Basins. The main watercourses or their major catchment areas in BiH, that constitute part of the Black Sea Basin, are: Una (9.130 km<sup>2</sup>), Vrbas (6.386 km<sup>2</sup>), Ukrina (1.500 km<sup>2</sup>), Bosna (10.457 km<sup>2</sup>), Drina River (7.240 km<sup>2</sup>) and the other direct tributaries of the Sava River (4.006 km<sup>2</sup>). The Adriatic Sea Basin covers the area of south and south-western part of BiH. It consists of the Neretva River basin with Trebišnjica and a part of the Cetina River basin. One of the basic geographical characteristics of the hydro-graphic network of BiH, which equally applies to both Black Sea or Adriatic basin, is that a great portion of the watercourse belongs to the category of international watercourses (both boundary and those crossing the border). With its entire watercourse in the territory of BiH, the Sava River is a natural border in the North of the country, while the Una River partially forms a natural western border; and the Drina River is the major part of the eastern border of BiH.

BiH has a large number of rivers (Pliva and Una) and mountain lakes (in the area of Dinarides), as well as underground (thermal, geo-thermal and mineral) waters. The most popular wells of mineral water are located in Kiseljak, Kakanj, Srednje, Busovača, Srebrenica, Žepa, Tešanj, Maglaj, Žepče, etc. Thermal springs are situated in Ilidža, Fojnica, Olovo, Tuzla, Gradačac, Teslić, Banja Luka, etc. Bosnian-Herzegovinian coast line is located south of the Neretva Delta where BiH has access to the Adriatic Sea with a costal line totalling 20 km and with a surface area of 8 km<sup>2</sup>.

## 5.8 MINERAL RESOURCES

BiH is a country with a quite high level of ore deposits, more specifically, mineral resources. The most important ores include coal, lead, zinc, silver, manganese, antimony, copper, mercury, and non-metal ores such as magnesite, barite and bauxite. Major coal mines

<sup>7</sup> First National Report on the Implementation of UNCCD in BiH, 2007.

<sup>8</sup> Čustović, 2005.

in BiH are: Banovići, Đurđevik, Kakanj, Zenica, Breza, Bila, Kreka, Sanski Most, Livno, Gračanica, Gornji Vakuf/Uskoplje, Ugljevik, Miljevina, Gacko and Stanari. Total geological reserves of coal in BiH are estimated to 5,647 billion tons, out of which 2,540 are balance reserves (1,438 billion tons of lignite and 1,103 billion tons of brown coal). Currently, there are nine metal and non-metal mines in BiH: Veovača, Olovo, Bužim, Vareš, Jajce, Čitluk, Posušje, Široki Brijeg and Bosanska Krupa<sup>9</sup>.

## 5.9 BIOLOGICAL AND LANDSCAPE DIVERSITY

In addition to the species diversity, the BiH diversity is also characterized by an extremely high degree of landscape diversity that integrates all forms of geological and biological diversity in the broadest sense of the word. BiH is rich in biological diversity, among other things, because it belongs to three different geological and climate regions: Alpine – High Nordic region, Euro Siberian – Boreo American region, and Mediterranean Region. More than 5.000 species and sub-species vascular plants have been identified in BiH, more than 100 fish species and more than 320 bird species and other elements of biological diversity<sup>10</sup>. No less than 30% of total endemic flora of the Balkans (1.800) is present in the territory BiH, and the country has an extremely high degree of biotopic diversity.

The territory with protected areas in BiH is relatively small in size and, in terms of percentages, its share in the total territory of BiH is very low and far beyond European standard. In 2011 it amounted to 2% altogether but, over the past nine years, it was expanded through designation of “Una” National Park in 2008 and some other similar activities. However, the share is still below the level of protection anticipated by numerous strategic documents<sup>11</sup>. National parks account for the major portion of all protected areas. The number of protected areas in relation to the state of biodiversity and other natural values of BiH is generally at a very low level and it is necessary to design and apply an entirely new approach to the management of special purpose areas.

## 5.10 DEMOGRAPHY AND POPULATION TRENDS

A Population, Households and Dwellings Census was conducted in October 2013.

According the preliminary results of the Census, a total of 3.791.622 persons were enumerated, 2.371.603 in the Federation of BiH, 1.326.991 in Republika Srpska and 93.028 in Brčko District BiH.

Level	Total enumerated persons	Total households	Total dwellings
Bosnia and Herzegovina	3,791,622	1,163,387	1,617,308
Federation of BiH	2,371,603	721,199	991,384
Republika Srpska	1,326,991	414,847	588,241
Brčko District BiH	93,028	27,341	37,683

*Table 3:  
Preliminary results of the  
BiH 2013 Population,  
Households and Dwellings  
Census, for Bosnia and  
Herzegovina, entities and  
Brčko District BiH<sup>12</sup>*

<sup>9</sup> State of the Environment Report of BiH, 2012

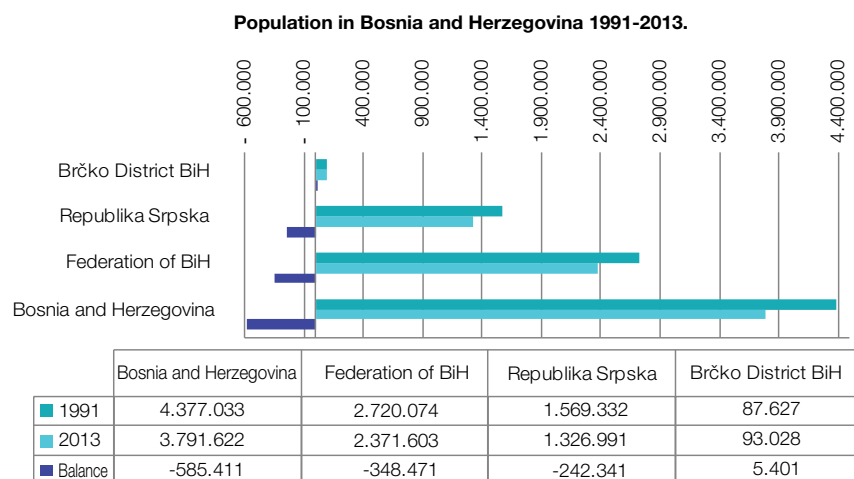
<sup>10</sup> Fourth National Report of BiH to the UN Convention of Biological Diversity, 2010.

<sup>11</sup> NEAP specifies protection of 15 - 20% territory of BiH

<sup>12</sup> Preliminary results of the Population, Households and Dwellings Census in BiH, 2013.



*Chart 3:*  
*Population in Bosnia and*  
*Herzegovina 1991-2013.*<sup>13</sup>



The 1991 Census in BiH enumerated 4.377.033 persons as permanent residents living in places where their families lived and according to the preliminary results of the 2013 Census, the number of enumerated persons is 3.791.622, which clearly indicates that major changes that took place during the period 1991 – 2013.

The tragic conflict in the region, as the General Framework Peace Agreement defined the 1992-1995 war destruction in BiH, had immense direct consequences on the demographics of the country: about 100.000 persons were killed and about 17.000 were officially recorded as missing persons. In addition to that, in the period from the beginning of war until the signing of the Dayton Framework Peace Agreement, about 2,2 million people had to leave their pre-war homes, which makes more than half of the pre-war domicile population. The period between 1992 and 1995 is characterized by war-time migrations. In addition to those who left during the war, estimates show that nearly 110.000 people moved from BiH in the post-war period and that more than 43.000 of them changed their citizenship/nationality permanently. Migrations continue after the war. The internal migrations trend in 2012 is discussed below<sup>14</sup>.

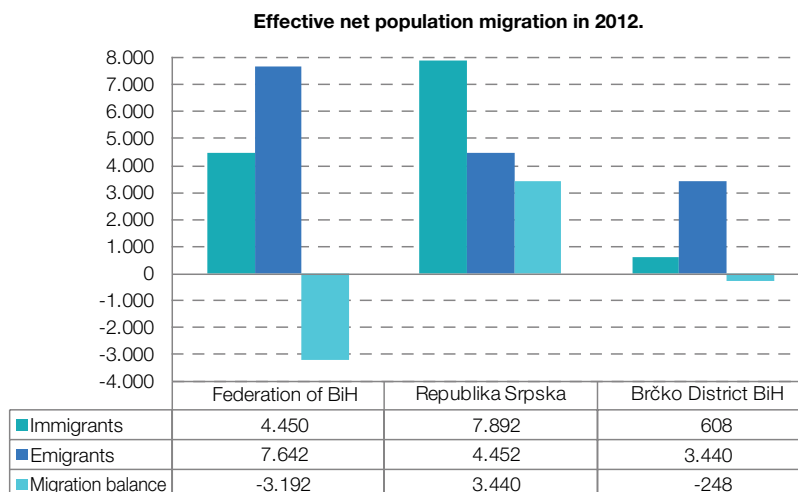
At the level of BiH, the number of immigrants/emigrants in 2012 amounted to 40.305. Out of that, the number of immigrants in FBiH was 25.082 (an increase of 16,8% as compared to 2011); in RS 14.615 (an increase of 41,1% as compared to 2011); and BD 608 (an increase of 7,2% as compared to 2011).

During the same period, the number of emigrants from the Federation of BiH was 28.274 (an increase of 28,6% as compared to 2011); in Republika Srpska the number of emigrants amounted to 11.175 (an increase of 16,0% as compared to 2011); and in BD BiH to 856 (an increase of 8,4% as compared to 2011).

The total net migration balance of RS is 3.440, of FBiH 3.192, and BD BiH total net migration balance amounts to 248. The largest number of persons who migrated within BiH were in the age of 20-39 (19.579 persons) which makes up 48,6% of total migrations.

<sup>13</sup> Federal Institute for Statistics, 2008.

<sup>14</sup> Agency for Statistics, 2012.



*Chart 4:*  
Effective net population  
migration in 2012.

A rather high percentage of the population in Bosnia and Herzegovina is the aging population with low fertility rates which, unless the situation changes soon may have serious consequences in the future. In addition to low natural growth rates, an uneven development of urban and rural areas due to population migrations from less developed into industrialized parts of the country (Banja Luka, Sarajevo, Tuzla, Mostar, Zenica, Trebinje, etc.) is another major demographic issue. According to estimates, about 45% of population resides in urban areas, with the average annual growth of urban population of 0,3% over the last 15 years. Administrative status of the town is related not only to a specific number of residents but also to the urban development level as well and the economic and cultural basis of municipalities. This adds to the pressure on suburban land to change the purpose which has increasingly turned into residential and industrial zones.

The mean age in BiH is 38,3 years. The largest proportion of the population in BiH belongs to the age group between 35 and 64 years of age (39,5%). Younger population (17 years of age) accounts for 21,6% of the total population. Elderly persons (aged 65 and over) account for 15,1% of the total population and out of 100 elderly persons 57 are female. Percentage of women over 65 years of age is 16,8% whereas for men this figure is 13,3%. The dependency ratio, that is, the percentage of inactive population (persons younger than 15 and older than 65) and active population (aged 15 to 64) in BiH is 48,3%, which means that for each 100 active persons there are 48 inactive ones. Fertility rates in BiH are very low. For every 100 women aged from 15 to 49 there are 18 children under 5 years of age. Average life expectancy is 74 years (72,1 for men and 77,3 for women). Child mortality (0-5) rate is 15% out of 100 live births.

According to the 2013 BiH Labour Force Survey, conducted by the statistical institutions in BiH, 2,598,000 persons belong the category of active population, whereas 1,133,000 belong to the labour force category. Out of the total number of labour force, only 822,000 are employed.

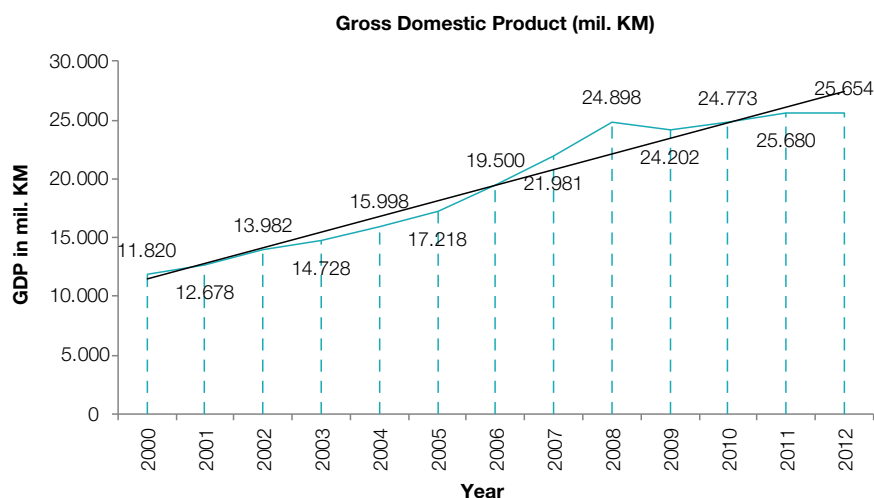
## 5.11 CURRENT ECONOMIC SITUATION AND TRENDS

Over the past two decades the country's economy has been characterized by a post-war and transitional recovery process, including an extremely complex political situation, which has directly affected its economic trends. Given rich natural resources, the entire economy has relied on their utilization, which is an unviable practice and highly detrimental for natural resources. The consequences of such economic development include land degradation, contamination of water resources, air pollution, deforestation, and unsustainable mining. A high unemployment rate, underdeveloped private sector, unstable and unavailable institutions, underdeveloped infrastructure – traffic in particular, insufficient investing in research and development, education system that has not been adjusted to the market requirements, and uneconomical utilisation of energy are major challenges affecting the

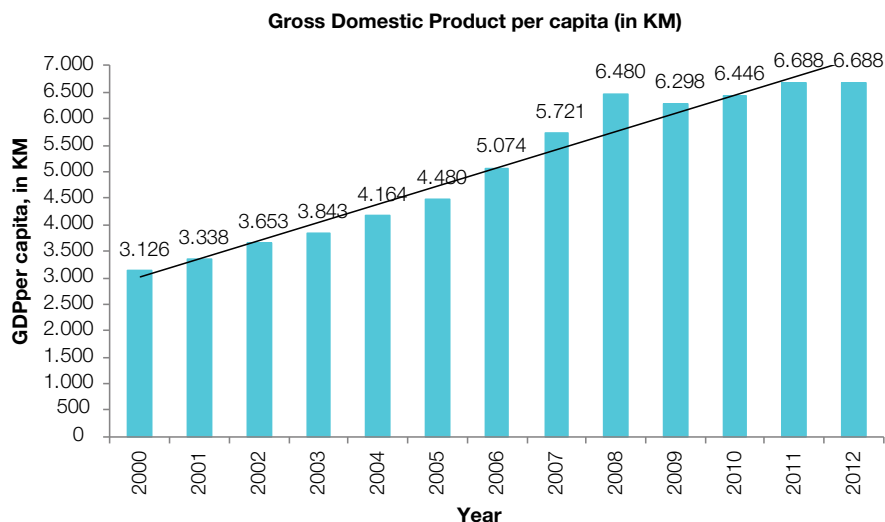
BiH economy, sustainable production and consumption. Economic recovery should be launched and tailored so as to accommodate the need for conservation and sustainable utilization of natural resources.

The nominal value of GDP BiH for 2012 was 25.654 million KM and, with a decline of 0,1% from 2011, whereas the real vale for 2012 was 1,1%. FBiH share in the BiH GDP in 2012 was 64,20%, RS 33,50%, and BD BiH 2,30%. GDP per capita amounted to 6.688 KM<sup>15</sup>.

**Chart 5:**  
Gross Domestic Product  
in mil. KM, for the period  
2000 – 2012.



**Chart 6:**  
Gross Domestic Product  
per capita, in KM, for the  
period 2000 – 2012.



Analyses show that 34,0% of value added was generated in 2011 by production activities (agriculture, fisheries, mining, manufacturing, electricity supply, and construction) whereas service activities generated 66,0%. The biggest value added share in GDP was generated by trade activities (13,1%), manufacturing (11,3%), public administration (9,3%), and real estate business (8,9%).

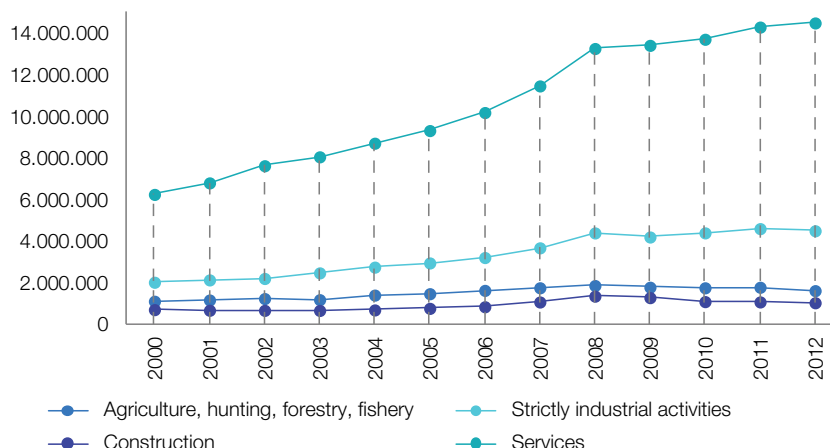
Viewed by activities, a decline of gross value added was recorded in 2011 in construction (4,2%) and electricity production (2,0%). The biggest growth of gross value added was recorded in fisheries (29,0%), mining (18,2%) other activities (6,6%), health (6,3%) and financial intermediation (6,3%). The greatest contribution to the GDP growth rate of 3,6% was made by trade (13,6%), manufacturing industry (11,7%), public administration (9,6%), and real estate business (9,2%) activities.

<sup>15</sup> Agency for Statistics of BiH, 2012  
Agency for Statistics of BiH 2013;

According to initial results, the biggest decline in 2012, as compared to the previous year, was recorded in the sectors of agriculture, forestry and fisheries (9,26%), construction (3,71%), manufacturing (3,67%), electricity production and supply (3,63%) and financial activities (2,20%).

In 2011, household consumption expenditures that account for about 80% of GDP amounted to 21.918 million KM, which represents a nominal growth of 2,72%, in comparison to 2010. In terms of real values, there has been a slight decline in consumption (0,3%), as shown by the average growth of prices of 3,03%.

**Gross value added, by activities (in 000 KM)**



*Chart 7:*  
Gross value added by activities, 2000 – 2012<sup>16</sup>

Regardless of relative stabilization of demographic situation over the past decade, the share of the work age population has shown negative growth rate of 5% since 2006 when the labour market analysis was published for the first time. In spite of a balanced gender representation in the work age population, labour force comprises much more men than women. Employment structure in BiH is very unfavourable as a small number of the work age population are employed in the manufacturing sector, especially in agriculture, which is manifested in abandonment of large areas of agricultural land and, as a result, less pressure on natural resources.

In August 2013, the number of persons employed in legal entities in BiH was 683,339, of which 279,722 were women. The number of unemployed, during the same period, was 555,937, of which 281,923 were women<sup>17</sup>. 67% of employed persons were working in different service providers in both private and public sector, whereas 26% found jobs in industrial activities. Out of the total number of employed persons, 5% were working in construction sector and 2% in agriculture.

Sector	Number of the employed persons
Agriculture, forestry, fisheries	15,344
Strictly industrial activities	175,472
Construction	32,523
Services	460,000
<b>Total</b>	<b>683,339</b>

*Table 4:*  
Number of the employed persons, by sectors in BiH

Nonetheless, according to data of the 2013 Labour Force Survey, 155,000 persons were employed in agricultural, 245,000 in non-agricultural and 422,000 in the service sector.

Preliminary data for 2013 are a positive indicator for the expected growth of foreign direct investments (FDI) in Bosnia and Herzegovina, especially if we take into consideration the significant investment plans suggested by the foreign investors<sup>18</sup>.

<sup>16</sup> Agency for Statistics of BiH, 2013

<sup>17</sup> Agency for Statistics of BiH, 2013

<sup>18</sup> Foreign Direct Investments (FDI) – Position and Performance, 2013.

Net FDI inflow (net financial assets and liabilities) in the first six months of 2013 was 247 million EUR, which is much more than in the same period in 2012 when they amounted to 115 million EUR<sup>19</sup>. According to the annual data of the Central Bank of BiH, total value of the FDI in BiH as of December 2012 amounted to 5,6 billion EUR. In the FDI structure, for the period May 1994 – December 2012, the equity and reinvested earnings were 4 billion EUR, and other capital (inter-company loans, bonds, money market instruments, trade loans, and other liabilities) was 1,6 million EUR. In 2012, FDI amounted to 285 million EUR, which was a decrease to 2,2% of GDP or by 19,6% as compared to 2011.

Total FDI balance at the end of 2012 amounted to 5,6 billion EUR or 11 billion KM, with Austria maintaining the largest contribution (1,3 billion EUR or 2,6 billion KM), followed by Serbia (959 million EUR or 1,9 billion KM) and Croatia (754 billion EUR or 1,5 billion KM). In the structure of the Foreign Direct Investment in 2012 (285 million EUR or 558 million KM), equity accounted for 154 million EUR (or 302 million KM), other capital amounted to 140 million EUR (or 274 million KM), while the amount of reinvested earnings was negative (-9 million EUR or -18 million KM)<sup>20</sup>.

The biggest share of foreign investments in 2012 was registered in the manufacturing sector (41%), banking sector (23%) and trade (21%).

## 5.12 INSTITUTIONAL SYSTEM OF LAND MANAGEMENT AND LEGISLATIVE FRAMEWORK IN BIH

### 5.12.1 INSTITUTIONAL SYSTEM OF LAND MANAGEMENT

The Sector for Natural Resources, Energy and Environmental Protection within the MoFTER was appointed as a coordination body for land issues at the national level for the purpose of common operation at the international level. The same applies to the Ministry of Civil Affairs which also has some competencies related to the environmental protection, but they are not clearly defined. We should also mention the Inter-Entity Steering Committee for the Environment, responsible for coordination and harmonization of the environmental legislation and policies of relations between the two entities, promotion of ratification of the international conventions and implementation of the EU projects. In order to be able to address and better coordinate overall issues of land protection, it is necessary to more clearly specify responsible institutions for a more coherent policy management, and to give a more important role to local communities, which have to be equal partners in all future activities.

*Table 5:  
Institutions in the field of  
land protection at the entity  
and BD level*

FBiH	
Ministry of Environment and Tourism	Administrative and professional responsibilities related to air, water and soil protection; monitoring and environmental standards; drafting the environmental strategy and policy, tourism development
Ministry of Spatial Planning	Spatial planning and land use
Ministry of Agriculture, Water Management and Forestry	Administrative, professional and other responsibilities in the field of agriculture, water management, forestry and veterinary medicine, management of the two river basins (the Adriatic and the Sava River Basin)
Federal Inspection Services Authority	Implementation of regulations and control in the field of environmental protection
Environmental Protection Fund of FBiH	Collection and distribution of funds for environmental protection on the territory of FBiH, promotion and funding of preparation, implementation and development of programmes, projects and similar activities related to conservation, sustainable use, protection and improvement of the state of the environment and use of renewable sources of energy

<sup>19</sup> Central Bank of BiH, October 2013.

<sup>20</sup> *ibid*



RS	
Ministry for Spatial Planning, Construction and Ecology	Protection of land as an element of the environment, issuance of measures to mitigate adverse effects of all activities involving land exploitation, or use of land in a way which may involve a risk of land contamination
Ministry of Agriculture, Forestry and Water Resources	Organization and implementation of activities related to land policy, protection and exploitation of land, protection against pests and improvement of health of plants, prevention of entry and spread of (quarantine and economically detrimental) pests, issuance of decisions and permits in the health protection sector
Republic Authority for Inspection Activities	Inspection, administrative and other technical responsibilities pertaining to the inspection control over trade of commodities and services in agriculture, plant protection, fresh water fishery, forestry, hunting industry, energy, mining, geology, oil and gas, pressure containers, water, transport, geodetic affairs, labour, employment, construction, ecology, special planning, urbanism, geodetic affairs, occupational health and safety, sanitary protection, production and sale of drugs, toxic substances and narcotics, protection against ionizing and non-ionizing emissions, social welfare, family welfare, child welfare, firefighting, upbringing, education, living standard of pupils and students and other issues pursuant to the law
Environmental Protection and Energy Efficiency Fund of RS	Fund raising, funding of programmes and projects in the field of conservation, sustainable use, protection and improvement of the environment, energy efficiency, and use of renewable sources of energy
BD	
Department for Urban Planning and Property Affairs	Environmental protection
Department for Agriculture, Forestry and Water Management	Responsibilities related to water management (issuing water licences, water discharge, and flood protection infrastructure)
Inspectorate	Implementation of regulations and controls in the field of environmental protection

Since 2006 the environmental issues in FBiH are mainly within the scope of responsibilities of the Ministry of Environment and Tourism. Spatial planning and land use is the responsibility of the Ministry of Spatial Planning, while the Ministry of Agriculture, Water Management and Forestry is in charge of agriculture, forestry, water management and veterinary medicine. Such an organizational structure indicates that land in FBiH is managed by three ministries, whereas, at the same time, there are no formal mechanisms to oblige the institutions to exchange data and information, and coordinate activities related to monitoring the state of, analysis and protection of land. In RS, there are two ministries responsible for environment and land. These are the Ministry for Spatial Planning, Construction and Ecology, and the Ministry of Agriculture, Forestry and Water Resources. The responsibilities of the aforementioned institutions are complex and treat land issues from different aspects, but there is neither consistent approach to the problem of land degradation nor the required legislation for its protection. The Government of BD has 10 Departments, two of them in charge of the environment and land issues. These are the Department for Agriculture, Forestry and Water Management and the Department for Spatial and Urban Planning and Property Affairs. Complex institutional structure, lack of efficient and effective horizontal and vertical coordination among different government levels hampers creation and development of a coherent and integrated land policy.

The improvement of the state of the environment in BiH should be a coordinated endeavour. To this effect, it is necessary to identify a mechanism which would facilitate a common approach in efforts to address this issue, as well as permanent regional and global participation with efficient, effective and coordinated cooperation with the entities and BD, cantons and local communities, aimed at designing common measures against land degradation. Shortcomings and weaknesses of the existing, and introduction of new laws require continuous communication and coordinated activities of scientific communities, local experts as well as all individuals.

In addition to higher education institutions, there are other institutions in BiH whose activities focus on land at scientific and professional level. The RS Agricultural Institute comprises the Institute for Agroecology, with a soil unit which carries out researches in the field of agro and hydro-melioration. The Federal Institute for Agropedology FBiH

carries out technical and other tasks in the competence of the Federation BiH related to land, prescribed by the Law on Agricultural Land ("Official Gazette of FBiH" No. 2/98) pertaining to expert technical institutions in the field of agriculture. Furthermore, the Faculty for Agriculture in Sarajevo comprises the Institute for Pedology, Agrochemistry and Melioration (PAM Institute) and the Agricultural Faculty of the University in Banja Luka comprises the Institute for Agroecology and Land, which in addition to their participation in the education process, also play an important role in scientific and expert research related to a great number of disciplines.

#### 5.12.2 LEGISLATIVE FRAMEWORK ON LAND

The National Environmental Action Plan BiH (NEAP BiH) for the period 2003 – 2008, is a document which to a certain extent defines the problem of land conservation. It was adopted by the governments and parliaments of FBiH and RS in 2003. Measures for improvement and monitoring of land are also detailed to a certain extent in the Poverty Reduction Strategy Paper, which the Council of Ministers BiH adopted in 2004.

The United Nations Country Team for BiH, in consultation with the Council of Ministers BiH, completed the United Nations Development Assistance Framework (UNDAF) for the period 2010 – 2014, with the goal to provide its assistance in this period. The priorities set in this document include the legal framework strengthening, capacity development for sustainable natural resources management, and participation in sustainable development planning at the local level. The existing legislation regulating the issues of environment, land, its spatial planning and use (Annex 3) is in line with the BiH constitutional organization, mandated to the entity and cantonal governments, namely the ministries and administrative organizations. There is no environmental legislation at the national level. At the entity levels, environmental policies are developed in accordance with the entity legislation.

The Law on Agricultural Land (Official Gazette of FBiH, No. 52/09) provides for the basic principles and management, protection, use, and disposition of agricultural land in the territory of FBiH. This Law was adopted for the purpose of conservation, proper utilization, increase in production capacity and enhancement of agricultural land management as a limited and non-renewable natural resource, regardless of its ownership, and harmonization of interests of all operators in use of agricultural land in economic development of the country. FBiH has not yet adopted the Law on Forests, which in practice has unforeseeable consequences on the forestry, administration bodies, economy, justice and other industries which use forestry products, and which is of crucial importance for sustainable forest and forest land management. We should not forget the Law on Spatial Planning and Land Use of FBiH (Official Gazette FBiH, No. 2/06), which defines and governs the land use planning at the level of FBiH through development and adoption of planning documents and their implementation, the land use at the level of Federation BiH etc. This Law, requires that planning at all government levels in the Federation BiH is in compliance with special regulations in the field of environmental protection, cultural, historical, architectural and natural heritage, soil, air, forests, water, health, as well as protection of energy generating, mining and industrial facilities, infrastructural facilities and communication installations, and protection of sports, tourist, military and security facilities and their infrastructure. The Law on Environmental Protection (Official Gazette FBiH, No. 33/03), which generated other laws significant for protection of other environmental aspects (air, water, waste management, etc.) is the "umbrella law" in FBiH.

The RS Law on Environmental Protection (Official Gazette RS, No. 71/12) defines the main principles of environmental protection which regulate, among other things, conservation, protection, renewal and improvement of ecological quality and capacity of the environment, as well as living quality, measures and requirements for management, conservation and rational use of natural resources, legal framework and framework of institutions for preservation and improved protection of environment, funding of activities related to environment, tasks and responsibilities of administrative bodies as defined in

the legislation and by-laws, and obligations of the public administration bodies. The Law on Agricultural Land (Official Gazette RS, No. 93/06, 86/07, 14/10 and 5/12) regulates planning, protection, development, use and disposition of land as well as other matters relevant for agricultural land. Agricultural land is defined as a natural resource and asset of general interest, used for agricultural production under the conditions defined in this Law, which is very important from the aspect of conservation, protection and its sustainable use. The Law on Forests also in force (Official Gazette RS, No. 75/08 and 60/13) regulates policy and planning, forests and forest land management, protection of forests, financing and value of forests, survey of forests and forest land, as well as other matters relevant for forests and forest land, in terms of improvement and sustainable use these resources. It is also important to mention the Law on Construction Land (Official Gazette RS, No. 112/06) which defines the terms and methodology of designation of construction land in the sites intended for construction, manner of use, management and disposition of publicly owned construction land, fees for use of land. Since 2010, the Law on Spatial Planning and Construction has been effective in RS (Official Gazette RS, No. 55/10) which, *inter alia*, regulates matters related to spatial planning, construction land and construction of buildings and facilities.

The BD BiH Law on Environmental Protection (Official Gazette BD; No 24/04) is the “umbrella law” in this field and a basis for the adoption of other regulations pertaining to the environmental protection. The area of protection and use of land in BD is regulated by the Law on Forests BD BiH (Official Gazette BD, No. 14/10), the Law on Agricultural Land (Official Gazette BD, No. 32/04) and the Law on Spatial Planning and Construction (Official Gazette BD, No. 29/08).

For the purpose of a systemic identification, monitoring and continued addressing of the problem of land degradation, it is necessary to conduct a detailed analysis of the applicable legislation, and based on this, to identify gaps and needs for adoption of new laws related to land protection. Also, in order to align the applicable legislation in this area with the EU standards and requirements, the existing laws and by-laws should be amended so as to treat land equally with other environmental components. The “Second National Communication on the State of the Environment in BiH”, in elaborates detail all environmental aspects (water, air, forests, biodiversity, etc.) while it provides only scarce information on land degradation. The relevant institutions of RS, FBiH and BD have no qualified staff to be able to draft and adopt secondary legislation on protection of land from degradation, i.e., they do not have the needed specialists in this field, which requires the involvement of local experts in development of necessary documents as well as upgrading of institutional and human “ecological” capacities in the future. The adoption of secondary legislation at all government levels should be synchronized and coordinated to avoid possible repetitions and to ensure optimum implementation of various international conventions and agreements related to land protection, ratified by the state.



## 6 LAND DEGRADATION IN BIH





## 6.1 PRESSURES BY SECTORS

Economic and industrial development of any country leads, unfortunately, toward various forms of land degradation. The state of BiH economy and industry is caused by war-induced destruction and the loss of pre-war markets, as well as by applying outdated technologies. There is a number of significant aspects of economic development that affect the land degradation in BiH, and the most important ones are elaborated in the remaining part of this chapter, by individual sectors.

### 6.1.1 AGRICULTURE AND LAND DEGRADATION

Agriculture of BiH, as one of the important branches of every country's economy and economic development has a considerable impact on processes taking place in the land/soil and on various forms of its destruction and degradation. Protection and prevention activities with BiH agricultural land refer to preservation of its physical and chemical properties, primarily its structure that may be adversely affected by soil compaction, and the compaction may be triggered in various ways. The use of heavy agricultural machinery, improper land cultivation, especially if carried out in the period of bad weather and soil related conditions (rain, wet soil, etc.) is a common practice of our agricultural producers. In addition, unprofessional application of mineral and organic fertilizers is also one of the causes of land degradation in BiH. Inadequate application of organic fertilizers (big doses, improper application etc.) may also lead to pollution and contamination of land, underground waters, watercourses, rivers and the like. The pollution and contamination refer, first of all, to nitrates but also to contamination of soil by heavy metals.

The main soil contaminants in BiH are, first of all, agrochemicals (fertilizers and pesticides). In lowland areas of Posavina, the river valleys, alluvial deposits and in karst fields where intensive crop farming and vegetable and fruit production are carried out, there is also a considerable discharge of pollution into land ecosystems, as a consequence of applying larger quantities of chemicals, and in some cases even organic fertilizers, in the process of which the issue of nitrogen is often in the first place. On higher and steep slopes there are vineyards and orchards, but ploughed fields as well. In addition to pollution caused by application of chemicals, varied intensity erosion also occurs affecting additionally the detachment and transportation of soil particles, and pollution of surface watercourses. Various types of soil, as well as the quantity and distribution of precipitation in some parts of BiH contribute additionally to the impact of agricultural activities on the environment conditions and quality.

Dangerous pollutants also include heavy metals (lead, cadmium, chromium, mercury, nickel, zinc), and radioactive substances, waste material, and river silt if applied on agricultural land for a number of years, etc. The presence and source of heavy metals in soil may be a consequence of usage of waste waters, sludge and urban garbage and waste as fertilizers, or existence of illegal landfills. As an additional form of land degradation, floods and droughts are becoming more and more frequent over the past several years. Data of the Federal Office for Civil Protection indicate that at the level of FBiH, for the period 2010-2012, flood and landslide-induced damages amounted to approximately KM 87,295,601.99, while drought-induced damages amounted to KM 156,071,352.80. The major damage was reported in Tuzla Canton amounting to KM 40,449,829.52 related to floods and landslides, and KM 98,580,440.00 related to droughts. Furthermore, catastrophic flooding that struck BiH in 2014 resulted in immeasurable consequences that are yet to be estimated. The problem of quality analysis and assessment of agricultural production impact on land in BiH is additionally accentuated by the fact that there is no systemic (both at the state and Entity levels) data collection or analysis related to the number of farmers, use and consumption of fertilizers and the like, which are the prerequisite for any serious assessment of influence of a sector on land.

Profile of BiH agriculture should be selected according to the land and climate conditions for any specific area. Moreover, fertility of soil should be maintained or improved through selecting adequate methods of cultivation. Regular soil fertility assessments should be carried out at least once in a five-year period in order to obtain reliable information on



the conditions, fertility and requirements regarding the soil improvement. Priorities for increasing the yield and producing high quality products are ensured through utilization of organic fertilizers, and the use of mineral fertilizers should correspond to the crops requirements for nutrients and minimal environment contamination. Quantities should be based on the needs of plants and nutritive composition of manure. Total quantity of nitrogen applied to soil must not exceed 170 kg/ha.<sup>21</sup>

Good Agricultural Practice Code<sup>22</sup> constitutes minimum standards related to farm management and they include: protection of natural resources, environmental management, labour force safety, animal health and wellbeing, safety of food and fertilizers, and health protection. The Good Agricultural Practice Code is just a set of recommendations on how to be a good farmer and improve performance. Good agricultural practice should be accompanied by legislation as well. Implementation of the GAP code in agricultural production process may be simple for some producers but in some areas it will be hard to implement due to natural conditions. The Code requires from farmers to contribute, within the framework of their respective capacities, to conservation of natural environment, soil fertility, food production potentials and quality of agricultural products.

In order to reduce to the minimum the negative impact of agricultural activities on the soil conditions and land degradation, it is necessary to undertake the following:

- Identify and select sets of land quality parameters that will be applied in monitoring;
- Strengthening of the institutions that will be dealing with protection, regulation and utilization of agricultural land;
- Establish a joint and generally accessible soil database that would be a result of research activities undertaken in this field to date, but also of permanent monitoring that certain institutions, dealing with the issues of utilization and soil quality control, would be in charge of;
- Development of regulations regarding the application of the best agricultural practices;
- Insist on directing the local communities' resources, obtained on the basis of agricultural land use change into construction land, toward reclaiming degraded land in the area of local community;
- Permanent training of farmers regarding the erosion issues and conservation measures;
- Establish a mandatory control of the quantity and type of fertilizer, which will be based on compulsory analysis of soil;
- Strict implementation of controlled utilization of pesticides;
- Initiate regulation of water deficits and excesses and their detrimental impact on soil;
- The problems of water deficit and excess, prevention of flooding and drought and their adverse effects on land and agricultural production should be resolved through the development of irrigation systems;

On the other hand, the basic strategic goals of the sustainable land use that should be fulfilled should be directed toward:

- Improving the legal framework with the aim of protecting agricultural land, as well as adopting the regulation missing and harmonizing the legislation with the EU acquis;
- Preventing further land loss, conserving and improving its quality in the domain of agricultural activities;
- Protecting the land from degradation, by changing the use and regulation of agricultural land.

21 According to Nitrates Directive (Council Directive 91/676/EEC)

22 Good Agricultural Practices - GAP

### 6.1.2 FOREST MANAGEMENT AND LAND DEGRADATION

Forest ecosystems have positive effects on soil and protect it from all potential types of degradation. Problems occur in case of deforestation caused by unplanned forest management, especially in high mountainous areas on limestone terrains, where barren, unprotected and most often shallow soils are exposed to water and eolic erosion. In addition to that, very often interrill and/or rill erosion takes places as a consequence of felling and transporting timber with heavy machinery. In order to protect forest lands from degradation it is necessary to establish, within the framework of forest management plans (forest-economy basis), an obligation of protecting the sections and divisions in which land is endangered by erosion (degradation) regardless of the reason. Such surfaces, that is, land, should be exempt and protected from regular forest management measures. Furthermore, it is necessary to carry out an analysis of localities of rare types of forest land in BiH (for example, podzol, brunipodzol), study their characteristics, carry out mapping and place them under protection from the aspect of habitat diversity. High mountain pasture lands on carbonates should not be forgotten as they are important too, and should be conserved and protected from degradation.

In the forest management context, FSC<sup>23</sup> certification means that forests are managed in line with strict environmental, social and economic standards. Certification implies regulation of forests and reforestation as every tree that has been cut down must be replaced by new planted one.

Certification of all state forests has been done in the RS, on the territory of 23 forest estates within the scope of JPŠ “Šume Republike Srpske”. In FBiH, the certification process for state forests in accordance with these standards has been completed only in some Cantons.

Priority activities are:

- Establish specific forest and forestland management systems in extreme conditions (fire risk, eolic erosion and the like);
- Identify, select and protect rare types of land (podzol, brunipodzol, peatlands, etc) from regular management measures;
- Establish additional measures of banning deforestation in high mountain and karts areas (where land is at particular risk of degradation);
- Insist on limited utilization of heavy machinery in forest exploitation activities.

### 6.1.3 INDUSTRY AND LAND DEGRADATION

Industry contaminates land by toxic pollutants indirectly and by deposition of pollutants directly from air (dry and wet deposition). Emission of aero-pollutants sooner or later falls on the ground in an altered or non-altered form. Pollutants contaminate not only the land itself but easily pass through soil and contaminate ground water. Plants absorb the pollutants from soil and pass them up the food chain of various consumers, to humans.

Thermal power plants and cement production facilities are powerful sources of dust and ash that contaminate arable land in their vicinity. Gas and aerosol emission from smelting plants, chemical industry facilities, thermal power plants, and central heating plants contaminate soil in the surrounding. In 1990, total emission of the equivalent CO<sub>2</sub> in BiH amounted to 34 million tons. The largest share of the emission belonged to energy sector (74%), agriculture (12%), industrial processes (11%) and waste sector (3%)<sup>24</sup>.

<sup>23</sup> Forest Stewardship Council A.C.

<sup>24</sup> The 2009 First National Report of BiH in accordance with the UN Framework Convention on Climate Changes; the 2013 Second National Report of BiH in accordance with the UN Framework Convention on Climate Changes; 2013 Climate Change Adaptation and Low Emission Development Strategy of BiH. The 2013 First Update Report on GHG Emissions of BiH

The industry sector in BiH is currently characterized by a low productivity and competitiveness levels. The main problems lie in the area of infrastructure and financial market that is underdeveloped and inefficient. The low level of technological development and lagging behind in the area of business strategies and quality management also contribute to the low productivity level, which reflects in high state current account deficit. Low competitiveness and productivity levels are insufficient to enable the financial sector to provide greater support to the industry<sup>25</sup>.

Obsolete technologies lead to environmental pollution and this is one of the major problems in the industry sector of BiH. BiH has achieved a significant progress in the implementation of EU Directive 2008/1/EC on Integrated Pollution Prevention and Control – IPPC, especially in terms of issuing environmental permits in industry. The Pollutant Release and Transfer Register (PRTR) have been introduced in BiH and, although in the inception phase, it is certainly one of the important steps towards future.

According to the BiH Institute for Standardization, there are 82 companies in BiH that have the ISO 14001 certificates, but none of them is part of Eco-Management and Audit Scheme (EMAS)- Plan for eco-management and audit of environmental impacts, as EMAS regulation applies to 27 EU Member States, three European Economic Area Member States and EU Accession Countries.

A specific soil-land pollution problem in BiH is related to emission of huge quantities of CO<sub>2</sub> sulphurous anhydride and various gases into atmosphere, which later on fall down in the form of precipitation and deposit on the ground, thus reducing soil fertility. In addition to that, discharge of wastewater and disposal of solid and mining waste and discharge of industrial fuels also put soil at risk of pollution.

With the aim of achieving the most efficient improvements and upgrading of the current conditions in the field of industry and protection of land/soil, it is necessary to undertake the activities and measures aimed at preventing pollution and contamination of land:

- Establish a single database on facilities/plants and polluters in BiH;
- Impose an obligation of waste water treatment before being discharged into water flows;
- Impose an obligation of monitoring the state, degree of land degradation (contamination, damage) in the vicinity of industrial facilities;
- Obligation of successful remediation and re-cultivation of land depending on the type of industrial facility;
- Increase the number of inspections aimed at ensuring compliance with legal provisions and evaluating impact of industry on the surrounding environment.

#### 6.1.4 ENERGY SECTOR AND LAND DEGRADATION

Energy sector development and energy consumption increase are accompanied by the increases in emissions of greenhouse gases and other pollutants, which makes the energy sector one of the key sectors when it comes to potential environmental impacts. The main local sources of energy in BiH are coal and hydro potential, while natural gas and oil are imported. Estimated hydro potential is nearly 6,800 MW, but out of that 35% of capacity is used, which is the lowest exploitation rate in Europe. The coal reserves balance amounts to almost 4 billion tons. Energy consumption and energy sector environmental impact in BiH are increasing although the level from 1990 has not been achieved yet.

Total energy consumption by fuels (CSI 029) from 1995 until 2008 was increasing and primary fuels used were: oil, gas, coal, electricity and renewable energy, including wood biomass.

In 1990, Total Primary Energy Supply (TPES) in BiH was about 7.8 Mtoe (Million Tons of Oil Equivalent), and in 2005 nearly 5.1 Mtoe<sup>26</sup>. According to data of European Environment Agency, over the period from 1995 until 2008, BiH recorded an increase in energy consumption, by annual rate of 3.14%<sup>27</sup>. The largest share in the final energy consumption in 2010 was taken by households – 43.9%; industry – 35.7%; and other consumers – 20.4%, including construction, traffic and agriculture<sup>28</sup>.

In the structure of primary energy consumption in 2008, fossil fuels 92.77% came first (coal: 64.47%, oil: 22.42%, gas: 5.89%), and renewable sources' share was 9.59%. The share of coal in the primary energy consumption in 2008 was 64.47%, natural gas 5.89%, and of oil 22.41%, which is 2.53% more than in 2007. Between 1995 and 2008, consumption of oil increased by 3.99%<sup>29</sup>.

In 2008, the share of renewable energy in the primary consumption was 9.59%, which is by 4.09% more as compared to 2007. Out of that percentage, the share of hydropower was 51.8%, while the energy consumption from biomass amounted to 48.1<sup>30</sup>. Increase in energy consumption from renewable energy sources is something that must be worked on as this is the only way for us to continue having energy but consumption of fossil fuels should be reduced, as it is quite detrimental for land and environment.

Under the relevant legislation, the energy sector in BiH is obliged to submit an application for issuance of the environmental permit, by production capacity and energy branch. After that, environmental protection measures are specified as well as monitoring of pollutants, with the aim of preventing pollution at the very source and improving natural resources management process.

The most important path toward the future in this sector is: separation of energy strategies, reduction of energy intensity, utilization of renewable sources of energy, and application of the best available technique (BAT).

With the aim of conserving the soil it is necessary to:

- Pay special attention to economical utilization of energy and selection of future energy sources, in order to minimize damage to land;
- Opt for highly efficient technologies in energy facilities and for types of available fuel that will significantly reduce the emission level;
- Ensure long-term development of energy sector while minimizing at the same time the adverse effects on land;
- Strive to use renewable sources of energy, that is, the sources that diminish total emission of greenhouse gases.

### 6.1.5 TRAFFIC AND LAND DEGRADATION

Transport and transportation infrastructure may have negative effects on land and the entire environment, and the impact is reflected in the following: it contaminates land, takes up and puts the land out of use, separates natural habitats, increases gas emission and noise levels, affects pollution of watercourses, air, flora and fauna. The products of fuel combustion, in urban areas of BiH in particular, affect the increased emission of greenhouse gases, reduced air quality and increased concentration of pollutants, thus making the traffic both local and global pollutant. A potential danger for land is posed also by a specific type of transportation of hazardous substances because, if an accident occurs and such substances get released into the environment, some very detrimental consequences may

<sup>26</sup> Strategic Plan and Programme for the Development of Energy Sector in the Federation of BiH, 2008

<sup>27</sup> European Environment Agency, Primary Energy Consumption by Sectors, 2010

<sup>28</sup> Agency for Statistics of BiH, Environment and Energy, 2011

<sup>29</sup> European Environment Agency, Primary Energy Consumption by Fuel, 2010

<sup>30</sup> Consumption of energy from renewable sources, 2010

take place and in the long run put the land out of use<sup>31</sup>. The state and quality of land, that is, environment on the whole, is mostly influenced by road transportation of goods as other types of transport in BiH (railroad, air and water) are less represented. The roads with high degree of traffic load contribute to greater environment and land pollution.

The data on total number of vehicles in BiH between 2003 and 2011 show an increase of registered motor vehicles since in 2003, there were 646,658 registered vehicles, while in 2011 the number increased to 854,078. It is important to point out that the majority of the registered vehicles (74%) is older than 10 years<sup>32</sup>.

Global market development process requires also the increases in the transportation of goods and people. On the other hand, it makes an additional pressure on environment. The road infrastructure in BiH is in very bad conditions, which leads to frequent traffic jams in bigger towns and is causing greater emission of gases into atmosphere thus affecting the quality of air and, consequently, the quality of land in urban settings. Average Annual Daily Traffic (ADT) on the busiest roads leading toward big urban zones varies between 10,000 and 15,000. Such roads with heavy traffic are dangerous having in mind the pollution of air and environment on the whole.

In the BiH transport sector there is neither monitoring of the quality and conditions of land nor statistical monitoring of the state of environment, such as, for example, traffic-related contamination of land, water and air.

In order to protect land and reduce to a minimum its exposure to pollution in urban areas and along road infrastructure, it is necessary to:

- Install land-quality monitoring stations along the roads with the average annual daily traffic of more than 8,000 vehicles;
- Introduce the process of monitoring the land conditions in urban settings (analyses of content of individual heavy metals, level of salinity for soils along the roads with heavy traffic during the winter season, and of other indicators as well);
- Introduce the control of emissions of traffic-related detrimental substances;
- Incorporate the environment protection aspect in the road construction planning processes.

#### 6.1.6 URBANIZATION AND LAND DEGRADATION

Some 200 years ago people all over Europe started moving from rural to urban areas. Nowadays, almost half of the world's population lives in towns and cities. However, urbanization has detrimental effects on land, and people for that matter, which was confirmed long time ago by numerous experts. When land is being urbanized, some 50% of its surface gets covered by impermeable layer of materials such as concrete and asphalt. Such loss cannot be compensated because once an infrastructure is built on land, which is based on concrete and asphalt, returning the land back into original condition is possible but only with abundant expenses. Another problem related to urbanization is that facilities are usually built on fertile land.

In the process of developing the spatial and regulation plans, and constructing residential, industrial and other types of facilities, infrastructure is often built on fertile agricultural land due to irresponsible decision-making, which has long-lasting effects on environment in BiH. It is also necessary to add here the industrialization and changes in commercial development that happen in parallel with the expansion of urban settings, which makes the losses of agricultural land in BiH manifold. Taking up of the land surfaces and their turning into urban zones, due to inadequate and uneconomical planning of resources, is mostly taking place around big towns and is primarily the result of expansion of residential settlements. In this way, large areas of fertile agricultural land are permanently put out of use.

31 The State of the Environment Report of BiH, 2012

32 Agency for Statistics of BiH, 2012



At the level of BiH, there is no body in charge of spatial planning. FBiH, RS and BD have the competencies for the development and implementation of legal regulations in this sector as well as adopted legislation regulating the issues of spatial planning and urbanism. The current situation is as follows: Republika Srpska has adopted a Spatial Plan that will be in effect by 2015, while in the Federation of BiH adoption procedure for such plan is under way. Four out of ten Cantons in total have developed and adopted spatial plans, but without a framework plan at the Entity level. Cantons that do have Spatial Plans are:

- Tuzla Canton: **Spatial Plan for the Tuzla Canton Area (2005 – 2025.)**
- Zenica-Doboj Canton: **Spatial Plan of the Zenica Doboj Canton (2009 – 2029.)**
- Central Bosnia Canton: **Spatial Plan of the Middle Bosnia Canton (2005 – 2025.)**
- Sarajevo Canton: **Spatial Plan of the Sarajevo Canton (2003 – 2023.)**<sup>33</sup>

At the end of 2000, 22 Municipalities in RS had neither spatial nor urban development plans, 32 Municipalities did not have spatial plans, while 30 municipalities did not have urban development plans. The situation has not changed significantly since then as, according to recent data, almost 80% of Municipalities in RS do not have adequate planning documentation, or do have but it is outdated and not in line with the current spatial plan<sup>34</sup>.

The data on the number of spatial and urban development plans in the FBiH Municipalities are not even available to public, which speaks about the situation when it comes to their existence, obsolete nature, and harmonization with other spatial-planning documents.

The role and function of spatial and urban development plans at all levels of government is to ensure development guidelines, with full respect for problems related to protection and conservation of land, especially the land suitable for agricultural production activities. The problem of illegal construction is also very pronounced due to inadequate and unsynchronized planning and implementation mechanisms, certain socio-economic factors, and war-time migrations of people. Environmental protection is accomplished in parallel with creating and setting the principles and goals for sustainable use of land, and with passing the construction guidelines and rules in the urban planning-related documents. In a situation when there are no planning documents a chaotic situation occurs where buildings are being constructed illegally and the process of their legalization takes place afterwards.

Such situation is quite detrimental for land and the entire environment. The urbanization process may have manifold negative effects on the state of land resources in BiH.

Therefore, the following steps should be taken:

- Introduction of the land quality monitoring;
- Introduction of analyses of land contamination in urban areas and obligatory measures of rehabilitation and remediation (treatment of contaminated land resources);
- Enhance the inspection of illegal construction especially on fertile land;
- Passing of the missing spatial plans;
- In the process of passing the Spatial and Regulation Plans, take into consideration the aspect of land conservation and protection;
- Harmonize the new and current Regulation Plans with the Spatial Plans;
- Increase the level of land use planning;
- Improve the current and adopt new land-environmental legislation.

<sup>33</sup> Spatial Plan of the Federation of BiH, 2012

<sup>34</sup> State of the Environment Report of BiH, 2012

### 6.1.7 IMPACT OF COAL MINES AND DISPOSAL AREAS ON LAND DEGRADATION

In spite of the fact that we are aware of the negative impact and pressures that mining is exerting on environment in BiH, in the previous period there were very few research activities carried out in this field. Coal mines are a very important part of energy sector in BiH, where there are 12 active mines (nine in FBiH and three in RS).

In BiH, coal is exploited at an area of 18,000 ha whereas the waste material disposal area takes up nearly 6,000 ha<sup>35</sup>. Open cast mining or surface exploitation of mineral ore (coal, iron ore, bauxite and clay) has left about 15,000 ha of damaged land to date<sup>36</sup>, and the main consequences of such exploitation are direct loss of land and putting the land out of use in areas where waste material is disposed. Quite often, soils are contaminated by heavy metals, and their physical features are distorted permanently. The largest coal mining areas are near Tuzla, Ugljevik, Gacko, Kakanj, Stanari and Prijedor.

Metal ore mines, that were mostly destroyed during the war and for that reason many are still inoperative, were not in focus of either local or international investors. Many of them have not been closed down properly and it is therefore necessary to make an inventory of the abandoned metal ore mines in order to identify critical spots, hazards and environmental risks, and to establish rehabilitation priorities. The problem of deficit of funds that would be directed toward studying the impact of mining areas on land and surrounding habitats has always been present and that is why we do not have necessary information on the impact of mining on the state of environment and land. Very few studies of the kind have been carried out to date and the available information were created mainly as a result of local projects related to re-cultivation and/or remediation of deposit areas around the mines. In most cases, systemic processes of land re-cultivation and remediation of areas in mines where exploitation was terminated were not carried out in accordance with the legal regulations. Also, there are no comprehensive measures in place for protection and adequate monitoring of possible environmental impacts. A standardized system of environmental protection, ISO 14001:2004, was introduced in one mine only (Stanari Coal Mine – Doboj), while preparation of quality management system implementation is on-going in another mine.

The laws on mining in the FBiH and the RS provide for the mandatory remediation of degraded areas and a land reclamation plan must be incorporated into the mining projects. In most cases, land reclamation is implemented by applying technical and biological measures, after which mined out areas can be used for agriculture or forestry.

According to the Law on Environmental Protection of FBiH and the Law on Environmental Protection in the RS, the mines producing more than 50,000 tons annually, or those covering an area larger than five hectares, are obliged to have an environmental permit, carry out regular monitoring of emissions and report to competent institutions.

The specified Laws also prescribe an obligation to implement strategy assessment of the environmental impact, the content and the procedure of which are defined by the Regulation on Plants and Facilities that require mandatory assessment of environmental impact and the plants and facilities that can be built and become operational only if the environmental permit was issued to them<sup>37</sup>, and the Decree on projects that must undergo environmental impact assessment and on criteria for deciding on the obligation of implementing the environmental impact assessment and the scope thereof<sup>38</sup>. In addition, it is prescribed by Law that the existing mines shall prepare action plans, including emission reduction measures, and waste management plans as well.

Due to the legislation adopted to date, it is clear that all mines in BiH will soon be required to implement certain measures in order to reduce their environmental impact. However, there is the question of implementation of the applicable laws and sanctions in case of

<sup>35</sup> Study for the BiH Energy Sector, 2008

<sup>36</sup> State of Environment Report of BiH, 2012

<sup>37</sup> Official Gazette of FBiH, No. 19/04

<sup>38</sup> Official Gazette of RS, No. 7/06

failure to comply with them. All funds collected due to inadequate operations and negative environmental impact must be directed toward reclamation of land in the vicinity of mines. The lack of knowledge in the field of prevention and reduction of mining impacts on land is obvious and requires a serious approach.

In RS, there is a significant number of active quarries exploiting limestone (Drenovača-Prijedor, Bjelajci-Mrkonjić Grad, Lubovo-Šipovo, Ukrina-Čelinac, Lapišnica-Istočno Sarajevo, Planina and Ljubačevo-Banja Luka, Krkojevci-Noví Grad, Kotlovići-Kneževó, Drakuljica-Bileća, Lučin Do and Turmetin Zubci-Trebinje, Hardovac and Lipac-Doboj and Kamenica-Teslić), dolomites (Podbrdo and Čirakovac-Mrkonjić Grad and Hardovac and Holijaci-Višegrad), and almost there is no Municipality in which territory the exploitation of technical-construction stone as a mineral resource is carried out. Major impacts of mineral-raw material complex on the environment in RS include discharge of pollutants into water (impact on surface and underground waters) and soil, waste generation and noise. Sufficient attention has not been paid to shaping and repurpose of excavated areas where exploitation was terminated. All large mineral facilities have environmental permit and are required to inform competent authorities on impacts on the environment and sustainable development<sup>39</sup>. Research, exploitation, processing and treatment in quarries have a huge adverse effect on the environment on the whole, and the land in these areas is mainly put out of use permanently. The mentioned fact requires undertaking of a series of adequate measures with a view to preventing or mitigating major part of adverse effects to full extent.

The following quarries are presently operative in FBiH:

- architectural decorative stone in Jablanica (gabbro), Novi Travnik (gabbro-diorite) and Vareš (amphibolite),
- technical stone in Ribnica (diabaz), Vareš (spilit), Fojnica (quartz keratphyre) and in Podrace (diabase).

Limestone and dolomite deposits are scattered throughout BiH. Herzegovina is especially rich in deposits of other stones like gabbro, diabase, gabbro, technical stone and the like<sup>40</sup>.

In order to carry out legal obligations successfully, aimed of protecting the environment and land in the vicinity of mines, it is necessary to undertake the following steps:

- Establish a database on mines, their surfaces and waste deposit areas;
- Fulfil efficiently the obligation of waste water treatment before it is discharged into water flows;
- Fulfil efficiently the obligation of monitoring the state and degree of degradation (contamination, damage) of land in the vicinity of mines;
- Obligation of successful remediation and reclamation of land following the completion of exploitation process;
- Increase the number of inspection reviews aimed at respecting the legal regulations and assessing the environmental impact of the mines on their surrounding areas;
- Effectively carry out the assessment of mining related risks for land before issuing environmental permits;
- Define measures to reduce the risk levels to a minimum

39 Development Strategy of RS, 2012 – 2016; Socio-Economic Survey, Sector of Non-financial Companies, Mineral-Raw Material Complex

40 State of Environment Report, 2012

### 6.1.8 LANDFILLS AND LAND DEGRADATION

Landfills are recognized as one of the factors of putting land in BiH at risk. Soils under the landfills (if the landfills are not of sanitary character) are mostly put out of use for a very large number of years. Presently, in BiH there is a significant number of illegal and unregulated landfills created partly due to the lack of waste disposal capacities and partly due to low public awareness on the importance of disposing of waste at the sites designated for that purpose only. The process of collecting data on the municipal and industrial waste was initiated by the Agency for Statistics of BiH no sooner than in 2008, and in cooperation with the Federal Institute for Statistics and the Republic Statistical Institute a database was established.

In BiH, there is no systemically organized separate collecting, sorting and recycling of waste. The current level of recycling, that is, utilization of waste, is not sufficiently high. Waste Management Strategy in BiH envisages the reorganization of waste management system, that is, division of the state into regions in which regional sanitary landfills will be built, the construction of which represents the prerequisite for systemic solution to waste treatment in BiH. The Strategy proposes the establishment of 16 regional landfills (10 in FBiH and 6 in RS). The proposed locations of regional landfills in FBiH are: Bihać, Bugojno, Goražde, Gračanica, Livno, Mostar, Tešanj, Tuzla, Zenica and Živinice, and in RS these are: Banja Luka, Bijeljina, Prijedor, Trebinje, Doboј and Zvornik.

According to data of the Agency for Statistics of BiH, the quantity of generated municipal waste per capita in BiH amounts to, on average, 1.07 kg/apartment/day (389 kg/apartment/year)<sup>41</sup>. The Republic Statistical Institute of RS in its communication<sup>42</sup> from 2009 presents waste generation of 0.76 kg/apartment/day (276 kg/apartment/year), while data for FBiH are not available. According to data available to date, which are received from public utility companies in FBiH, waste generation ranges even up to 386 kg/apartment/year in Sarajevo Canton<sup>43</sup>.

Capacities of the current landfills in the majority of municipalities are already taken up and the majority of landfills do not meet even the minimum of technical requirements. Most landfills do not apply procedures for controlled management of landfill gases that develop due to biodegradation of waste. The leachate waters from most landfills are not being collected, not treated thus putting in danger the ground and surface water flows and land, due to high levels of organic material and heavy metals. Additional problem is related to illegal dumpsites that are mostly scattered in rural areas and are the direct consequence of, first of all, the lack of resources for expanding the waste collecting systems but also of the poor organization of waste management at the local level. In addition to these ones, unregulated dumpsites are often formed along the roads and travel communications and are often very inaccessible, making the removal of waste difficult. The best approach to resolving the problems is to plan and implement the measures for preventing reoccurrence of illegal dumpsites, such as: installing visible signs banning the disposal of waste, introducing supervision services, intensifying the sanctions, etc. In addition to the repressive measures, in certain areas it is necessary to improve the level of coverage by a waste collection service. In addition, one of the core activities for prevention of illegal disposal of waste is raising public awareness of the detrimental effects of illegal dumpsites on human health and environment.

Defining a public awareness policy, for the purpose of including the issues of environment and waste, is the obligation of ministries and local self-governance bodies at all levels, with support of experts. This policy requires that all companies dealing with waste include into their contracts the development of public awareness campaigns on quality waste management practices. Specific attention has to be paid to the awareness raising about the need of sustainable management of hazardous waste and, for that matter, the need of constructing the adequate infrastructure in form of storage, treatment and disposal facilities. Given the multiple negative effects of landfills on land degradation, resolving the issues of presence and remediation of illegal dumpsites and introducing sanitary regional landfills is at the same time solution for reduction of land degradation as well.

41 Agency for Statistics of BiH, 2010

42 Republic Statistical Institute of RS, 2010

43 Federation Waste Management Strategy 2008 – 2018, 2008

With the aim of improving the current situation in the waste management area, it is necessary to undertake the following steps:

- Identification of all landfills in BiH, including information on their size, type of waste, vicinity of residential settlements and of water flows;
- Fulfil the obligation for development of waste management plans at the level of local communities;
- Establish regional sanitary landfills where that is possible;
- Influence upon the reduction of waste quantities for final disposal with more efficient utilization of resources;
- Ensure systemic monitoring of parameters for the assessment of land condition in the vicinity of landfills;
- Implement more efficiently the applicable legal regulations on waste management;
- Raise public awareness of environmentally acceptable waste management practices and detrimental effects of illegal dumpsites on human health and environment;

## 6.2 ECONOMIC AND ENVIRONMENTAL DEGRADATION OUTLOOK

Soil in BiH represents a very vulnerable and sensitive resource that has to be used with particular care. Although we are aware of changes in space, soil degradation has not been studied at the level of BiH, so it is very difficult to objectively assess the situation and make adequate forecasts to this end. Soil studies by now have most usually been partial in character for purposes of specific projects, development of forest management bases and management plans, assessment of soil quality, while the only research conducted throughout BiH in 2000 included the inventory of the post-war situation of land resources. Faculty of Agricultural and Food Sciences in Sarajevo is implementing projects related to development of a map of the soil use-value at municipal level thus providing not only an insight into available land resources but also a baseline for monitoring changes in land use. A good example of soil study is a pilot project implemented by the Agricultural Institute of RS carried out in the territory of several municipalities. The project identified and set model areas for monitoring specific pollutants, i.e. soil monitoring. Continuous monitoring of the situation of land resources in BiH unfortunately does not exist as yet.

In the process of its economic recovery, BiH is faced with the problems of unemployment, low Gross domestic product, poor infrastructure, which put aside the issue of environmental and soil preservation and protection.

One of the more serious problems BiH is faced with is the outflow of highly qualified experts, scientists and intellectuals. This problem seriously endangers the chances for the establishment of a knowledge-based economy, i.e. for the entire development of the country<sup>44</sup>. In 2000, the World Bank estimated that total migration outflow of highly qualified staff from BiH amounted to 23.9%. Although there are no official data on the number of students and graduated citizens who had left the country, according to the latest Report of the World Economic Forum (WEF)<sup>45</sup> BiH is ranked 140<sup>th</sup> out of 144 ranked world countries, leaving behind only Serbia, Burundi, Haiti and Algeria.

At the BiH level, as well as at the lower administrative levels in the country, adequate analyses and data for most of different sectors are lacking. Lack of reliable data on soil, its quality, changes through time, is particularly evident, as well as studies and research, and forecasts in terms of land use, socio-economic and demographic development in the country. Due to the absence of quality information, databases, monitoring system

<sup>44</sup> Ministry for Human Rights and Refugees, 2012

<sup>45</sup> The Global Competitiveness Report 2012-2013, 2012



etc., the analyses are mainly based on situation assessments where, in some cases, data is doubtful. All this disables an insight into the existing situation and trends, but also forecasts of future situation and changes through sectors. Hence this Chapter is focusing on the main economic and environmental forecasts, and emphasises the need for the problem of soil degradation to become sufficiently visible, and that implementation of measures and actions starts as soon as possible so as to ensure the baseline for future trend analyses, preparation of scenarios and forecast.

### 6.2.1 DEGRADATIONS AND ECONOMIC DEVELOPMENT THROUGH ALTITUDE ZONES

Even after the end of war, BiH is still faced with many of its consequences, which unfortunately, immensely affected the entire country, all segments of life, particularly demographic structure and land use. According to data, out of the total of 4.4 million inhabitants, 200,000 people were victims of war, whereas 2.2 million people were dislocated from their residences. In addition, BiH has a higher percentage of aging population with the low fertility rate, which can have serious consequences on the future of economic sustainability.

Population leaves less developed parts of the country on a daily basis and migrates to big urban centres such as Sarajevo, Tuzla, Banja Luka, Zenica, Mostar, etc. Many rural areas have been destroyed and abandoned, which results in great changes in the manner of use of agricultural land, as well as the entire biodiversity at those areas. If we observe changes and consequences on land cover/land use (according to CORINE) from the perspective of the altitude zones, even the economic perspective, the situation is as follows (Vojniković et al, 2012):

#### Altitude range from 0 to 500 m a.s.l

The greatest change concerns transition of forest vegetation succession into deciduous forests (4,875.1 ha), as well as reverse degradation process of transition of deciduous forests into succession (3,170.4 ha). In this altitude zone, there is a very pronounced process of transformation of the complex land cultivation system into discontinued urban fabric (2,817.9 ha). The important changes also occurred in transformation of non-irrigated arable land into discontinued urban fabric (1,166.1 ha). There also some changes in conversion of land, mainly used for agriculture, with large areas of natural vegetation into discontinued urban fabric (358.9 ha).

#### Altitude range from 501 to 800 m a.s.l

The greatest change concerns transition of forest vegetation succession into deciduous forests (6,113.6 ha). The class of complex soil cultivation system has undergone intensive transformation processes into the class of discontinued urban fabric (1,009.0 ha). There are frequent shifts in transforming the successions of forest vegetation in all three categories of forests: broad-leaved forests (2,069.0 ha), coniferous forests (252.9 ha) and mixed forests (960.2 ha).

#### Altitude range from 801 to 1,200 m a.s.l

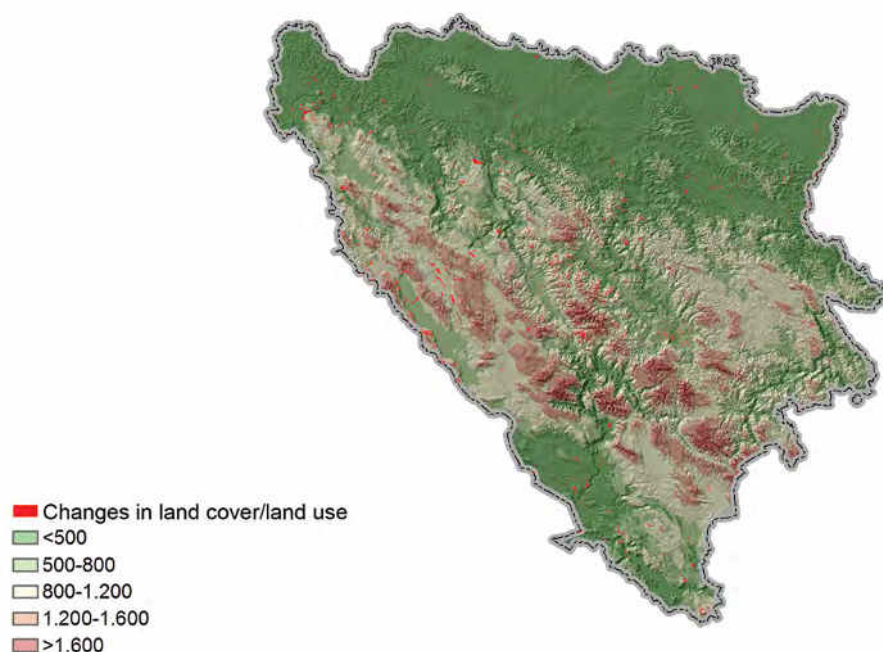
The same as in the above cases, the greatest change was observed in transition of forest vegetation succession into broad-leaved forest (11,474.9 ha). The second great change concerns transformation of grazing pastures into a complex land cultivation system (1,781.1 ha). There are frequent shifts in transforming the transitional woodland in all three categories of forests (broad-leaved forests 1,181.1 ha; coniferous forests 451.7 ha and mixed forests 1,368 ha). There are also significant changes in conversion of mixed forests into transitional woodland (848.0 ha), as well as transition of coniferous forests into succession (635.9 ha). There are also changes in pastures that are covered with transitional woodland -shrub (357.7 ha).

#### Altitude range from 1,201 to 1,600 m a.s.l.

This zone has undergone excessive shifting of deciduous (3,641.8 ha), coniferous (444.6 ha) and mixed forests (318.7 ha) to forest vegetation succession.

Changes that occurred in the altitude range 1,600 – over 2,000 m a.s.l. are minor, as well as differences in other classes, therefore they were not considered.

Figure 6:  
Changes of land cover/land  
use through altitude zones



The greatest changes were registered in the altitude zone 801-1,200 m, namely at the surface of all classes (including those that were not described in detail), in the total of 21,859.0 ha. They are followed by changes in the altitude zone up to 500 m (20,072.7 ha) where the more intensive process of conversion of agricultural land into construction land is evident, as well as transformation of succession into deciduous forest vegetation. This confirms the process of depopulation of agricultural areas in this altitude zone and their transformation into transitional woodland.

In the analysed ranges of higher altitudes (501-1,600 m) the most frequent and greatest changes are degradations of deciduous forests into a lower economic form – forest vegetation succession. One can assume that these processes of forest degradations most frequently appear in private estates where population moved to other areas. Within this area, there is also some trend of transformation of succession into a higher economic form – forests. This usually goes on agricultural plots that are not cultivated any more, they are thus neglected and susceptible first to succession and along with its progression, to forming of forest vegetation too. Manifestly, economic and industrial development of every country, unfortunately, inevitably leads to various forms of soil degradation (physical, chemical, biological, etc.). There are several important aspects of economic development affecting the degradation of soil in BiH, those most significant will be elaborated further in this Chapter through individual sectors.

### 6.2.2 ECONOMIC OUTLOOK

Socio-economic situation, as well as consequences of migrations of population in the country, are the main causes of land degradation. Data also show that migrations of population have continued after the war, so we can assume that this trend will go on in the future as well. As for demographic trends, the problem is the birth-rate decline, whereas the total fertility rate is below the level of simple reproduction of the population. In addition to low population growth, which threatens to depopulate rural areas in BiH, a demographic issue of importance from the perspective of land use is the unbalanced development of urban and rural areas caused by migrations of population from less developed to more developed parts of the country (Banja Luka, Sarajevo, Tuzla, Mostar, Zenica, Trebinje etc.). It is estimated that 45% of the population live in urban zones, with the average annual growth of urban population of 0.3% in the course of the past 15 years. Likewise, spatial plans in BiH foresee further increase in the urbanization rate.

Expansion of urban centres will lead to increase in permanent loss of agricultural and forest land, which, as the analyses in this document show, is not negligible in terms of

loss of surfaces. Uncontrolled and illegal construction throughout the country causes and will continue to create many problems for the land and contribute to landslides, illegal dumpsites, illegal forest harvesting, etc.

Although agriculture is one of the most significant branches of economy in BiH, this sector has been recovering very slowly in the post-conflict period. Relative to other branches of economy, agriculture has been stagnating. Namely, the share of agriculture in the BiH gross national income has decreased over the past twelve years from around 14% to approximately 8%.

Only 53% of arable land in BiH is under crops. The analysis shows that the share of cultivated land is decreasing relative to arable surfaces, fallow land areas are constantly increasing and thereby the surfaces of uncultivated land as well. Migrations, poor agricultural policies, mined areas, unprofitability of agricultural outputs, abandoned arable land, are only some of the causes of reduction of agricultural land. Small and fragmented land holdings, poor technical equipment of agricultural holdings, outdated production technologies, low input use, almost symbolic use of irrigation systems (as little as 0.4% of total arable land), and still dominant presence of labour-intensive and natural production methods are just some of the factors affecting the modest overall agricultural production, whereas the achieved average yields classify BiH at the very bottom of the European scale.

It is important to emphasise that the continuous decrease in arable agricultural land should be perceived from the perspective of working age population in agriculture. Working age population in agriculture is aging, it is not able to cultivate larger surfaces and is forced to leave agriculture, while young people leave rural areas to continue their education and then stay in urban areas, whereas almost one fourth of economically active population is unemployed.

Inadequate management and use of grazing pastures contributes to biodiversity decrease and destruction of rural areas landscape. Production practices have not been adjusted to natural properties of soil in BiH. Unregulated land and small and fragmented holdings reduce agricultural production output. Inadequate and uncontrolled application of artificial fertilizers and other chemical inputs decreases soil fertility, contributes to erosion, change in soil pH values as well as other types of soil damaging. Inadequate technical equipment and machinery for land cultivation also contribute to erosion and other types of soil damaging.

In addition to significantly affecting agriculture, degradation, at least to some extent, also affects some agricultural processes and activities. The overall changes in agriculture from 1992 to the present have influenced the decrease in mineral fertilizers use, while the effect of reduction in livestock is a decline in application of organic fertilizers as a nucleus for development of degradation processes.

Given all the aforementioned identified problems, along with depopulation of rural areas, the assumption is that these negative trends will continue in the future as well.

According to MAC, there are 1,417 vulnerable communities in BiH affected by landmines/UXOs. It is estimated that landmine/UXOs contaminated locations directly affect safety of 540,000 people, out of which 152,000 people in high hazard communities, 180,000 people in medium hazard communities, and 208,000 people in low hazard communities. Considering the number of mine-impacted communities and the extent of landmine influence, BiH is one of the most endangered countries in the world. The largest numbers of impacted communities are the rural ones. It is estimated that population of the main urban complexes have a relatively safe socio-economic life as compared with rural population, which economically depends on the access to mine contaminated land. Indirect impact occurs as a consequence of landmines in the closer and wider area, and can be expressed in losses in trade and production, inability to improve agricultural production, etc., which slows down economic development of the mine-contaminated areas. Given the regular daily demining activities in the field, the share of mine contaminated surface is declining. However, the mine-clearance process is long lasting and expensive, thus a large portion of affected areas will remain contaminated in the near future as well, which will continue a downward trend from the perspective of land use in the affected areas.

Unplanned, uncontrolled and excessive exploitation of mineral resources is also causing land degradation. One of the main problems in the BiH industrial sector is the outdated technology that causes pollution/contamination of the environment. There is still no systematically organized separate waste collection, sorting and recycling in BiH. It is a challenge to organize long-term energy development thus minimizing its adverse impacts on the environment. It is necessary to turn to using renewable sources of energy.

Dynamics of industrial production trends in BiH is determined by interaction between domestic and export demand. Changes in domestic demand are less significant and mainly reflect in electricity and mining, as well as a small share of the processing industry. On the other hand, the BiH processing industry is to a large extent export-oriented, thus the export demand plays a primary role and in practice fully defines industrial production trend in BiH. Given that full recovery of most industries in EU is expected in the period 2014 – 2015, these developments are expected to enable full recovery of industrial production in BiH as well.

Problems and limitations that BiH is confronted with in terms of economic development will certainly persist in the near future too, particularly in the area of agriculture, given that their addressing takes time, but also adequate and synchronized mechanisms of planning and implementation from national to lower levels, in accordance with competencies, followed by continuous financial support, training and capacity development of all participants. As for financing of land policy measures, we need to refer to allocations of the entity level ministries of agriculture. The importance of land policies has been recognized by the relevant ministries, but to a much less extent than expected. These allocations, as presented in Table 6, are very modest and decline from year to year. It is visible from the aforementioned that adequate importance and attention are not attached to this very important resource of our country.

Given that in the observed period 2008 – 2012, there were drastic cut offs in allocations for land measures, this trend in allocations for land subsidies is possible to persist. In case these allocations increase, the situation is not expected to change much, since agricultural sector is in itself complex, and specific measures need to be linked to other measures and policies, which will in synergy lead to more significant changes.

Agricultural policy measures	2008	2009	2010	2011	2012
Increasing surfaces of agricultural holdings	2,134,292	439,591	-	-	-
Investing in land regulation	-	-	-	760,882	753,785
Regulation and protection of agricultural land	1,099,745	973,397	660,353	-	-
<b>Total</b>	<b>3,234,037</b>	<b>1,412,988</b>	<b>660,353</b>	<b>760,882</b>	<b>753,785</b>

*Table 6:  
Allocations for Land Policy  
measures in KM<sup>46</sup>*

### 6.2.3 ENVIRONMENTAL OUTLOOK AND CLIMATE CHANGE

Like most countries in the region, in the course of the past decade, BiH has also faced the consequences of climate change, which reflect, inter alia, in phenomenon of increasingly frequent extreme weather conditions. We can say that we are in a period of frequent droughts and floods, which are globally present and attract increasing attention.

Given that climate characteristics and soil water regimen and their interaction define the effects of agricultural production, there is a growing concern as to the impact of climate change on agriculture, since our major plant production is concentrated in the area with occasional droughts (Posavina), which is simultaneously an important indicator of soil fertility. Severe droughts have caused enormous damage to agriculture in 2000, 2003, 2007 and 2011. Along with drought, in the period 2000 – 2012, agriculture was affected by hail-storms, extremely strong winds, frost, strong rains and floods. Due to high temperatures and risk of summer period drought, agriculture in Herzegovina and in the north of the country displays the greatest vulnerability to climate variability. Combination

<sup>46</sup> Information obtained from the Office for Cordination and Harmonization of Payments System in Agriculture Food Industry and Rural Development in BiH

of increasing drought likelihood and lack of irrigation potential is probably the highest risk that agricultural sector is facing. There are other effects too. For instance, the risk of fire can increase due to lack of moisture and threat to destroy grains. Domestic animals/cattle are also affected by conditions caused by high temperature in terms of overheating and spread of diseases.

Climate change directly mostly affect agriculture and forestry, since their output essentially depends on the climate, as well as soil on which production under these conditions will not be possible without artificial irrigation. If to this scenario we add land degradation too (particularly in vulnerable parts such as Herzegovina), agricultural development and maintenance of the existing production level will inevitably become uncertain. Organic farming represents one of the ways of gradual and long-term preservation of soil fertility, structure and moisture, which will in parallel reduce erosion and flooding and maintain biological diversity.

BiH is not faced only with the drought problem, which has almost become a regular phenomenon, but also with the extreme flooding. Heavy rainfall, which exceeded the record for the last 120 years in measurement history, in mid-2014 resulted in catastrophic flooding. Only within the period of 48 hours (May 13-14, 2014) 150 l/m<sup>2</sup> fell in some areas of BiH. Rivers Bosna, Drina, Sana, Sava, Vrbas and other rivers overflowed their banks. Brčko, Maglaj, Doboj, Derventa, Tuzla, Prijedor, Travnik, Janja, Bijeljina, Zenica, Živinice, Vareš, Zavidovići, Ključ, Banja Luka, Čelinac and many other towns and settlements were flooded. The area along the River Sava was endangered<sup>47</sup>. Thousands of landslides were triggered throughout BiH.

Figure 7:  
Map of flooding in BiH<sup>48</sup>



47 Taken from [http://bs.wikipedia.org/wiki/Poplave\\_u\\_Bosni\\_i\\_Hercegovini\\_2014](http://bs.wikipedia.org/wiki/Poplave_u_Bosni_i_Hercegovini_2014)

48 Taken from <http://www.un.ba/bih/stranica/mape-poplavljenih-podrucja-u-bih>





Figure 8:  
Flooding in BiH<sup>49</sup>

In terms of environmental conditions, according to the global model EH50M, it is estimated that there will be a temperature rise from 0.7 to 1.6°C for every °C of global level increase in the period 2031 - 2060<sup>50</sup>. Available data and analyses indicate that climate change will jeopardize all three macro-areas in BiH.

The available water resources will decline in vegetation season, when the needs for water are largest. Risk of floods will be more pronounced. Longer dry periods are expected, as well as more frequent floods with torrents, intensity of erosion, hail, storms, thunders and maximum speed of wind, which can pose a threat to all forms of human activity<sup>51</sup>.

Mountain forest ecosystems play a significant role in conservation of water in BiH, and they should be maintained and protected as important reservoirs of natural water (Food and Agriculture Organization, 2010). When we say mountain forest ecosystems, we should not forget mountain forest soils as an important factor of conservation of water reserves, water cycle, absorption of CO<sub>2</sub> etc. As for the threats to biological diversity, the most affected areas are the Alpine-Nordic and Mediterranean area. The area of Dinarides, as an extremely significant centre on the Balkans rich with endemic species, will be particularly affected. This mountain chain has specific biological and geo-morphological properties. Rivers in the karst areas and ecosystems that developed along the rivers can also be in great danger.

It is expected that climate change will largely affect plants with habitats in the mountain areas of BiH. The number of herbaceous plants of narrow ecological valence is expected to decline in the highest mountain areas since they will not be able to adjust to new habitats fast enough.

Climate change and vegetation movement can significantly disturb future distribution, number and survival of animals. Speed of change, together with urban and agricultural barriers, can also affect the ability of many species to move to the zones that suit them better in terms of climate and ecology<sup>52</sup>.

This document is the first step in the process of identification of the land degradation issue in BiH and represents a baseline for further actions and introduction of the required standards and norms focused on improving its state and conservation.

The first task is to make the land degradation issue sufficiently visible since it is obvious that all other natural resources are better focused than land. To catch up on the road to the EU, we need to accept the EU measures, standards and directives.

Given the heterogeneity and complexity of the state of natural conditions in BiH, we need to collect data and prepare the inventory of the current state of land resources, for which we need cooperation of all social factors, but primarily on a voluntary basis. The current state of land in BiH should be comprehensively analysed (based on the available data), and formed a unique database to see what we have, and then a detailed operational plan elaborated through the activities to be implemented in the future period.

49 Taken from <https://www.google.ba/search?q=MAPA+POPLAVA+U+BIH>

50 First National Communication of BiH under the UN Framework Convention on Climate Change, 2009

51 *ibid*; Risk Assessments of BiH regarding Natural or Other Disasters, 2011

52 First National Communication of BiH under the UN Framework Convention on Climate Change, 2009

Furthermore, the existing Environmental Protection Funds of RS and FBiH should spend their funds by allocating as much as possible to concrete activities and projects resulting in reduced pollution and degradation of all natural resources, and initiate the establishment of the Land Department. More intensive scientific and research and expert work requires considerably higher investments than the present ones.

The indispensable role in implementation of measures and projects is played by the Entity authorities, which should use an affirmative and proactive approach to encourage cooperation of all other social factors, and participate in development of action plans for land protection at all government levels. The countries faced with the land degradation problem due to intensive agricultural activities (e.g. Missouri, USA) allocate huge funds for active land monitoring by setting measuring points and permanent test spots for conducting required surveys. The results are used as a baseline for projecting the most efficient conservation measures to maintain the needed production level, but also decrease land degradation. Those farmers who implement these measures are eligible for state subsidies. However, this and other examples should serve us only if and when they are applicable in our conditions. In the future, the efforts should be made to adopt the rules of good agricultural practice and ecological farming, which would be encouraged by various incentives by the authorities.

There are several measures that can support the adaptation of agriculture and that can be applied on climate variability and climate change too. First of all, improvements in the irrigation systems, including drip irrigation; inclusion of agriculture in water management programmes (including construction of canals and reservoirs); changes in land cultivation methods with focus on different forms of conservational tillage; introduction of crop rotation; changes in dates of sowing and harvesting; mixing less productive drought-resistant crops with highly productive types that are sensitive to drought; growing crops for green manuring; mulching; developing drought-resistant varieties; improvements in hail protection; agro-climatic regionalization; development of monitoring and early warning systems; raising awareness and training of farmers; increasing capacity of farmers for livestock management during hot periods, etc.

The important policy measure related to adaptations to climate change would be an insurance programme against possible risks in agricultural production. It is also important to emphasise the increase in surfaces under greenhouses, development of multifunctional agriculture, as well as promotion and adoption of an integrated sustainable development and energy efficiency.

Measures that could assist in reducing the agricultural sector vulnerability to climate change primarily include increasing soil capacity to absorb and accumulate water; developing soil organic matter and support to the forms of agricultural production contributing to this, first of all organic farming. Furthermore, organic farming also includes conservation and use of old, indigenous varieties of a specific area, characteristic for certain location and adjusted to its climate conditions, as well as an asset for still undefined future needs in development of new varieties.

The obvious synergy and interaction among climate change, conservation of biodiversity and combat against land degradation in BiH indicates to great significance of coordination of all activities among relevant agencies such as institutes for hydrometeorology, institutes for forests and agriculture, as well as institutions in charge of water and air monitoring, but also a pragmatic approach in order to strengthen capacities of the existing agencies for collecting, verifying and compiling data on land, biodiversity, state of the environment and climate change. It is also essential to realize a synergistic approach to implementation of three Rio Conventions in Bosnia and Herzegovina, and enable the fulfilment of global objectives for land and biological diversity protection, as well as combating climate change at local level, too.

When it comes to mitigating the effects of climate change, it is necessary to strengthen institutional and professional capacities for development and implementation of climate policies, monitor greenhouse gas emissions, and plan, implement, monitor, report and verify mitigation activities.

The following are the most important priority activities:

- To define the areas according to the level of risk of different forms of land degradation;
- To develop an integrated and comprehensive list of land degradation indicators;
- To establish systems of sustainable land management and systematic soil quality monitoring;
- To prevent or at least reduce the use of farming land to non-agricultural purposes to the least possible extent;
- To introduce more stringent control of prescribed obligations for owners of water and environmental permits after their obtaining;
- To protect land in intensive plant production against the effects of high-tech machinery (mechanization) (land compaction and deterioration of physical soil properties); chemicalization (soil contamination with chemicals, pesticides, mineral fertilizers, etc.);
- To allocate funds for agricultural land conversion into projects of rehabilitation of degraded land.
- To improve irrigation system in the areas susceptible to drought.

# 7 STRATEGIC GUIDELINES FOR STRENGTHENING THE LAND MANAGEMENT SYSTEM





## 7.1 STRENGTHENING LEGISLATION AND MANAGEMENT SYSTEM

The main baseline principles of regulations providing for the environment issues are defined in the Entity and BD level laws on the environmental protection and include a number of basic principles.

**The sustainable development principle** stating that sustainable development is the one that meets the needs of the present without compromising the ability of future generations to meet their own needs, within the environmental capacity. Sustainable development is achieved by adopting and implementing decisions that ensure compatibility of the environmental interests and the interests of economic development; this is a long-term concept that includes and integrates environment, economic and social development.

**The precautionary and prevention principle** is achieved by environmental impact assessment and use of best available and accessible technologies, techniques and equipment; it promotes prevention of environmental pollution and avoidance of activities that may pose a threat to the environment or human health.

The substitution principle stating that every activity that can potentially pose environmental risks should be replaced by alternative activity which has a lower impact on the environment, and the activity can also be substituted if the costs of such activity exceed the values that need to be protected.

**The integration principle** is based on prevention or minimizing the risk of environmental damage.

**The principle of cooperation and shared responsibility** states that the goals of sustainable development can be achieved only through harmonized joint activities of all relevant participants who are required to, through joint work with the authorities, physical and legal entities and other institutions, maintain cooperation based on shared responsibilities in order to protect the environment.

**Public participation and access to environmental information** states that in exercising the rights to a healthy environment, everyone has the right to be informed on the state of the environment and to participate in making decisions whose implementation could have an impact on the environment, and the environmental data is public.

**The principle “Polluter pays”** refers to the principle that the polluter pays compensation for the caused pollution when it causes or may cause environmental pollution, or if it produces, uses or trades with raw materials, intermediate goods or products containing environmentally hazardous substances. Polluter, pursuant to regulations, bears the total costs arising from the caused risk to the environment, including the costs of the caused environmental risk and the remediation costs.

Strengthening legislation and land management system implies continuous situation analyses, monitoring, and development of guidelines for improvements in situations when this is necessary. The aforementioned principles to a sufficient extent include the aspect of land conservation and protection, which would, along with their efficient implementation, ensure the land use on sustainable basis. However, not only the abovementioned principles for environmental protection should be taken into consideration when planning and drafting future regulations, but also contemporary principles and guidelines that improve land management system.

## 7.2 FINANCIAL MECHANISMS FOR LAND PROTECTION

In the past period, BiH has received substantial financial support for addressing the environmental issues and enhancing the environmental protection. There are different programmes and instruments within which BiH withdrew funds for this:

- Community Assistance for Reconstruction, Development and Stabilisation (CARDS);
- Instrument for Pre-Accession Assistance (IPA);
- Multi-annual Indicative Planning Document (MIPD) for the period 2007 – 2009;
- Multi-annual Indicative Financial Framework (MIFF) for the period 2009 -2011;



- Official Development Assistance (ODA) for environmental development in BiH;
- Donor funding.

Environmental protection in BiH is mainly based on implementation of regulatory rather than economic instruments. Due to the fact that this is a society still in the process of recovery from the consequences of war, economic instruments are slowly emerging, and the funds collected based on environmental protection are partially allocated to improvements in this field, but the situation is still not satisfactory. Both Entities have undertaken a series of important activities by now (introduction of obligatory environmental permits; compensations; tax incentives for environmentally friendly products, technologies and services; fees for environmental degradation according to the “polluter pays” principle; and monitoring the state of the environment), but on the other hand, economic instruments for environmental protection have not been sufficiently integrated in policy yet. As priorities, BiH identified water resources, air and waste management, and only partially land, which is perceived as an unlimited resource, which affected the irresponsible relationship of community towards land. Also, Entity Ministries of Agriculture, Water Management and Forestry are implementing a series of important projects which, either partially or wholly, deal with the need to protect the land from degradation. Some projects are being implemented in both Entities, e.g. Small-Scale Commercial Agriculture Development Project and Irrigation System Construction Project, while some projects are being implemented within the scope of Entity Ministries.

Agricultural Advisory Services operate within the scope of both Ministries, which assist farmers, through education procedure, in improving methods and techniques of agricultural production, managing agricultural holding, increasing income and productivity, improving the standard of living and enhancing social and educational standards in rural areas.

Competent Ministries for environment have also undertaken a series of important environmental activities and projects, which will be presented within the scope of Action Plan in this Document. Socio-economic development and its needs are an important factor affecting the structure of land use in BiH, which causes frequent unplanned and inadequate change of its use. Consequently, infrastructure has been identified as one of the “biggest land consumers”.

There are two Funds functioning at Entity levels, namely the Environmental Protection and Energy Efficiency Fund of RS (established under the Law on the Fund and Financing the Environmental Protection, Official Gazette RS, No. 117/1 and the Law amending the Law on the Fund (Official Gazette of RS, No. 63/14)) and the Environmental Protection Fund of FBiH (established under the Law on the Environmental Protection Fund, Official Gazette FBiH, No. 33/03).

The activities of the Funds ensure financial support to achieving the goals and principles of the environmental protection (protection, conservation and improvement of the quality of air, water, land and forests, as well as mitigation of climate change and protection of the ozone layer), conservation of biodiversity and geo-diversity, enhancement of energy efficiency, waste management, preservation of natural habitats, encouraging sustainable use of protected natural resources, rural development, encouraging sustainable economic activities, i.e. sustainable economic development, as well as stimulate research and development studies, programmes, projects and other activities, including the demonstration activities.

### 7.2.1 ENVIRONMENTAL COSTS AND THEIR FUNDING

Due to very complex political structure of BiH, it is very difficult to collect and elaborate comprehensive data on the costs and economic instruments currently applied at all government levels. Even when something is defined in detail and regulated by laws, the usual situation is that the secondary legislation is lacking or adopted by one Entity but not by the other, and even if it is adopted its operability is very low and inefficient. On the other hand, an insight into “Annual reports on business entities’ investments” reveals the scope and type of investments in environmental protection and improvement of environmental infrastructure by the important business companies in BiH. According the data of the RS Institute for Statistics, out of overall investments in new fixed assets, one share relates to investments in environmental protection (e.g. devices, filters, measuring systems for neutralisation, purification and control of gases, air and water; appliances for purification, removal and recycling of solid wastes; equipment for protection against noise, vibration, construction of landfills, land reclamation, afforestation of barren land, facilities for protection against erosion and flooding, etc.).

The Entity Environmental Protection Funds collect their proceeds on the basis of various fees arising from laws and by-laws, which are allocated for environmental projects. In FBiH, environmental fees are collected under the Law on Waste Management (Official Gazette FBiH, No. 33/03), Law on amendments to the Law on Waste Management (Official Gazette of FBiH, No. 72/09); air pollution fees (under the Decree on the types of fees and criteria for calculating fees for air polluters effective as of 20 October 2011 (Official Gazette of FBiH, No. 66/11)); environmental fees from motor vehicles (under the Decree on special environmental fees collected during the registration of motor vehicles effective as of 7 March 2011 (Official Gazette of FBiH, No. 14/11)); fees under the Law on Water Resources, collected from general and special water fees (Articles 169 and 170 of the Law). The Fund's proceeds from collected water fees are used pursuant to Article 178, paragraph 3 of the Law on Water Resources (Official Gazette FBiH, No. 70/06).

The Environmental Protection and Energy Efficiency Fund of RS collects proceeds from: the funds allocated under the Law on the Fund and financing of environmental protection of RS (Official Gazette RS, No. 117/11); fees arising under the Decree on fees for environmental packaging waste burden (Official Gazette RS, No. 101/12); fees for water protection collected from owners of transport vehicles running on oil or petroleum products pursuant to the Law on Water Resources (Official Gazette RS, No. 50/06 and 92/09); proceeds arising based on international programmes, projects and other environmental protection activities, energy efficiency and renewable sources of energy, contributions, donations, gifts and assistance pursuant to the law.

In addition to the aforementioned, there are also fees for utilization of forests and forest land, divided between forest management areas and forest holdings under jurisdiction of public companies and competent Ministries. Private entrepreneurs are obliged to pay fees to forest holdings for use of forest resources, of which certain percentage goes to local communities. Moreover, both entities charge a 0.07% profit tax to all companies existing in BiH, which are allocated to the entity budgets and targeted to forestry development. Additionally, in FBiH there is also a fee for forest land conversion into a mining zone, collected from the mining companies.

Agricultural land owned by the state can be leased or granted for concession exclusively to agricultural producers for the purpose of consolidation of farming land. In the Federation BiH, the total surface of agricultural land under lease or concession in 2012 amounted to 6,925.47 ha. Out of the total land surface, 72.6% refers to lease or concession in Canton 10. In 2011 and 2012, the overall number of applied projects related to regulation and protection of agricultural land co-financed from the earmarked funds collected by the converged purpose of agricultural land is 63. The total regulated area of land amounts to 741.76 ha<sup>53</sup>.

#### Conclusions and recommendations

Lack of comprehensive data on costs and economic instruments for land protection is one of the problems we are faced with. The state, entity and cantonal budget expenditures and their presentation is designed in such a way that it is difficult to separate the funds collected and spent on the basis of environmental protection and land conversion from other investments and expenses. Therefore, it is important to clearly and precisely define in reports (from local up to the state level) how much resources were collected on the basis of environmental protection and land conversion, and how much was spent on concrete measures of land protection from degradation. The Laws on Environmental Protection in both the Entities provide for the obligation of collection of fees, fines and taxes for pollution and use of natural resources. The offences subject to collection of fees are precisely defined, whereas the specificities of the type and amounts of fines are not, so we should focus on them when drafting the secondary legislation. We should also not lose sight of the funds collected by local communities based on agricultural land conversion to construction areas. These funds need to be targeted to rehabilitation of degraded land and addressing the issues of land at the local community territory. More stringent controls need to be introduced in implementation of land rehabilitation measures by the companies with environmental permits (zones around mines, industrial zones, etc.) and foresee sanctions in case of failing to fulfil this obligation after completion of exploitation. To be able to monitor the land protection investment flow, we need to create a single database of the implemented projects (within the MoFTER) available to all, in order to avoid double funding of the same studies, particularly in case of donors' funds.

53 Reports from individual cantons on undertaking adequate measures concerning the agricultural land, 2013

### 7.3 JOINT ACTIONS RELATED TO CONVENTIONS

In addition to the UN Convention to Combat Desertification in those Countries Experiencing Drought and/or Desertification, BiH has also ratified a series of other Conventions, including those indirectly related to the issues of land desertification, such as: UN Framework Convention on Climate Change; UN Convention on Biological Diversity; Convention on Environmental Impact Assessment in a Transboundary Context; Convention on the Conservation of the European Wildlife and Natural Habitats, etc. As land is directly connected with climate and biodiversity, we will show their mutual impact and inter-dependence below.

The study results presented in the Fourth Report to the UN Convention on Biological Diversity proved that conversion of habitats, excessive exploitation of resources and pollution had caused the most intensive pressures on biological diversity. The ecosystem group exposed to the greatest pressures caused by the intensive process of habitat conversion is precisely the one that the ecosystems typical for BiH belong to. Land degradation inevitably leads to decline in biological diversity, both in terms of terrestrial flora, fauna or vegetation. Loss or degradation of soil reflects in biodiversity loss. What has been identified as a threat to land (habitat conversion, uncontrolled urban planning, pollution, acidification, forest fires, dumpsites, irrational forest management, barren land, etc.) is simultaneously a threat to biodiversity as well. Hence there is a strong synergy between the Convention on Biological Diversity and the UNCCD Convention, since appreciation of principles and attitudes of one Convention at the same time protects the principles and attitudes of the other Convention and vice versa. The UN Framework Convention on Climate Change is also very strongly connected to the two aforementioned Conventions. The First National Communication of BiH under the UN Framework Convention on Climate Change, 2009, forecasts possible risks for Alpine-Nordic and Mediterranean biodiversity caused by climate change. These are the areas with represented sensitive soil types (high-mountainous and karst soils), which will inevitably be affected by the same phenomenon due to the fact that every ecosystem is characterised by well-balanced interactions between plant and animal communities, land and climate. Some studies show that climate change really poses a great threat to biological diversity of plants in Europe (Thuiller et al., 2004), and thus the land itself too.

Given that land is the inseparable part of the environment, all future measures focused on its protection should also take care of other environmental aspects, namely they should focus on comprehensive implementation of environmental actions that appreciate inter-relations between the issue of desertification and other environmental aspects (climate change, biodiversity, quality and protection of water, reduced emissions, waste disposal, etc.). The international commitments defined by the Conventions are far from being simple and require the Signatory Countries to implement the activities in a coordinated and synchronised manner. This approach should also be applied in BiH, in order to achieve optimum efficiency in combating desertification and cost-efficiency of all resources included in this process.

#### Conclusions and recommendations

To achieve synergy with other Conventions we need to undertake joint actions, which will equally treat all environmental aspects. Given that climate change in BiH will significantly affect shifting of altitude vegetation belts higher up, which can cause extinction of plant species with narrow ecological valence, special attention needs to be paid to sensitive soil types (vegetation) in high-mountainous and karst areas as well. These land resources have to be protected and excluded from regular management measures. The key actors in this respect are the competent Ministries and public forestry companies. Protection of rare and endangered types of land will simultaneously protect biodiversity too, and indirectly affect possible consequences of climate change in BiH.

## 7.4 INTERNATIONAL COOPERATION IN THE FIELD OF LAND PROTECTION

For the actions focused on mitigation of land degradation to be fully implemented, we need bilateral and multilateral international cooperation, as specifically defined under the Convention, referring to underdeveloped countries such as BiH. Articles 11 and 12 of the Convention confirm the importance of international cooperation as a factor of ensuring favourable situation for enforcement of its provisions. Efficient addressing of the land degradation issues requires assistance from international institutions, foundations, other developed countries, but cooperation among local, regional, entity and state level institutions within their mandates should be of priority importance. A series of significant and strategic projects has been implemented so far, focused on environmental protection and enhancement in BiH. These projects were funded by various international institutions, sometimes with local contribution to funding too. Vulnerability of natural resources and their conservation should be observed at a regional level, with the inclusion of scientific and expert community and capacities of all regional members to the Convention. Transboundary cooperation is an unavoidable link in the chain of future integrated approach to land management. All the countries – members to the Convention in the region should be equally included in management of the regional centre to combat desertification. International cooperation also implies the ongoing exchange of knowledge and experience (know how), technology transfer, scientific and expert resources, identification of priorities to combat land degradation, as well as implementation of joint scientific and research projects to achieve results at the regional level.

### Conclusions and recommendations

Protection and conservation of land resources requires local, entity, regional and international cooperation through development and implementation of joint projects to include and address the issues of land degradation, biodiversity and climate change. BiH should mobilize all scientific and expert resources and strengthen staff development and reform the institutions in charge of land issues. One of the priorities should also be to initiate the establishment of a regional centre to combat desertification, which would prepare and implement joint regional and sub-regional projects, collect information, analyses, and train and retrain staff according to the needs of each of the countries.

## 7.5 ROLE OF EDUCATION AND SCIENCE IN COMBATING LAND DEGRADATION/DESERTIFICATION

Raising awareness on the significance of the environment starts from preschool and primary education where children, within the framework of subjects such as My Environment, Nature, and Biology, acquire the basic knowledge on environmental protection, ecological issues, the importance of personal contribution to the environment, ecology, raising awareness on the environment, organizing actions on the environmental protection, etc. In terms of secondary education, there are some vocations, such as forestry and agriculture, where land is more represented in curricula, whereas in other secondary schools the ecological discipline is studied as part of biology syllabus, but without any particular accent on land and soil, the importance of their conservation and the issues of degradation. Higher education institutions have study programmes that include the ecology and environmental protection. Thus, for instance, at the University of Sarajevo, this area is studied at the Faculty of Natural Sciences and Mathematics (Department for Biology - the ecology curriculum; Department for Geography – Tourism and environment curriculum), Faculty of Forestry (Department for Forestry and Horticulture), and the Faculty of Mechanical Engineering (Department for energy, process and environmental engineering - environmental engineering curriculum), than Faculty of Mechanical Engineering in Zenica (Department for ecological engineering). The University of Banja Luka, the Faculty of Natural

Sciences and Mathematics (curriculum for ecology and environment) and the Faculty of Technology (curriculum for ecological engineering). Furthermore, the University of Business Studies (Faculty of Ecology), the Independent University (Faculty for Ecology) include this study programme, whereas in Tuzla, this study programme is with the Technological Faculty (Department for environmental engineering) of the University of Tuzla. The International University of Travnik has a Faculty for Ecology; and in Zvornik there is a Department of the Faculty of Technology (curriculum for ecological engineering). The University of Mostar has a Faculty of Natural Science and Mathematics and Education Sciences with two courses – Environmental Science, and Tourism and Environmental Protection, as well as the Institute for Tourism and Environment, with courses on land and environment. As a study subject, land is included in curricula of the Faculty of Forestry of the Banja Luka University, Faculty of Forestry of the Sarajevo University, Faculty of Forestry of the East Sarajevo University and the Faculty of Biotechnology of the Bihać University, than the Agriculture and Food Science Faculty of the Sarajevo University, the Faculty for Agriculture of the Banja Luka University, the Faculty of Agriculture of the East Sarajevo University, the Agro Mediterranean Faculty of the University “Džemal Bijedić” in Mostar and the Faculty of Agronomy of the University of Mostar. The importance of environmental protection is incorporated in all levels of education, and land as part of the environment is studied and researched only within specific study programmes at faculties and institutes. The aforementioned indicates to the fact that wider knowledge on the land issues and the problem of its degradation is mainly available to students of the narrowly profiled study programmes at forestry and agricultural faculties.

#### Conclusions and recommendations

More significant results in the field of land protection require comprehensive scientific studies, more extensive capital investments, application of modern methods and technical resources, and scientific forecasts of possible adverse effects, which cannot be achieved by its restriction to one or only several institutions. Scientific studies concerning conservation of land against any form of degradation should be a priority. The role of Entities and Cantons is essential, since on the one hand, they are responsible for raising environmental awareness through formal education system, and on the other hand, they are responsible for timely implementation, increased efficiency and application of scientific and research studies. Curricula and programmes starting from preschool to higher education level need to be harmonized (by introducing new (elective) subjects focused on protection of land from degradation in curricula of the existing study programmes; introducing (compulsory) “green lessons” in the countryside into curricula of preschool and primary education) where land issues would be the topic, etc.).

## 7.6 PUBLIC PARTICIPATION IN COMBATING LAND DEGRADATION/DESERTIFICATION

The UN Convention attaches great importance to the role of public opinion to combat land degradation/desertification. Moreover, public participation, particularly in the sphere of raising awareness, has been identified by the Aarhus Convention that BiH acceded in 2008. The efficiency of taking concrete steps in combating land degradation is conditioned by the state of economic and social situation of a country, since, in a situation when there is high unemployment and economic crisis in the country, the problem of land conservation is not considered particularly important. In order to attract public attention, and increase its participation in the processes of drafting and adoption of the environmental legislation, we need to form a system that will efficiently and in shortest possible time, provide answers to submitted requests (inquiries), and permanently and effectively inform the public on taken steps. This type of dissemination of information can, to some extent, seem passive since it would be available only to those who have interest in finding out the state of a specific environmental aspect. We note that the public bodies responsible for the environment have so far published numerous promotion materials for the World Water Day, Earth Day, World Environmental Protection Day, and the World Ozone Layer Preservation Day, but in terms of land – the importance of its preservation from degradation is still invisible in BiH.



Mobilizing citizens for the purpose of raising public awareness on the importance of land as a natural resource, and its preservation, represents a very important part of AP implementation. In the previous period, media in BiH have not paid enough attention to the problems and state of the environment, and almost none to land issues. Regardless of whether they are printed or electronic media, their information on these segments is limited, minimized and treated as irrelevant. On the other hand, one can find a certain number of good examples, primarily as a consequence of efforts of specific non-governmental organisations and individuals, that resulted in high quality articles, reports and publications. BiH has numerous environmentally friendly NGOs as supported by the figures of the NGO Directory 2006 (Regional Environmental Centre), according to which there are 87 registered non-profit organizations in BiH dealing with environmental issues with the total of 54,628 members. Moreover, there is also the Soil Science Society in BiH, the only association that gathers numerous experts in this field. The Soil Science Society has to be an equal partner to institutions in all segments of land/soil protection in BiH, and participate in implementation of the activities planned in AP.

The issue of lack of information, analysis, research, single databases on polluters, facilities with environmental permits, amounts collected under environmental protection at all government levels, inevitably reflect on the awareness and behaviour, that do not sufficiently appreciate ecological functioning of all citizens. Systemic addressing of the issue of land protection against any type of degradation implies more active involvement of all citizens, public and non-governmental organisations, in the process of creating, adoption and implementation of environmental decisions and all other activities.

### **Soil Science Society in Bosnia and Herzegovina**

Goals and activities of the Society are to:

- Develop and improve all areas of soil science,
- Provide support in implementation of study results of all areas of soil science in agricultural and forestry production, economy, and education process in scientific and educational institutions,
- Launch scientific journal and other professional publications,
- Actively participate in soil protection,
- Care for education of young scientific staff,
- Collaborate with other scientific and professional organisations in the country and abroad.

### **Conclusions and recommendations**

For this problem to become topical, there is a need to promote land preservation in mass media more aggressively, to organize workshops, seminars, training courses, meetings with local communities, companies, scientific and research institutions, NGO sector, etc. In addition, attention should be paid to marking and promotion of specific dates such as the World Day to Combat Land Desertification, World Environmental Day, World Forestry day, distribution of materials and development of a Yearbook on the state of the environment by governmental and non-governmental institutions with participation of media to the maximum extent possible. Public participation requires close collaboration of civil sector, particularly the Soil Science Society in BiH with the state, entity and cantonal institutions and local communities. Governmental institutions in charge of the issues of land protection should initiate cooperation in early stages of planning of specific activities, invite the Soil Science Society in BiH and other stakeholders and involve them in decision making process. Relevant information should be made available, and local experts included in development of relevant laws and by-laws, strategies and projects in the field of land protection, as well as professionals and representatives of the NGO sector, and actively collaborate with local communities.

## 8 INDICATORS



## 8.1 ABOUT INDICATORS (IN GENERAL)

For the purpose of monitoring the state of the environment and impacts that some production sectors make on the environment through their respective undertakings and operations, various models have been developed over the past several decades, trying, through certain indicators, to establish an efficient system of monitoring and assessing the state of environment but also of the implementation of activities that lead toward more positive, sustainable manner of environment management. Indicators are defined as representative values of an observed case. Indicator quantifies information by aggregating different, discrete and periodic measurements into one numerical representative value. The result is derived information. In other words, it may be defined that indicator = information obtained from a set of data.

Indicators should be representative, relevant, convincing, transparent and accurate. There is a number of criteria for selecting an indicator, but the most important ones are the relevance of a problem, from the point of view of negative environmental impact, importance from the political point of view, and availability of data for calculation of indicators.

The World Bank, Eurostat, FAO, various scientific-research institutions, and, for the past decade, the European Environment Agency (EEA) developed their models of indicators in order to enable as efficient and uniform environment monitoring process as possible.

The European Environment Agency defined tools supporting the development of indicators, including the DPSIR (Driving forces, Pressures, State, Impact, Responses) framework for assessment and typology of environment indicators, which distinguishes four types of indicators (descriptive indicators, performance indicators, eco-efficiency indicators, and total welfare indicators). A terminology framework for assessment of the state of land and its multiple impacts on the environment was also developed. This includes the DPSIR Framework that applies to land and contaminated sites, as well as a multipurpose and multi-influential approach based on the term of multiple functions of land (environmental and socio-economic), including inter competition between these functions.

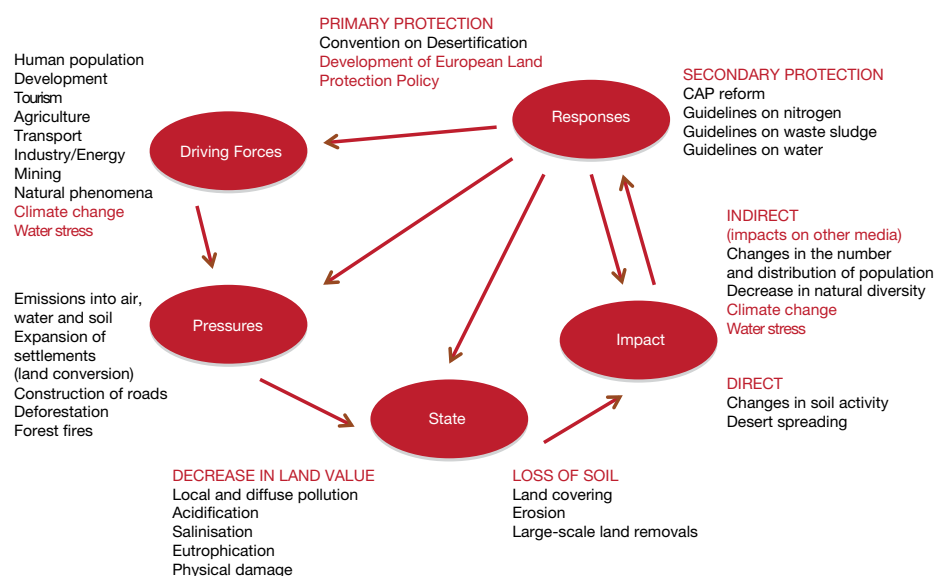


Figure 9:  
DPSIR System

Negative impacts on land, caused by the activity of various factors, may be grouped into three different groups, such as: contamination, degradation and destruction (Table 7). Indicators reflect pressures from various sectors, changes of the land cover, land degradation (sealing, local and diffuse contamination), and impacts on land such as habitat fragmentation.



**Table 7:**  
*Overview of the three  
most important groups of  
impact<sup>54</sup>*

Contamination	Degradation	Destruction
Heavy metals	Leaching of CaCO <sub>3</sub>	Surface mining
Acid rains	Humus loss	Disposal of materials
Pesticides	Leaching of clay	Water erosion
Radionuclides	Surface erosion	Settlements
Fertilizers	Furrow erosion	Industry
Industrial waste	Deflation	Airports
Municipal waste	Improper cultivation	Roads
	Soil density	Water accumulation
	Compaction	Playgrounds
	Creating of puddles	
	Unstable structure	

In the EU, an estimated 52 million hectares, representing more than 16% of the total land area are affected by some kind of degradation process<sup>55</sup>. According to Montanarella (2012), the main processes taking place in EU with respect to land degradation include: erosion, a decline in organic matter, soil compaction, salinization, landslides, contamination, loss of soil and decline in biodiversity. BiH has not been spared from various types of land degradation (physical, chemical, biological, etc.).

Based on the specified basic documents and national interests, BiH should make efforts to develop National List of Indicators, the aim of which would be establishment of a single data collection and processing system. The National List of Indicators will ensure flow and long-term supply of data necessary for the process of reporting toward international acts (conventions and protocols), and will ensure necessary baselines for the governments in BiH to make valid decisions related to the sustainable development policy.

## 8.2 UNCCD INDICATORS

For the purpose of reporting and insight into implementation of the Convention by member countries, UNCCD has prescribed a set of indicators. UNCCD indicators are generally divided into:

1. Progress indicators (previously used term was impact indicators)
2. Reporting indicators

UNCCD progress indicators (previously known as impact indicators) provide an insight into progress in reaching long-term benefits for the population living in land degradation and drought affected areas, affected ecosystems and global environment.

Progress indicators, which will be elaborated below, are divided into:

1. Mandatory progress indicators (Proportion of the population in affected areas living below poverty line, land cover status and indicators related to strategic objective 4 of the UNCCD Strategy: increase in the level and diversity of available funding for combating desertification/land degradation and mitigating the effects of drought, and Development policies and measures to address the issue of land degradation and mitigating the effects of drought),
2. Other progress indicators, which are classified below into relevant and less relevant indicators for BiH.

The process of mandatory reporting on the state of land at national level is based on the Decision 3/COP 8 from 2008 when member states adopted ten-year strategic plan and framework in order to encourage the implementation of UNCCD. All reporting indicators were supported by guidelines that enable monitoring and preparation of reports (see reporting indicators in Annex 4).

<sup>54</sup> Development of National Environment Monitoring System, 2005

<sup>55</sup> *ibid*

## 8.3 GENERAL OVERVIEW OF UNCCD INDICATORS

### 8.3.1 MANDATORY PROGRESS INDICATORS FOR STRATEGIC OBJECTIVES 1, 2 AND 3 OF UNCCD STRATEGY

Based on the Decision 17/COP.9, affected member states are required to submit a report on two mandatory progress indicators for Strategic objectives 1, 2 and 3 (Proportion of population living below the poverty line and land cover status) using metrics defined during iterative process of finishing the set of progress indicators (poverty rate, land cover and soil productivity).

<b>Name of mandatory indicator 1</b>	<b>Proportion of the population living below the poverty line</b>
<b>Strategic objective the indicator is related to</b>	Improvement of living conditions of affected population.
<b>Goal of indicator</b>	The goal of this Indicator is to measure and follow the changes in poverty, as a proxy for human wellbeing. It may be used to identify deprived livelihoods, assess the impact of desertification and assess the progress made by signatory countries in combating the desertification. The indicator represents human wellbeing. It can be used to identify deprived livelihoods, assess the impact of degradation and assess the progress made by signatory countries in combating desertification.
<b>Description of indicator</b>	The poverty line describes an absolute threshold below which people are considered to be poor. The poverty rate describes the percentage of the human population living below the poverty line. Ideally, signatory countries report the poverty rate for affected areas using the rural poverty line (poverty line specific to rural areas). In addition, the rural poverty line should be used to report the poverty rate in rural areas. In the absence of the rural poverty line, the national poverty line should be used to report the poverty rate in affected and rural areas or, if these are not available, in the country as a whole. Finally, if no poverty lines are available, the generic poverty line of US\$ 2.00/capita/day should be used to assess poverty rates.
<b>Name of mandatory indicator 2</b>	<b>Land cover status</b>
<b>Strategic objective the indicator is related to</b>	Improve the condition of affected ecosystems.
<b>Goal of indicator</b>	The goal of this indicator is to measure and monitor changes in land cover and land productivity. It can be used to indicate land degradation in terms of long-term loss of ecosystem primary productivity, and to assess the progress made in maintaining or improving the condition of ecosystems.
<b>Description of indicator</b>	Land cover reflects the (bio)physical dimension of the Earth's surface. This can indicate the land's ability to sustain human activities and land use. Ideally, signatory countries should provide data on the areas of each land cover type, the percentage of the total national area covered by each land cover type and any patterns and trends over time. Where available, data should also be provided on the net primary productivity of each land cover type, if such data are available, in order to give some indication of the total productive capacity of the land.

### 8.3.2 MANDATORY PROGRESS INDICATORS FOR STRATEGIC OBJECTIVE 4

<b>Name of mandatory indicator 3</b>	<b>Increase in the level and diversity of available funding for combating desertification/land degradation and mitigating the effects of drought</b>
<b>Name of mandatory indicator 4</b>	<b>Development policies and measures address desertification/land degradation and mitigation of the effects of drought</b>
<b>Strategic objective the indicators are related to</b>	Mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors
<b>Expected impact 4.1.</b>	Increased financial, technical and technological resources are made available to affected developing country Parties, and if needed, to the Central and Eastern European countries
<b>Expected impact 4.2.</b>	Enabling policy environments are improved for UNCCD implementation at all levels



### 8.3.3 OTHER UNCCD PROGRESS INDICATORS – PURPOSE OF THE SUGGESTED UNCCD INDICATORS

Other 9 progress indicators that the country Parties may report additionally are presented as follows<sup>56</sup>:

#### 1. Water availability per capita

**Purpose:** To monitor trends in water availability and the accessibility of safe drinking water. To measure the impact of DLDD on water resources, and mitigation efforts. To assess efforts towards removing/preventing pollution of water, and enhancing access to safe drinking water.

#### 2. Change in land use

**Purpose:** Highlight changes in the productive or protective uses of the land resources over time and highlight unsustainable land use.

#### 3. Food consumption per capita

**Purpose:** To assess and monitor the level of under-nutrition within the DLDD intervention areas.

#### 4. Capacity of soils to sustain agro-pastoral use

**Purpose:** To monitor the status of soil health and to encourage the stakeholders to assess the health of soils and increase the awareness of the need to improve soils.

#### 5. Degree of Land Degradation

**Purpose:** To measure the extent and severity of land degradation at the national level. To measure the implementation and progress of agreements and programmes aimed at addressing the causes of land degradation and to reclaim degraded lands.

#### 6. Plant and animal biodiversity

**Purpose:** To determine a baseline against which changes in natural ecosystems and biodiversity induced by land use pressures will be assessed. To measure population trends and use them as an indicator for monitoring overall environmental sustainability. To monitor, in particular, changes in agricultural diversity that act as a measure of changes in ecosystem function in relation to food production and may restrict the ability of farmers in dry lands to adapt to environmental change. To demonstrate the impact of DLDD interventions on maintaining or enhancing the diversity of crops and livestock in agricultural systems within an intervention area.

#### 7. Drought Index

**Purpose:** To measure drought as a climatic driving force of DLDD. To monitor the climatic conditions affecting water availability, provide early warnings of drought, and assess drought severity. To evaluate measures to reduce dry land degradation.

#### 8. Carbon stocks above and below ground

**Purpose:** To monitor changes in above and below ground stocks as a global benefit.

#### 9. Land under Sustainable Land Management (SLM)

**Purpose:** To monitor the impact of using SLM practices on reducing land degradation, rehabilitating degraded areas and ensuring the optimal use of land resources for the benefit of present and future generations. To act as a surrogate for: a) global benefits (climate regulation and carbon sequestration); b) vegetation cover and its composition which are globally important for biodiversity; c) water retention and regional hydrologic balance. To assess progress towards harmonization of conflicting goals of production on the one side, and environmental protection on the other.

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<sup>56</sup> The UNCCD Impact Indicators Pilot Tracking Exercise: Results and Conclusions, 2012.

## 8.4 INDICATORS RELEVANT FOR BIH

Based on the above stated UNCCD Indicators, below is the overview of proposed mandatory, relevant and less-relevant indicators for BiH.

MANDATORY INDICATORS	
Percentage of population living below the poverty line* <i>* This indicator, given that it refers globally to population living in desertification-affected areas, is not considered relevant for BiH.</i>	<ul style="list-style-type: none"> <li>Measures and monitors changes in poverty</li> </ul>
Land cover status	<ul style="list-style-type: none"> <li>Measures and monitors changes in land cover and productivity</li> </ul>
Increase in the level and diversity of available funding for combating desertification/land degradation and mitigating the effects of drought  Development policies and measures address desertification/land degradation and mitigation of the effects of drought	<ul style="list-style-type: none"> <li>Measures and monitors changes in financial, technical and technological resources</li> <li>Measures and monitors development policies and measures</li> </ul>
OTHER PROGRESS INDICATORS	
Relevant indicators	
Drought	<ul style="list-style-type: none"> <li>Drought index P/PET and SPI index</li> </ul>
Water availability per capita	<ul style="list-style-type: none"> <li>Water resources management indicators</li> </ul>
Change of Land Use	<ul style="list-style-type: none"> <li>Analysis of land use changes within CORINE Land Cover and other sectoral sources and database (farming and forestry)</li> </ul>
Degree of Land Degradation	<ul style="list-style-type: none"> <li>Area at risk of desertification</li> <li>Soil losses by sheet erosion and rill</li> </ul>
Land under Sustainable Land Management (SLM)	<ul style="list-style-type: none"> <li>Forestation area</li> <li>Forest managed area (with plans or forest management projects)</li> <li>Size of protected natural areas</li> <li>Organic farming</li> <li>Number of organic livestock farms</li> <li>Use of fertilizers and pesticides</li> <li>Evolution of the efficiency of irrigation systems</li> <li>Areas under agro-environmental measures</li> <li>Number of farms qualifying for environmental compliance requirements of the European Common Agricultural Policy</li> <li>Surfaces on which conservation agricultural measures are applied</li> <li>Decline of organic matter</li> <li>Land degradation due to farming</li> </ul>
Less relevant indicators	
Biodiversity	<ul style="list-style-type: none"> <li>Abundance and conservation of terrestrial flora and fauna</li> </ul>

In addition to the abovementioned indicators, there are two additional indicators relevant for BiH:

1. Landslides,
2. Contamination.

## 8.5 DESCRIPTION OF STATUS OF INDICATORS FOR BIH

### 8.5.1 MANDATORY INDICATORS

#### INDICATOR: Land Cover Status<sup>57</sup>

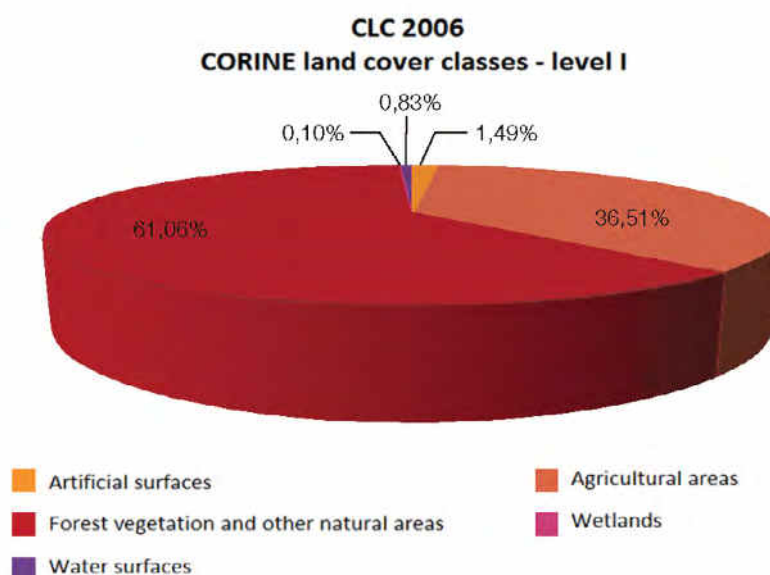
With respect to the natural-geographic features, BiH is a diverse and rich country. However, large areas are left to lose their identity, to developmental succession, degradation and similar processes. Excessive exploitation of mineral raw material and woodland, application of unsustainable practices in agriculture and forestry create different types of damage and loss not only of land but of biodiversity as well, thus decreasing the quality and beauty of landscape.

The conditions in certain area are commonly assessed on the basis of data on land cover / manner in which the land area is used. In this analysis of changes in the land cover, a spatial dynamic model is used and it is based on CORINE database on land cover in BiH. CORINE BiH<sup>58</sup> is a digital database on the conditions and changes of the land cover and use in BiH for the period 2000 – 2006. It may be considered a unique, relevant source of information on land cover at the state level as, among other things, it was prepared on the basis of modern techniques and remote sensing technologies. Basic characteristics of the land cover in BiH for 2006 as well as the structure of changes that took place from 2000 to 2006 are as follows:

- **Land Cover in BiH and Structure of Changes for the period 2000 – 2006.**

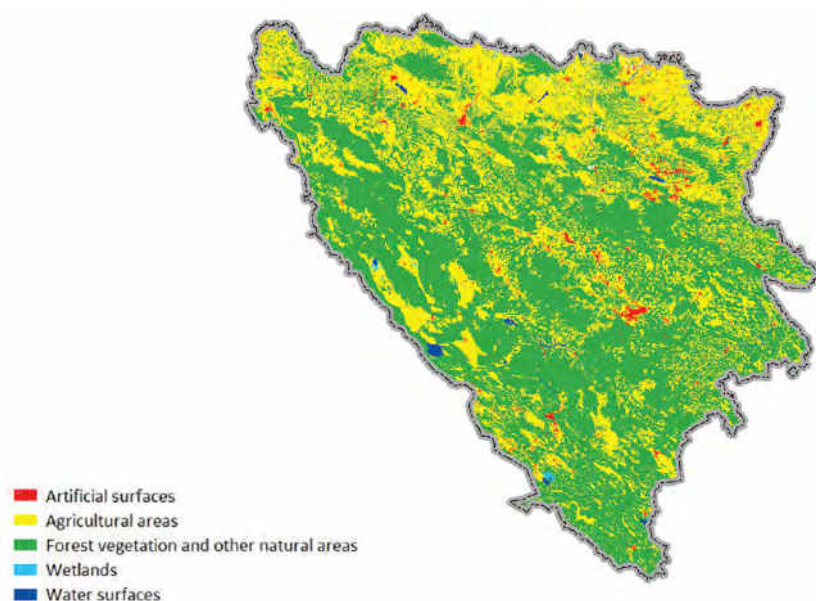
In BiH, CORINE 2006 is characterized by 31 out of 44 classes of the CORINE nomenclature. The group category Forest Vegetation and Other Natural Areas in the structure of main categories, accounts for 61.07%. The second category, by its share, is the category of Agricultural areas, with the proportion of 36.70%. Proportional share of the category Artificial Surfaces amounts to 1.48%, Water surfaces to 0.66%, and Wetlands to 0.10%.

*Chart 8:  
Structure of Land Cover in  
BiH for 2006*



<sup>57</sup> Ljuša, 2014.

<sup>58</sup> Institute for PAM

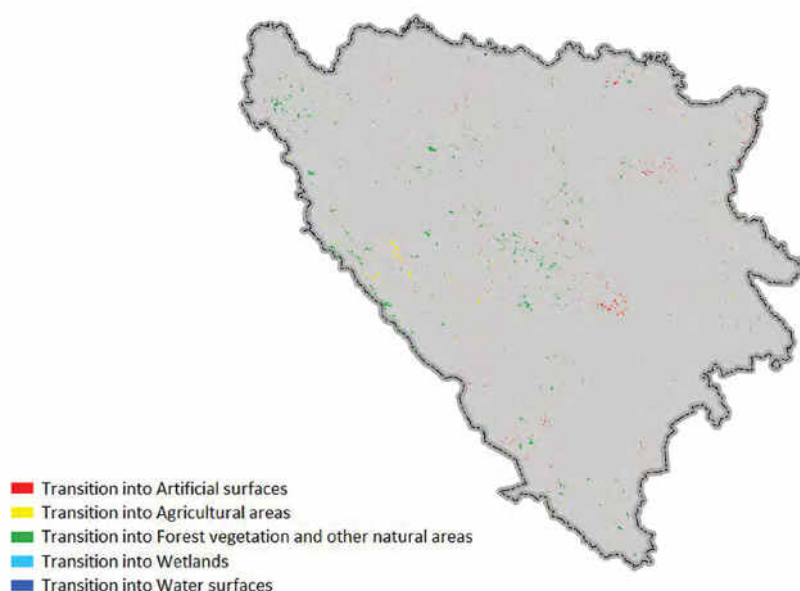


**Figure 10:**  
Land Cover in BiH  
(Source: CORINE 2006,  
Faculty of Agriculture and  
Food Sciences, Sarajevo,  
Institute for PAM)

Land cover changes, for the period 2000 – 2006, are shown in Figure 10, distributed across the entire territory of BiH. The surface of changes that got into the structure of the CORINE 2006 database in accordance with the development methodology, amounts to 35,009.02 ha, which is 0.68% of the total surface of BiH (Table 8). Still, the total surface of BiH, which suffered from changes in its cover land, amounts to 47,905.86 or 0.93% of the total surface of BiH, taking into account the mapped changes bigger than 5 ha.

Group class	Surface CLC 2000 (ha)	%	Surface CLC 2006 (ha)	%	Difference 2006/2000
Artificial surfaces	68,858.50	1.34	75,752.49	1.48	6,893.99
Agricultural areas	1,884,767.36	36.81	1,879,249.39	36.70	-5,517.97
Forest vegetation and other natural areas	3,128,202.16	61.09	3,127,086.16	61.07	-1,116.00
Wetlands	5,326.51	0.10	5,051.18	0.10	-275.33
Water surfaces	33,663.21	0.66	33,678.51	0.66	15.30
Total surface	5,120,817.73	100.00	5,120,817.73	100.00	0.00

**Table 8:**  
Structure of land cover  
changes in BiH, for the  
period 2000 – 2006 – CLC  
level I



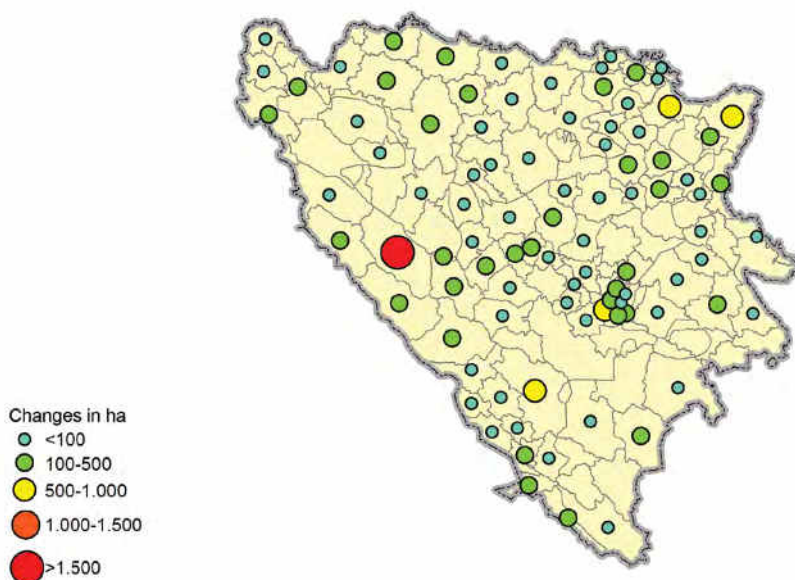
**Figure 11:**  
Land cover changes for the  
period 2000 – 2006.  
(Source: CORINE 2006,  
Faculty of Agriculture and  
Food Sciences, Sarajevo,  
Institute for PAM)

Greatest changes occurred in the group category 'Artificial surfaces', which were expanded by 6,893.99 ha. Within the same category, urban settlements increased most, for 5,727.98 ha. Agricultural areas decreased by 5,517.97 ha, and the greatest decrease was recorded when it comes to pastures – 3,221.89 ha. The decrease is also evident when the issue is about forest areas. Broad-leaved forest vegetation area was decreased by 5,977.27 ha, as well as the class Natural pastures, by 3,221.89 ha. However, in the context of changes within the group category Forest vegetation and other natural areas, significant increase of surfaces under transitional woodland shrub was recorded and it amounted to 6,574.10 ha, making it the greatest change in this category. Wetlands have decreased while water bodies have increased in size.

#### • Changes in the Structure of Agricultural Surfaces (> 5 ha)

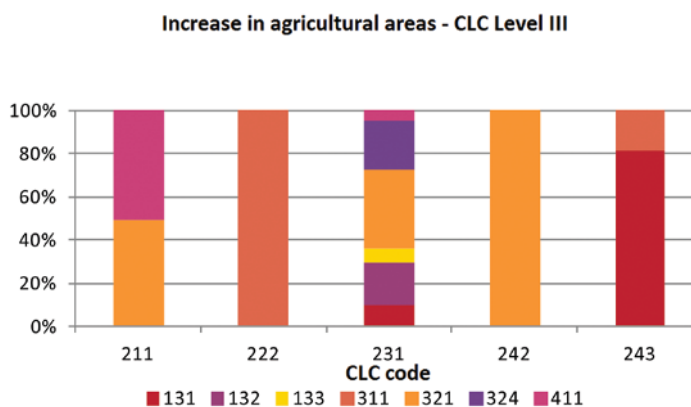
As it has been stated already, considerable changes took place in the period 2000 – 2006 with respect to the structure of agricultural areas. Analysis showed that total changes related to agricultural lands amount to 14,365.72 which is 29.99% of total recorded changes. The structure of changes shows slight expansion of agricultural areas, reduction but also transition of one agricultural class into another. In accordance with the structure of changes a conclusion can be drawn that the agricultural lands are reduced by 8,686.89 ha.

Figure 12:  
Total changes in  
agricultural areas (2000  
– 2006.)



Increase in agricultural areas amounts to 554.40 ha, which is 3.84% in the structure of total changes on agricultural areas. Analysis shows that a part of these changes is related to transition of the group categories: Forest vegetation and other natural areas (53.47%), Artificial surfaces (34.87%), and Wetlands (11.66%) into agricultural areas, as shown by the Chart 9.

Chart 9:  
Increase in agricultural  
areas





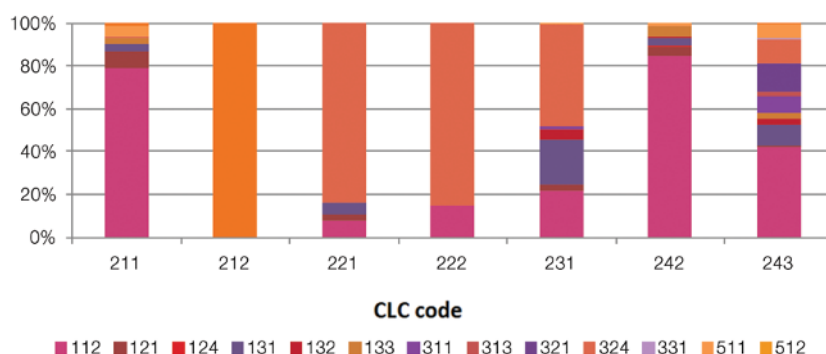
**Legend**

211 Non-irrigated arable land	131 Mineral extraction sites
222 Orchards	132 Landfills
231 Pastures	133 Construction sites
242 Complex cultivation patterns	311 Broad-leaved forests
243 Agricultural areas with significant areas of natural vegetation	321 Natural grasslands
411 Inland marshes	324 Transitional woodland-shrub

When it comes to conversion of Forest vegetation and other natural areas into agricultural lands, this phenomenon is most represented in Kupres (172.67 ha) and Laktaši (52.98 ha), but can also be observed in Banja Luka, Trebinje and Tuzla. Conversion of Artificial surfaces into agricultural lands is ranging from 6.62 (Gračanica) to 51.69 ha (Livno), and this phenomenon has also been recorded in the following municipalities as well: Banovići, Bugojno, Gacko, Gračanica, Kalesija, Livno, Travnik and Živinice.

Total reduction of agricultural lands amounts to 9,241.30 ha (Chart 10). The biggest changes were recorded with conversion of class 242 (Complex cultivation patterns) into other classes, and in the structure of reduction of agricultural lands it amounts to 47.05% (4,348.22 ha). Significant reduction of surfaces was also observed in transitions of the following classes into other ones: 243 (Agricultural land with significant areas of natural vegetation) 1,744.32 ha (18.88%), 211 (Non-irrigated arable land) 1,527.82 ha (16.53%) and 231 (Pastures) 1,148.10 ha (12.42%). The smallest changes (5.11% in total) were recorded in the following classes: 221 (Vineyards), 222 (Orchards) and 212 (Non-irrigated arable land).

**Decrease in agricultural areas - CLC Level III**



*Chart 10:  
Decrease in agricultural  
areas*

**Legend**

211 Non-irrigated arable land	112 Discontinuous urban fabric
212 Irrigated arable land	121 Industrial or commercial units
221 Vineyards	124 Airports
222 Orchards	131 Mineral extraction sites
231 Pastures	132 Landfills
242 Heterogeneous agricultural areas	133 Construction sites
243 Agricultural land with significant areas of natural vegetation	311 Broad-leaved forests
	313 Mixed deciduous and coniferous forest vegetation
511 Watercourses	321 Natural grasslands
512 Water bodies	324 Transitional woodland-shrub
	331 Beaches, dunes, sands

Recapitulation of surfaces shows that 64.55% of total reduction of agricultural surfaces accounts for transition into class 112 (Discontinuous urban fabric). Analysis shows that the biggest changes were recorded in the following municipalities: Tuzla, Bijeljina, Modriča, Lukavac, Zvornik, Novi Grad Sarajevo, Prijedor, Zenica, Mostar, etc. Neglecting the agricultural land, that is, transition into class 324 (Transitional wood-land shrub) is a significant process that has been going on. Total of 1,168.18 ha of land has been converted into this class. This change is most pronounced in the area of Mostar (258.51 ha), BD of BiH (121.35 ha), Bugojno (92.46 ha), Kneževo (77.33 ha) etc. The highest neglect levels are related to loss of pastures due to transitional succession – 559.28 ha.

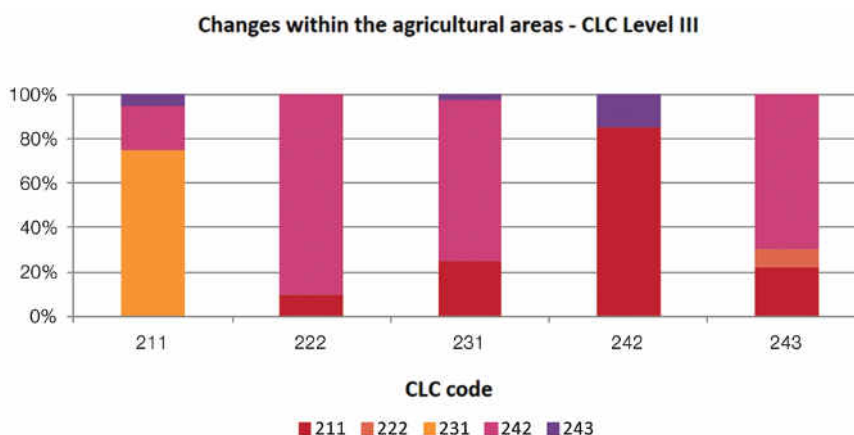
*Figure 13:*  
*Neglected agricultural land*



In addition to the reduction and expansion of agricultural areas, the process of transition of one agricultural class into another took place in the observed period and it amounted to 4,570.08 ha (Chart 11). The most significant changes, or 79.78% in the structure of these changes, is related to transition of the class 231 (Pastures) into other classes.

Recapitulation of surfaces shows that the greatest increase occurred in the class 242 (Heterogeneous agricultural areas) by 3,100.27 ha, and in class 211 (Irrigated arable land) by 1,198.28 ha. The data indicates intensified agricultural activity in some parts of the country.

*Chart 11:*  
*Changes within agricultural areas*



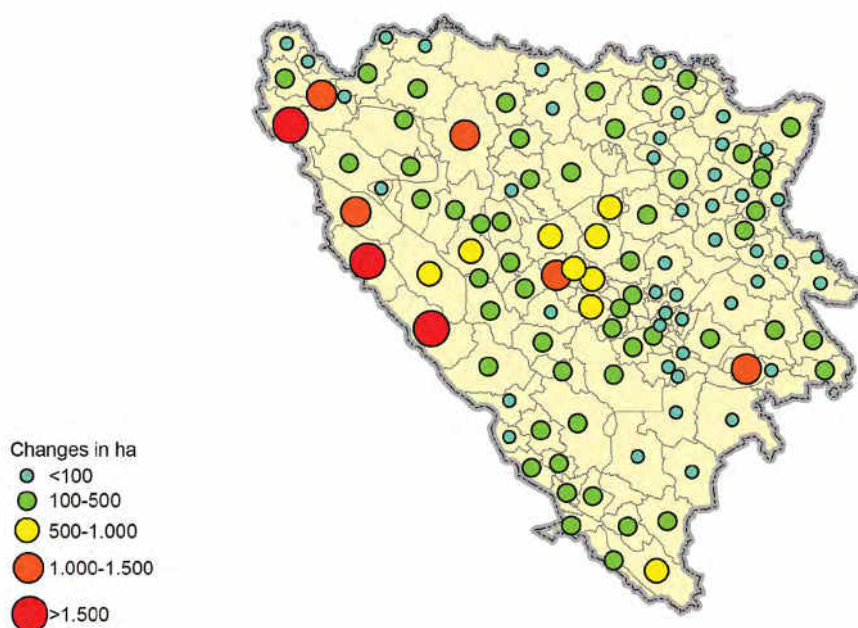
**Legend**

- 211 Non-irrigated arable lands
- 222 Orchards
- 231 Pastures
- 242 Complex cultivation patterns
- 243 Agricultural lands with significant areas of natural vegetation

Analysis shows that the greatest change of 1,833.06 ha occurred in Glamoč, where 1,249.52 ha was converted from class 231 (Pastures) into class 242 (Complex cultivation patterns). Changes exceeding 100 ha were recorded in the following municipalities: Grahovo, Rogatica, Livno, Brčko, Kupres, Bugojno, Ravno, Bosanska Krupa and Bihać.

- **Changes in the structure of forest areas (> 5 ha)**

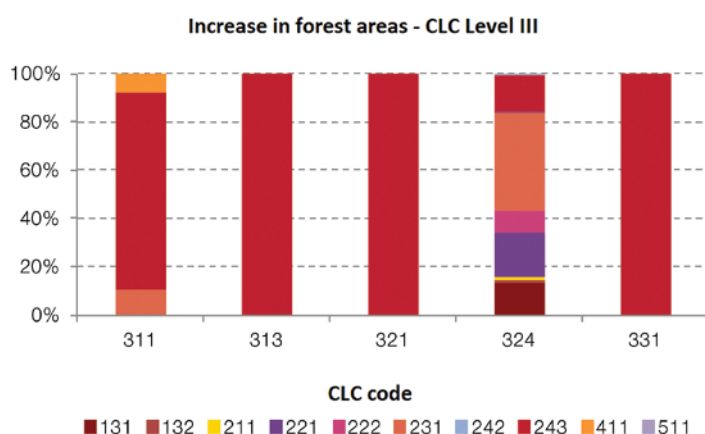
Total changes in the structure of areas under forests, taking into consideration the changes above the 5 ha level, amount to 34,844.75 ha, that is, 72.73% of total changes recorded. As in the case of agricultural areas, a slight increase, decrease, and a transition from one class into another were recorded. In accordance with the change structure, a conclusion can be drawn that forest areas were decreased by 1,072.03 ha.



*Figure 14:*  
Total changes in forest  
areas (2000 – 2006.)

Change of certain classes into forest areas amounts to 1,819.94 ha or 5.22% in the structure of total changes in forest areas. Analysis shows that the largest share of these changes is related mainly to transition of agricultural land into Transitional woodland/shrub (324) and this change amounts to 1,168.18 ha or 64.19% of total changes within this class. Transitional woodland is most pronounced in the area of Mostar (258.51 ha), BD (121.35 ha), Bugojno (92.46 ha), Kneževo (77.33 ha), etc. 10.91% of changes relate to transition of Artificial surfaces into forest areas, while other changes are below 1%.

**Chart 12:**  
Increase in forest areas

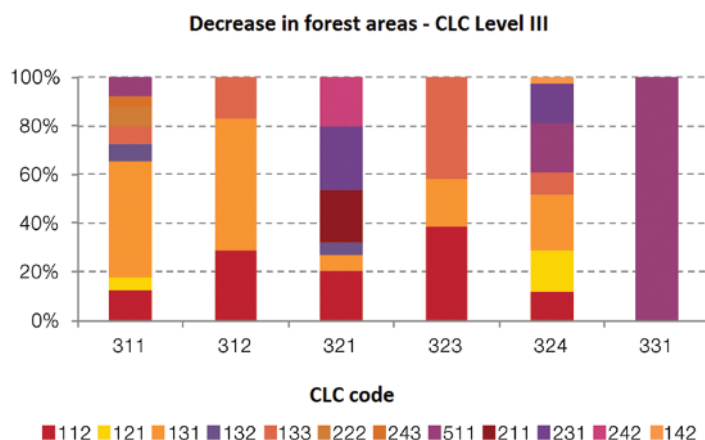


#### Legend

311 Broad-leaved forests	131 Mineral extraction sites
313 Mixed deciduous and coniferous forest vegetation	132 Landfills
321 Natural grasslands	211 Non-irrigated arable lands
324 Transitional woodland-shrub	221 Vineyards
331 Beaches, dunes and sands	222 Orchards
411 Inland marshes	231 Pastures
511 Watercourses	242 Complex cultivation patterns
	243 Agricultural lands with significant areas of natural vegetation

Forest areas have been reduced by 1,352.22 ha (3.88%). The biggest reduction of 946.42 ha is related to transition of forest areas into group class Artificial surfaces, in the process of which 521.97 ha of Broad-leaved forest (311) areas was lost. These changes were recorded in the following municipalities: Ilidža (140.99 ha), Čitluk (112.63 ha), Ljubuški (93.1 ha), Milići (64.12 ha) etc. 296.44 ha of forest areas were converted into agricultural land and the biggest change was recorded in Kupres (172.67 ha).

**Chart 13:**  
Decrease in forest areas



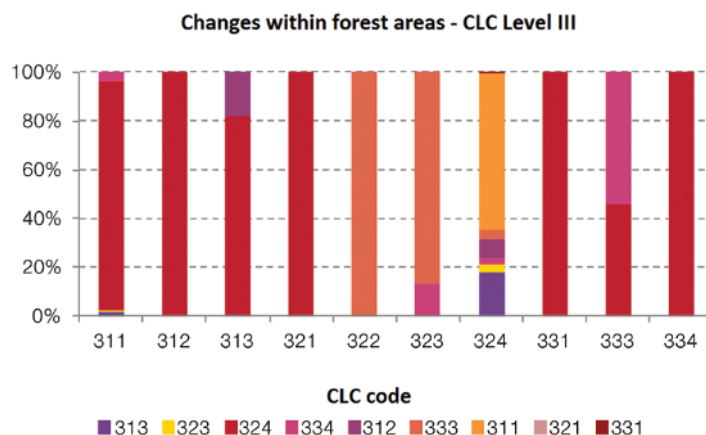
**Legend**

311 Broad-leaved forests	112 Discontinuous urban fabric
312 Coniferous forests	121 Industrial and commercial units
321 Natural grasslands	131 Mineral extraction sites
323 Xerothermic vegetation	132 Landfills
324 Transitional woodland-shrub	133 Construction sites
331 Beaches, dunes and sands	142 Sport and recreation facilities
511 Watercourses	211 Non-irrigated arable lands
	222 Orchards
	231 Pastures
	242 Complex cultivation patterns
	243 Agricultural lands with significant areas of natural vegetation

When it comes to changes in forest area, the most significant processes are related to transition from one forest class into another. This change amounts to 31,672.60 ha or 90.89% of total changes. Analysis shows that 52.16% of changes are related to transition of class 311 (Broad-leaved forest) into other classes in the amount of 16,521.82 ha, in the process of which 15,569.44 ha of broad-leaved forest was converted into the class Transitional woodland-shrub (324) which may be considered as a loss of this resource, due to the felling of trees mainly. The biggest change of this kind was recorded in the following municipalities: Livno (1,745.80 ha), Grahovo (1,712.56 ha), Banjaluka (1,198.67 ha) and Gornji Vakuf (1,017.18 ha).

On the other hand, a reverse process has been observed – the transition of Transitional woodland into forest (32.59% or 10,323.57 ha), and an increase in broad-leaved forest (6,647.79 ha). This change is dominant in Bihać (1,079.50 ha) and Bosanska Krupa (805.33 ha).

It should be pointed out that the change of 1,102.69 ha (3.48%) is related to transition of some classes into a class Burnt areas (334). Burnt areas were identified in eight municipalities: Trebinje (489.58 ha), Ravno (209.11 ha), Livno (118.67 ha), Bileća (87.96 ha), Konjic (59.32 ha), Tomislavgrad (53.71 ha), Ljubuški (39.60 ha) and Ljubinje (5.18 ha).



*Char 14:*  
Changes within forest areas

**Legend**

311 Broad-leaved forests	323 Xerothermic vegetation
312 Coniferous forests	324 Transitional woodland-shrub
313 Mixed deciduous and coniferous forests	331 Beaches, dunes and sands
321 Natural grasslands	333 Sparsely vegetated areas
322 Moors and heathland	334 Burnt areas



**Table 9:**  
Changes in land area  
(2008 – 2012.)

Class	Change (ha)
Artificial surfaces	74.61
Agricultural lands without orchards	-19.15
Orchards	117.54
Forest vegetation and other natural areas	-536.22
Transitional woodland-shrub	355.76
River	7.46

**Figure 15:**  
The conditions in 2008



**Figure 16:**  
The conditions in 2012  
(Source: A study of use  
value of the land in  
the area of Gradačac  
Municipality, Faculty of  
Agriculture and Food  
Sciences, Sarajevo,  
Institute for PAM)



#### • Land Productivity

Arable land accounts for 1,585,000 ha, which is 62% of agricultural land, while cultivated surfaces account for about 1 million hectares, out of which 47% is unused. According to statistical data for 2012, cultivated land by type of cultivation amounted to 1,006,000 ha, out of which sown land accounted for 527,000 ha, fallow land and uncultivated land for 476,000 ha, nurseries and other arable land for 3,000 ha. Areas under cereal cultivation amounted to 304,000 ha, fodder covered 137,000 ha, vegetables 78,000 ha and industrial crops 8,000 ha. In the structure of land sown with crops, share of cereals amounted to 57%, fodder 26%, vegetable 15% and industrial crops 2%.

According to climate parameters, the year of 2012 is considered the year of extreme drought. The drought that took place in 2012 is a continuation of the drought that took place in 2011 resulting in the disappearance of all reserves of moisture due to high temperatures and precipitation deficit, affecting the low levels of rivers and ground waters. In addition to the drought, 2012 was marked by huge quantities of snowfall and severe spring frost. All these weather conditions had a negative impact on the entire plant production: production of cereals, maize, fodder and industrial crops, production of vegetables, and fruit yield and quality. In addition to the direct impact of drought on plant production, drought affected livestock and livestock production.

The largest cultivation land surfaces are used for production of cereals. Maize is most represented culture and it is sown on 197,841 ha. Total production of cereals in 2012 amounted to 868.13 thousand tons, and in relation to 2011 it decreased by 19.5%. The 2012 drought also decreased the maize production rate by 30%, buckwheat by 28%, barley and oat by 1%. Wheat and rye production in 2010 increased by 7% and 11.2% respectively as compared to 2011.

Total industrial crops production amounted to 8,764 t and decreased by 13.3%. In the structure of industrial crops production, predominant industrial crops were soya (76%) and tobacco (17%). Industrial crops production in 2012 recorded a decline, which was reflected in the production of oilseed decrease by 63%, tobacco by 18% and soya by 0.6%.

Total fodder production was 646,545 t and decreased by 16.3%. In the production structure predominant place was taken by maize for fodder (58.6%), clover (14%), Lucerne (13.2%) and grass-clover mixtures (11.8%). Fodder yield and production decreased by 40 to 60% due to drought.

Total vegetables production in 2012 amounted to 528,487 t and was decreased by 22% as compared to 2011. As far as the production structure is concerned predominant vegetable was potato that is cultivated on the surface of 36,787 ha. The size of surface under other vegetables amounted to 34,945 ha.

In the structure of fruit trees, the greatest share of all productive trees produces plum and the plum orchards account for 51% of total land under orchards. Total production of various fruit in 2012 amounted to 203,937 t and is lower by 30.7% in comparison to 2011. Due to extreme weather conditions such as severe spring frost, high summer temperatures and the precipitation deficit, the fruit production in 2012 suffered from serious damages. The berry fruit production in 2012 was conducted on a surface of 2,533 ha. Total berry fruit production amounted to 15,699 t and was lower by 2,577 t, or 14.1%, as compared to 2011. The total number of productive grapes in 2012 was 13,662. Total production of grapes amounted to 25,931 tons.

Since the data from the latest forest inventory are not available yet, the data on estimated annual growth and growing stock in BiH vary depending on the source used. The growing stock in the Federation of BiH is 161,842,588 m<sup>3</sup> or 196.6 m<sup>3</sup>/ha. The total annual growth is 4,201,015 m<sup>3</sup>/yr, that is, 5.08 m<sup>3</sup>/ha/yr<sup>59</sup>. According to the data of the Forests and Forest Land Cadastre of Republika Srpska (situation as of 31 December 2011) the total growing stock in the Entity amount to 228,171,218 m<sup>3</sup>, that is, 230 m<sup>3</sup>/ha. Annual growth amounts to 5,179,187 m<sup>3</sup>/yr for public forests and 1,272,507 m<sup>3</sup>/yr for privately owned forests (that is, 7.17 m<sup>3</sup>/ha/yr in public and 4.71 m<sup>3</sup>/ha/yr in private forests).

Production of forest assortments in BiH was increased by 5.42% in 2010, compared to 2009. Production of coniferous assortment increased by 13.05%, while production of deciduous assortments increased by only 0.19%. The total production of assortment in BiH in 2010 reached 3,614,899 m<sup>3</sup>, out of which 1,577,825 m<sup>3</sup> were coniferous and 2,037,074 m<sup>3</sup> deciduous assortment. The most significant increase was recorded in production of coniferous round wood - 61.77%, deciduous round wood - 33.98%, other long deciduous trees - 24.85% and mining coniferous trees - 22.00%.

In accordance with the Constitution of BiH and the Constitutions of the FBiH and the RS, as well as the Brčko District Final Award, the competencies for the management of natural resources, including the land resources (that is, development, protection, usage and protection from detrimental impacts) rest with the entities and BD BiH. Within the Entities, the respective Ministries of Agriculture, Water Management and Forest are competent for the land issues, and in BD BiH competencies rest with the BD Department for Agriculture, Forestry and Water Management.

59 Reports from individual cantons on undertaking adequate measures concerning the agricultural land, 2013

**At the level of BiH there is no system for monitoring the land cover changes. However, it is necessary to make the unification of reporting data models of competent institutions, which would facilitate their integration for the needs of international reporting.** BiH is part of the CORINE Programme that should provide geographical information on land cover in the European countries, through creating a database on CORINE Land Cover. Given the fact that CORINE programme is implemented every five years, this source may be used but it is not suitable for one-year reporting processes. In addition to that, when it comes to land cover, there are partial researches only and data collected through diverse projects. To this end, emphasis should be placed in particular on the projects related to the development of a Land Use Value Map at the level of municipality, establishing a system of monitoring of land cover changes.

When it comes to the issue of land productivity, statistical institutions in BiH collect data on regular basis on the production of major crops. Presently no statistical data have been kept on the state of forest resources, but they can be collected from competent institutions and forest management agencies at the entity and lower administrative levels.

**INDICATOR: Increase in the level and diversity of available funding for combating desertification/land degradation and mitigating the effects of drought**

**Development policies and measures address desertification / land degradation and mitigation of the effects of drought**

The mentioned two indicators are related to the measurement of accomplishment of Strategic objective 4: Mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors. With respect to this, it is necessary not only to develop policies and measures but also ensure funding for their implementation. It is necessary to plan the use of budgetary funds and incorporate planned measures into annual plans of institutions. Additional funding sources are also funds of donors who are active in BiH. These are very important indicators from the viewpoint of reporting as well, which indicate the activities taken by governments and competent institutions in accomplishing and implementing AP objectives.

## 8.6 RELEVANT INDICATORS

**INDICATOR: Drought**

In the last decade, like most of the countries in the region, BiH has been facing the consequences of climate change which, inter alia, reflect in the ever more frequent occurrence of extreme weather conditions, namely floods and droughts, as being globally present, and more and more attention is paid to them. Climate projections forecast that the occurrence of these events, as a consequence of climate change, will be even more intense in the coming decades. This is supported by the fact that, in the period 2000-2012, there were 5 years recorded with extreme drought (2000, 2003, 2007, 2011, 2012), as well as two extremely rainy years (2009, 2010).

A consequence of climate change is a decrease in precipitation in the region (First and Second National Communication to UNFCCC), particularly during the summer period, which mostly affects the sectors of agriculture and water resources, which underlines the need to prioritize these issues.

Given that climate characteristics and soil water regime, as well as their mutual relation, define the success of agricultural production, there is an increased concern about the impact of climate change on agriculture. Drought is a natural phenomenon, which, in contrast to other natural phenomena, occurs gradually, lasts a long time, and covers large areas, whereas its spatial distribution is not possible to locate in advance.

Prior to its analysis, we first need to define what the term “drought” means. For meteorologists, those are periods with considerably less than average precipitation;

in agriculture, those are periods when soil moisture is considerably below average and insufficient for growth and development of agricultural crops, whereas for hydrologists, those are low river flows and extremely low water levels in accumulations for extended period of time.

When the quantity of precipitation exceeds the potential evapotranspiration, the loss caused by evapotranspiration is compensated. In case that potential evapotranspiration (PET) exceeds precipitation (water inflow), water supplies from soil are exhausted and finally lead to drought.

Annual precipitation in BiH (1,250 mm) up to several times exceeds the potential evapotranspiration (725 mm), but due to poor precipitation distribution, potential evapotranspiration, most frequently during July and August, cannot be covered by precipitation, so the deficit of soil moisture occurs. Average annual soil moisture deficit in BiH amounts to 125 mm, being the highest in the southern regions (300 mm), considerably lower in the northern parts (100 mm) and the lowest in the central parts of the country (50 mm).

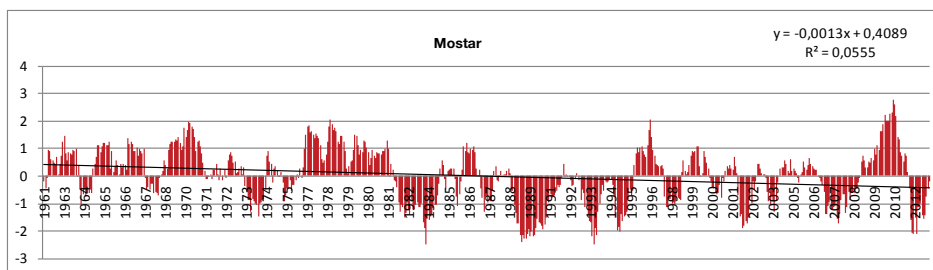
In order to monitor drought in time and make comparisons among different regions, one needs to use a standard numeric index for its assessment. There is a wide variety of different drought indices developed and used for analysis, assessment and monitoring of drought in the world. Two drought assessment indices will be presented in this document as follows: i) the Standardized precipitation index and, ii) the Aridity index based on P/PET ratio.

### Drought analysis using the Standardized Precipitation index (SPI)

The fact is that precipitation deficit (rainfall) can exert various impacts on soil moisture, level of underground water, water accumulations and water flows. As a challenge to these phenomena and the need to monitor and analyse them, in 1993, McKee et al developed a new method for assessment of water deficit called the Standardized precipitation index (SPI). The advantage of this method is that, for its calculating, one only needs to have data on precipitation. Although SPI is not directly related to parameters determining agricultural drought, such as soil moisture balance, it is still recommended for use throughout world by the Commission for Agricultural Meteorology of the World Meteorological Organization (WMO, 2009).

Based on long-term observations, it is possible to analyze the occurrence of drought in a specific time interval (1, 3, 6, 9, 12, 24 and 48 months), and compare these values with the values of some other region. This variety of measurement intervals enables SPI to monitor short-term water supplies of importance for agriculture or long-term water supplies related to water flow in watercourses, water level in the lakes or underground water level.

Drought index using the SPI method has been applied for 7 weather stations as follows: Mostar (Graph 15), Bijeljina (Graph 16), Livno, Gradačac, Banjaluka, Bihać, Doboj (Annex 1). Reference series of data 1961-2012 were analysed for calculation of the SPI for different time scales ( $SPI_1$ ,  $SPI_3$ ,  $SPI_6$ ,  $SPI_{12}$ ).

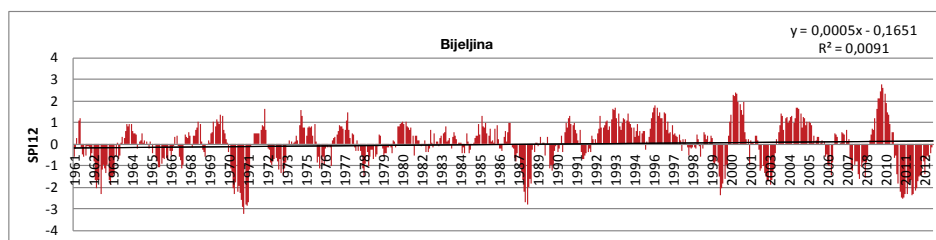


**Graph 15:**  
*SPI<sub>12</sub> at the territory of  
Mostar (1961 – 2012)*

The Standardized precipitation index ( $SPI_{12}$ ) in weather stations Mostar, Banja Luka, Livno, Gradačac, Bihać and Banja Luka, displays a negative linear trend, which indicates that the drought increase occurred, but the changes are not of significant importance. The greatest changes, i.e. negative trend are in the territory of Mostar where the coefficient of determination  $R^2$  equals 0.055, and Gradačac, where  $R^2$  equals 0.047.



**Graph 16:**  
*SPI<sub>12</sub> at the territory of  
Bijeljina (1961 – 2012)*



In weather stations Doboj, Bijeljina and Sarajevo, linear SPI<sub>12</sub> trend for the analysed time period is positive, i.e. drought is increasingly rare. However, one should pay attention to the last decade of this period (2000 – 2012) when there was a pronounced variability between years and the occurrence of extremes. This is a decade with the highest number of dry summers, which certainly shows that dry periods became more frequent, but the number of wet summers has increased too, which undoubtedly indicates to great variability in precipitation during the past decade.

The main disadvantage of this method is that it can observe changes only in precipitation patterns of a specific region. Different aridity indices are applied to perceive drought from several aspects. The aridity index based on P/PET ratio is accepted by UNCCD as a reference bio-climate indicator of drought and desertification process, hyper-arid, arid, semi-arid and dry sub-humid areas. From the point of view of BiH, this aspect is of limited significance considering the climate divergence in time and space, as well as other factors affecting the dryness of pedo-climate such as karst character of large space, distinct relief and its porosity.

### Drought analysis using the Aridity index (P/PET)

Monthly, quarterly (June, July and August) and annual values were determined of the average index for a reference period 1961-1991, and the included precipitation and PET data were taken from 53 weather stations throughout BiH.

Based on the conducted analysis, the average annual value of IA for the overall territory of BiH amounts 15.3 (Table 11), which, according to classification, makes this territory humid at an annual level. However, observed on a monthly level, average values vary from 0.63 to 57.44. The lowest and the only value which under the criterion can be classified to a sub-humid zone was established for July, and equals 0.63.

**Table 10:**  
*Classification of aridity/  
humidity*

Zone	UNEP (1992) P/PET (Thorn Thwaite method)
Hyper arid	< 0.05
Arid	0.05 – 0.20
Semi-arid	0.20 – 0.50
Sub-humid	0.59 – 0.65
Humid	> 0.65

Monthly, quarterly (June, July and August) and annual values were determined of the average index for a reference period 1961-1991, and the included precipitation and PET data were taken from 53 weather stations throughout BiH.

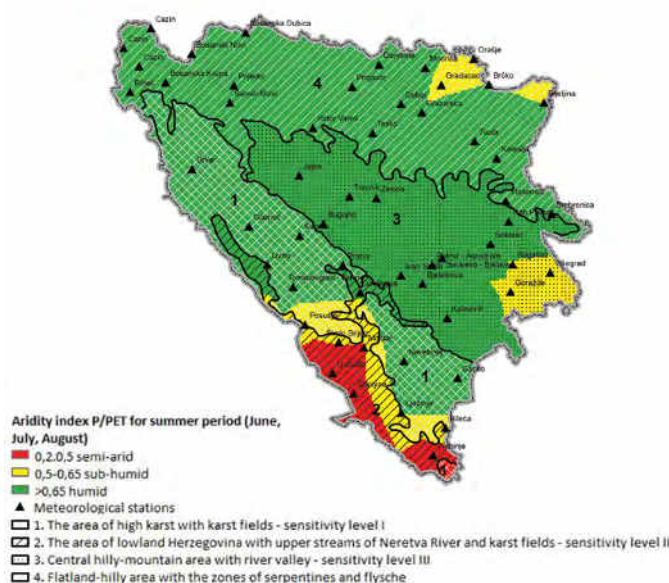
Based on the conducted analysis, the average annual value of IA for the overall territory of BiH amounts 15.3 (Table 11), which, according to classification, makes this territory humid at an annual level. However, observed on a monthly level, average values vary from 0.63 to 57.44. The lowest and the only value which under the criterion can be classified to a sub-humid zone was established for July, and equals 0.63.

**Table 11:**  
*Monthly and annual value  
of Aridity index for the  
territory of BiH*

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
BiH	57.44	38.32	11.15	3.68	1.17	0.91	<b>0.63</b>	0.75	1.15	2.68	11.13	54.63	15.30

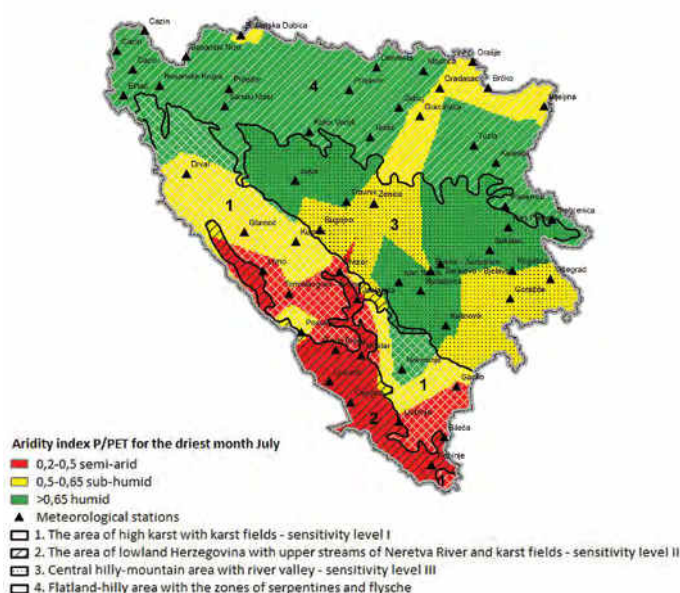


In a climate sense, hence the IA values as well, BiH represents a very heterogeneous area. Accordingly, average values for the whole territory of BiH do not indicate to the occurrence of drought and dry areas, so, for this reason, we need to observe individual locations within BiH. Figure 17 presents the IA map for 53 analysed weather stations for three summer months: June, July and August.



**Figure 17:**  
Aridity index P/PET for  
summer period – June, July  
and August

As it can be seen on the IA map with average values for summer period (June, July and August) within the period 1961 – 1991, there are no arid zones in BiH, i.e. zones with IA value under 0.2. Semi-arid zones in our conditions represent the most vulnerable areas to drought and water deficit. They are characteristic for the extreme south of the country, namely the area of the southern sub-Mediterranean part of BiH. This zone continues towards the inland (continent) with a sub-humid zone, which also spreads to the east in the region of Goražde and Višegrad (Podrinje), as well as to the north-east at the territory of Posavina and Semberija. These areas are very important for agricultural production in BiH, which makes this situation and distribution of aridity even more important. According to this indicator, the remaining part of BiH represents a humid zone.



**Figure 18:**  
Aridity index P/PET for the  
driest month - July

On average, July is the month with the least precipitation in BiH. Figure 18 presents spatial distribution of IA for July. The same as with the summer period, there are no arid zones

either. Semi-arid zones include the sub-Mediterranean part of BiH, spreading north from Gacko over Ljubinje, Mostar, Jablanica, to Prozor and Livno. Semi-arid zone covers a much larger area than was the case with spatial distribution of the summer period IA. This zone spreads in the central part of the country, from Goražde over North Herzegovina to Zenica, Bugojno and all the way to Drvar on the east. This area also includes regions around Posušje, Bosanska Dubica and Posavina and Semberija to the north. Humid zone is mostly located on the north-east (Podrinje) around Srebrenica, in the central part of BiH, i.e. region of high mountains around Sarajevo, as well as the north and north-west part of the country (Krajina).

As it can be seen on the IA maps, average monthly values of the aridity index greatly vary in space and throughout the year. Table 12, in addition to monthly values, also contains values for vegetation period (from April to September) and the summer period (from June to the end of August).

More intensive red colour indicates to higher aridity, i.e. more frequent dry periods and increased precipitation deficit. As for the vegetation period, according to the above classification, the areas for all presented weather stations have value above 0.74, and thus belong to humid zone. However, if we observe only summer period, values vary from 0.4 – 1.01, i.e. from semi-arid to humid zone. Summer period is driest at the area of Herzegovina (Bileća, Čapljina, Široki Brijeg, Mostar) where average IA amounts 0.50. Areas of Čapljina, Mostar and Široki Brijeg belong to semi-arid zones, whereas Bileća area belongs to sub-humid zone. In the territory of Herzegovina, on a monthly level, IA is lowest in July and August, when it varies from 0.26 -0.63 (semi-arid to semi-humid).

**Table 12:**  
Average monthly IA for  
some weather stations in  
the territory of BiH<sup>60</sup>

Weather station		Vegetation period					Vegetation period	Summer period	
		IV	V	VI	VII	VIII	IX	(IV - IX)	(VI, VII, VIII)
Period 1961 – 1991									
Northern Bosnia	Bihać	2.37	1.42	0.95	0.86	0.97	1.39	1.33	0.93
	Bijeljina	1.21	0.76	0.81	0.56	0.56	0.65	0.76	0.64
	Doboj	1.38	1.01	0.88	0.70	0.67	0.85	0.91	0.75
	Gradačac	1.44	1.17	0.76	0.63	0.43	0.59	0.84	0.61
Central Bosnia	Goražde	1.36	0.85	0.68	0.54	0.59	0.93	0.83	0.60
	Sarajevo	1.67	1.04	0.87	0.70	0.66	0.97	0.98	0.74
	Tuzla	1.53	1.11	1.00	0.79	0.77	0.85	1.01	0.85
	Vlasenica	2.25	1.37	1.20	0.96	0.89	1.21	1.31	1.01
	Zenica	1.26	0.90	0.76	0.53	0.62	0.85	0.82	0.64
	Livno	2.28	0.98	0.91	0.41	0.75	1.24	1.09	0.69
Herzegovina	Bileća	3.01	1.17	0.79	0.44	0.63	1.48	1.25	0.62
	Čapljina	1.54	0.64	0.46	0.26	0.47	1.06	0.74	0.40
	Široki Brijeg	2.72	1.25	0.67	0.32	0.56	1.33	1.14	0.52
	Mostar	2.53	1.17	0.62	0.30	0.53	1.05	1.03	0.48
Period 2000 – 2012									
Bihać		1.79	1.13	0.78	0.51	0.73	2.00	1.16	0.67
Gradačac		1.17	0.74	0.86	0.48	0.42	0.89	0.76	0.59
Sarajevo		1.31	0.93	0.70	0.61	0.46	1.31	0.89	0.59
Mostar		1.87	0.73	0.47	0.26	0.34	1.33	0.83	0.36
Differences between periods 1961 – 1991 and 2000 – 2012									
Bihać		0.58	0.29	0.17	0.35	0.24	-0.61	0.17	0.25
Gradačac		0.27	0.43	-0.10	0.15	0.01	-0.30	0.08	0.02
Sarajevo		0.36	0.11	0.17	0.09	0.20	-0.34	0.10	0.15
Mostar		0.66	0.44	0.15	0.04	0.19	-0.28	0.20	0.13

IA for the summer period in the Northern and Central Bosnia is somewhat higher than in Herzegovina and ranges from 0.60 – 1.01 (semi-humid to humid). IA is the lowest, i.e.

60 Information obtained from Federal Institute for Hydrometeorology and the Republic Institute for Hydrometeorology

the driest summer is in the area of Goražde (0.60) and Gradačac (0.61). The driest month in Central Bosnia is July, namely in the area of Livno (0.41), while in Northern Bosnia it is August, in the area of Gradačac (0.43).

It is necessary to point out that mean values for a longer period of time are used to develop IA, so the extremes and high oscillations are not seen by this method. Extreme droughts or the extreme high intensity precipitation represent the greatest threat to stable agriculture and safe food supply for population.

Furthermore, we have also conducted a comparative analysis of multi-annual series of data for the periods 1961-1991 and 2000-2012 (Table 12). The comparison of these two series of data indicates to increased IA values, i.e. precipitation deficit, which is particularly pronounced during the vegetation period.

IA increase present in all the presented weather stations, i.e. locations, is determined on vegetation, seasonal and monthly level. On average, during vegetation, this increase ranged from 0.08 – 0.2, and during summer from 0.02 – 0.25. The highest IA rise during vegetation was established for the area of Mostar (difference between periods 0.2), while the area of Bihać records increasingly warmer summer periods (difference of 0.25).

There is an IA increase from April to August. Change is most pronounced in the first part of vegetation, namely April and May. In September, index value rise is noticeable in all locations, i.e. precipitation deficit decline.

Finally, we need to say that the foreseen changes in precipitation and its distribution patterns (spatially and seasonally), combined with rise in temperature and evaporation, resulting in increased precipitation deficit, will likely continue to cause extreme events (drought) and lead to lack of access to water during summer when plants need it most. The area of Herzegovina particularly stands out (most severely in lime and karst areas) where these changes are the most pronounced. As a consequence of the aforementioned, we are going to have decreased yields in the future due to reduced precipitation, increased evaporation and decreased soil moisture supplies.

**The Drought indicator is monitored by the Entity Institutes for Hydrometeorology in BiH.** This indicator should be further developed within the Drought Management Centre for South-eastern Europe (DMCSEE) in order to meet the reporting requirements at international level, as well as mitigation and response system.

BiH is not a member of DMCSEE since in the project application process for the establishment of the Centre it was not eligible for the EU funds supporting this project.

#### INDICATOR: Water availability per capita<sup>61</sup>

The most important task in the area of water utilization is to ensure potable (drinking) water for the purpose of meeting the needs of population and of the economy that has requests for using the highest quality water.

Lowland parts of the country, with the highest quality land potentials (Posavina, Semberija), as well as river basins with the highest population concentrations (River Bosna) are the poorest in domicile waters. About 40% of the population live in the areas along the River Bosnia basin, while only 14% of the available water flow is formed therein. The most favourable situation is in the basins of Trebišnjica and Neretva rivers, with 19.8% of the BiH basin surface, where 9.6% of people live, and a flow of 34.8% of the highest quality water is formed.

The situation is much more unfavourable when we get out of the domain of average flows and when the flow time unevenness is taken into a detailed consideration, which is expressed through a multiple basis – both by annual values and as unevenness within years. Annual flows in BiH basins may go as low as 40% of average values. In the months with the peak consumption levels (July, August, September) average flows go down to 40% and even 30% of average annual values, and the low water periods may even take two to three months in continuity. Moreover, analyses show that all watercourses in BiH and RS recorded the phenomenon of the succession of dry / low water years, which can be neutralized through realization of complex systems only, with accumulation basins of huge relative volumes.

<sup>61</sup> Water Management Strategy of the Federation of BiH, 2010 – 2022, 2010; Framework Plan of Water Management Development of RS, 2006

About 60% of the population in the Federation of BiH is covered by the public water supply systems (in urban areas the coverage amounts to 94% of the total number of population, while in rural areas the coverage is much lower and amounts to approximately 20%). Other population meet their needs through individualized, group or local water supply systems that are not covered by the public water-supply utilities' competence and management procedures. The total quantity of abstracted water, for the water supply requirements in the Federation of BiH, is about 261,542,143 m<sup>3</sup>/annually, which for the 1.39 mil. of residents covered by the public supply systems provides gross specific consumption of 512 l/dwelling/day. A certain number of public water supply systems in towns, and in rural areas in particular, is still not able in certain periods of the year to meet the basic consumers' demand for water and, quite often for quality water, which results in frequent supply reduction – in particular in the basins of Krka and Cetina Rivers (Adriatic Sea River Basin) and in the northern part of Bosna and Drina Rivers sub-basins (Sava River Watershed). One of the reasons for rationed water consumption is related to the losses in the very water supply systems. In such conditions it is extremely difficult to ensure unvarying distribution of the available volumes to all consumers and the basic sanitary prerequisites. In a nut shell, it may be concluded that the present household consumption norms for the areas with regular supply amount to 120 l/dwelling/day, which is, at the same time, the average consumption norm of the population in the Federation of BiH. According to the available data, the average specific consumption for the industry connected to the town water supply system is about 64 l/dwelling/day.

In RS, public water supply systems cover about 46% of the population, while 54% rely on rural water supply systems, own water wells, springs or surface water sources (estimates show that there are about 9,800 local or rural water supply systems in the RS). Coverage in urban areas is about 87% and this can be explained by the fact that there are several towns with very low coverage levels. Insufficient coverage of households by the water supply systems is recorded in particular in the following municipalities: Sokolac, Kozarska Dubica, Novi Grad, Oštra Luka, and Kneževno. On the other hand, there are some areas, that is, municipalities, where the water supply systems have been developed well but the quality of water is an issue, which is the case in Prnjavor or the areas located directly along the Sava River Basin. 46% of the population are connected to the municipality water supply systems, 11% to local community systems and 43% of residents use water from individual wells or sources. Therefore, 57% of the population is covered by the organized water supply systems. Annual consumption of industry, from its own sources, is about 150 million m<sup>3</sup> which is equal to the population equivalent of 1.20 million, that is, more than all municipality utilities are able to set aside from their own water supplies. The level of water contamination control and treatment of wastewater is very low. In general, there is no treatment (purification) of water supplied to consumers, although it is estimated that more than 40% of raw water requires additional treatment. Average losses of water in water supply systems are about 50% of total quantities, speaking a lot about the conditions of those systems.

In addition to the strategic objectives, defined by the entities' strategies, the BiH Draft Water Management Policy document<sup>62</sup> defines the priorities in the field by 2035. One of them is supply of urban and rural areas with potable water.

The document shows the current situation as follows:

Percentage of population connected to the public water supply systems	FBiH	RS	BD	BiH
Percentage of the population covered by the public water supply systems, having continuously satisfactory quality water supply, in accordance with the EU Drinking Water Directive	36%	34%	25%	35%
Percentage of the population covered by the public supply systems, with occasional deflections from quality standards specified by the EU Drinking Water Directive	24%	23%	12%	23%
<b>Total</b>	<b>60%</b>	<b>70%</b>	<b>37%</b>	<b>58%</b>

The policy objectives are to achieve, by 2035, the 90% supply of the BiH population with drinking water through public, health and safety controlled water supply systems. For the remaining 10% of the population, living in rural areas, the drinking water supply will be provided through individual water supply systems. At the same time, it is planned to reduce the water losses in BiH to the level below 20%.

62 The document has not been adopted yet by the BiH Council of Ministers.

Pursuant to the BiH Constitution and the Constitutions of the RS and the FBiH, as well as to the Arbitrary Award for BD BiH, water resources management (development, protection, utilization, protection from detrimental impacts) is under the competence of entities and BD respectively. At the entity level water sector is under the competence of the Entity Ministries of Agriculture, Water Management and Forestry, and the BD Government Department for Agriculture, Forestry and Water Management, or under the competence of subjects entrusted by public authorizations.

In the Federation of BiH, Entity Ministry transfers its competencies onto two agencies: The Sava River Watershed Agency and Adriatic Sea Watershed Agency, whereas in the Republika Srpska competencies are transferred onto the Public Company „Vode Srpske“.

**Indicator ‘Availability of Drinking Water’ is available for reporting.** The required data is available in the competent ministries at the levels of Entities and BD, which are responsible for the implementation of water management policies.

### INDICATOR: Land Use Change<sup>63</sup>

Changes taking place in agricultural and forest lands in BiH are the reflection of, first of all, effects of war, population migrations, especially from rural to urban areas, ownership relations, etc., but also of the current economic situation and the lack of certain implementation and inspection policies and mechanisms. These trends are prevailing even today as land management instruments and adequate rural and agricultural policies have not been developed. When it comes to the current causes of land damages in BiH they may be divided into two major groups:

- Permanent exclusion of land from production (construction of residential complexes or industrial and other facilities; water accumulations; roads; interrill erosion; etc.,
- Temporary exclusion of land from production (surface exploitation of various raw materials; diverse waste dumpsites; deforestation; mine fields; etc.).

Bosnia and Herzegovina still does not have a system of permanent monitoring of land. That is the reason why the Third Level Classification of the CORINE database 2000-2006 and the data related to the mapped changes bigger than 5 ha, are used for the analyses of the state and losses of land (temporary and permanent). These data enable spatial and dynamic analysis and therefore, all land losses will be presented in the following part of the document in a way that all changes will be analysed (with the aim of obtaining better insight into the spatial conditions and changes), in spite of the fact that all changes were not included into the CORINE database in accordance with the development methodology. For example, according to the CORINE 2006 Database, the surface under the group category ‘Artificial surfaces’ amounts to 75,752.49 ha. In relation to the situation in 2000, these surfaces were increased by 6,893.99 ha. However, the increase in artificial surfaces is much bigger, taking into consideration the mapped changes bigger than 5 ha, and they amount to 8,332.66 ha.

### Agricultural Land Loss

In the structure of the total permanent and temporary losses of land, 7,386.25 ha or 88.64% is related to the transition of agricultural surfaces into the class Artificial surfaces. The average loss of agricultural land (from 2000 to 2006) was 1,231 ha annually. The structure of agricultural land use change into artificial is shown in Table 13, which shows that the largest proportion of land (80.77%) was converted into the class Discontinued Urban fabric, while the smallest loss of 28.81 ha is related to enlargement of airport surfaces.

Artificial surfaces – Classification Level III	Decrease in agricultural land (ha)	%
Discontinued urban fabric	5,965.65	80.77
Industrial and commercial units	332.27	4.50
Airports	28.81	0.39
Mineral extraction sites	628.38	8.51
Landfills	127.98	1.73
Construction sites	303.16	4.10
<b>Total</b>	<b>7,386.25</b>	<b>100</b>

**Table 13:**  
Structure of land use change, transition of agricultural land into artificial surfaces (2000 – 2006.)

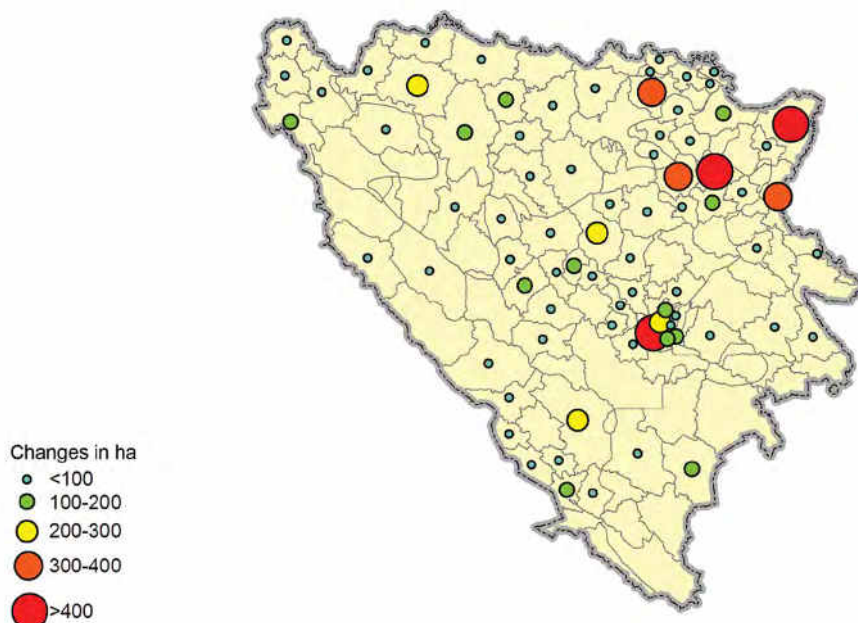
63 Ljuša, 2014.



Further analysis shows that, in the structure of agricultural land, the largest proportion of land change use is related to the class of Complex cultivation patterns (4,304.34 ha). The Artificial surfaces were increased on account of Non-irrigated arable land in the amount of 1,428.09 ha, and Agricultural lands with significant areas of natural vegetation in the amount of 1,018.15 ha. Pastures were decreased by 564.89 ha. Other changes are below 1%.

In the context of areas where agricultural land was converted into the class **Discontinued urban fabric**, analysis shows that the biggest changes were recorded in the following municipalities: Ilidža (545.74 ha), Tuzla (497.57 ha), Bijeljina (490.63 ha), Modriča (374.99 ha), Lukavac (361.07 ha), Zvornik (314.23 ha) and Mostar (272.12 ha).

**Figure 19:**  
Area of agricultural land  
use change into artificial  
surfaces (2000 – 2006)



The largest increase in the category of **Mineral extraction sites** was identified in the following municipalities: Kakanj (82.37 ha), Bijeljina (62.89 ha), Gacko (59.77 ha), Ugljevik (42.15 ha), Lukavac (37.98 ha), Visoko (37.55 ha) etc.

The largest increase in the category of **Industrial and commercial units** was identified in the following municipalities: Vitez (56.96 ha), BD (45.90 ha), Mostar (42.41 ha), Ilidža (31.78 ha), Banjaluka (27.21 ha), Bijeljina (23.32 ha) etc.

Analysis shows that **Construction** sites were identified, among other places, in Laktaši (103.81 ha), Kreševo (26.89 ha), Mostar (24.95 ha), Vogošća (18.18 ha), Visoko (14.59 ha), Sarajevo Centre Municipality (13.03 ha) etc.

At the expense of agricultural land, **landfills** increased in four towns / municipalities as follows: Gacko (57.21 ha), Živinice (40.52 ha), Tuzla (21.21 ha) and Novi Grad (9.03 ha).

**Neglect of agricultural land**, that is, appearance of transitional woodland – shrub is also a significant phenomenon in BiH. The total of 1,168.18 ha land was converted into this class. The highest rates of conversion into transitional woodland – shrub are recorded in the area of Mostar (258.51 ha), BD-a (121.35 ha), Bugojno (92.46 ha), Kneževo (77.33 ha) etc. The highest levels of agricultural land neglect are related to the loss of pastures due to their conversion into transitional woodland in the amount of 559.28 ha. Neglected pastures are mostly located in Bugojno (92.46 ha), Kneževo (77.93 ha), Rogatica (69.20 ha), Ugljevik (68.38 ha), Zenica (50.28 ha) etc. Neglected vineyards were recorded in Mostar, on the total surface of 258.51 ha, whereas 203.52 ha of land under the class Agricultural lands with significant areas of natural vegetation was converted into transitional woodland (Osmaci (45.92 ha), Novi Grad (32.06 ha), Lukavac (30.17 ha) etc.). In addition, 121.35 ha of orchards became neglected land (all of it in Brčko District), as well as 14.05 ha of non-irrigated arable land (Modriča and Šamac), and 11.47 ha of the class Complex cultivation patterns (Srbać).

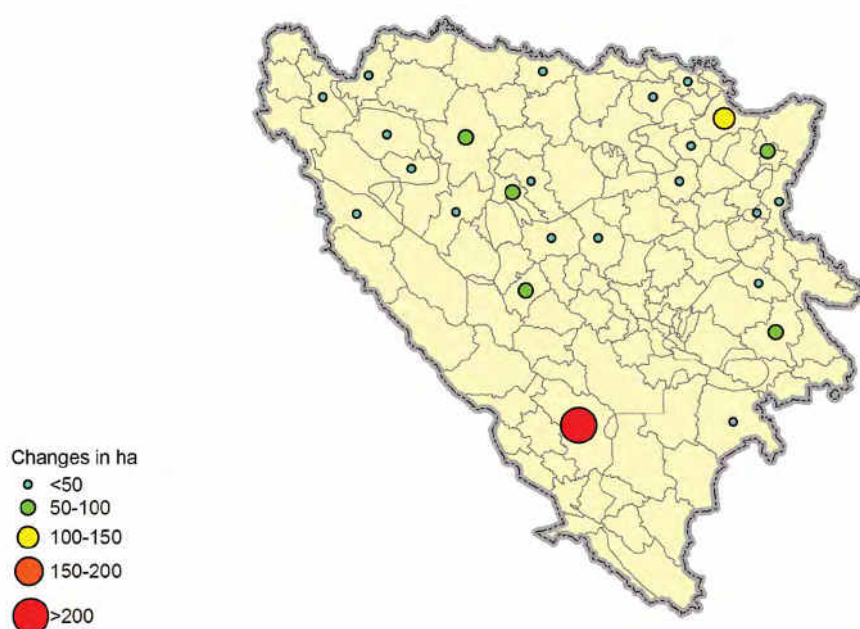


Figure 20:  
Transitional woodland –  
shrub areas (2000 – 2006)

### Losses of the forest land

Forest land is used also for construction of diverse infrastructural utilities and permanent and temporary losses of this resource are quite frequent. Analysis shows that, from 2000 to 2006, 946.42 ha of forest land was converted into a group category of Artificial surfaces, of which broad-leaved forests take up 521.97 ha, and the average annual loss of forest land accounts for 157.74 ha. The structure of the change of forest land use into the group category of Artificial surfaces is presented in Table 14. The biggest changes are related to an increase in the class Mineral extraction sites (435.41 ha or 46.10%) and Discontinued urban fabric (24.35% or 230.47 ha) and the smallest loss of 7.11 ha is related to the loss caused by construction of a sports-recreational surface.

Artificial surfaces –III level of classification	Decrease in forest land (ha)	%
Discontinued urban fabric	230.47	24.35
Industrial and commercial units	76.13	8.04
Mineral extraction sites	435.41	46.01
Landfills	63.53	6.71
Construction sites	133.77	14.13
Sports-recreational surfaces	7.11	0.75
<b>Total</b>	<b>946.42</b>	<b>100</b>

Table 14:  
Structure of forest land  
use change into artificial  
surfaces (2000 – 2006)

When it comes to geographical distribution, the greatest change of this kind was recorded in the following municipalities: Ilidža (140.99 ha), Čitluk (112.63 ha), Ljubuški (93.1 ha), Milići (64.12 ha) etc.

**Mineral extraction sites** were increased most in the following municipalities: Ilidža (64.56 ha), Milići (64.12 ha), Kakanj (47.77 ha), Jablanica (20.82 ha), Vareš (20.63 ha), Posušje (18.42 ha), Ljubuški (17.27 ha), Čitluk (17.26 ha) etc.

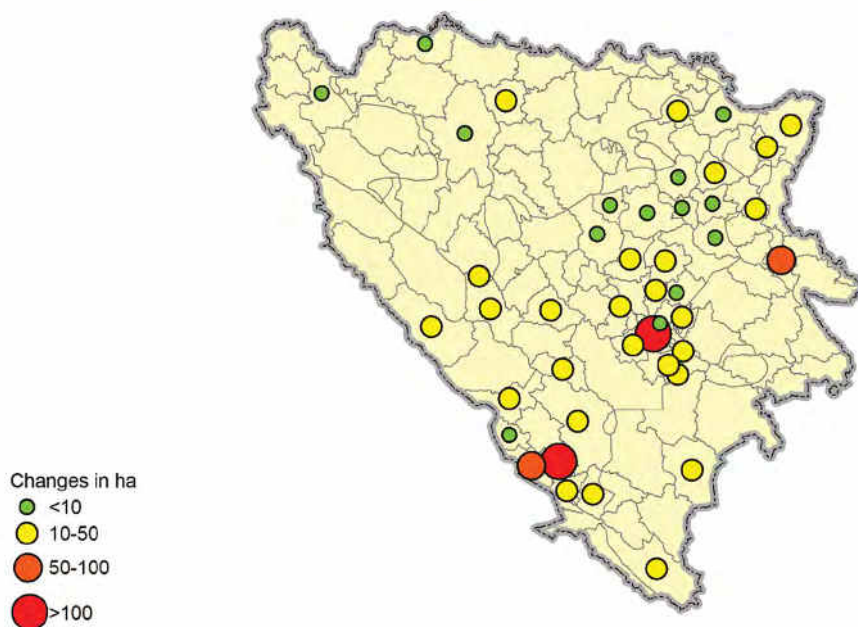
Usage of forest land for construction of **Discontinued urban fabric** was recorded in the following municipalities: Ilidža (52.96 ha), Ljubuški (37.05 ha), Mostar (26.69 ha), Kupres (21.38 ha) etc.

The largest areas under the class **Construction sites built on forest land** were identified in the areas of the following municipalities: Čitluk (55.80 ha), Ljubuški (19.11 ha), Osmaci (16.29 ha), Hadžići (11.75 ha), etc.

**Industrial and commercial units** constructed on account of forest land were recorded in the following municipalities: Čitluk (23.70 ha), Ilidža (19.80 ha), Ljubuški (19.67 ha), Gradačac (12.07 ha) etc.

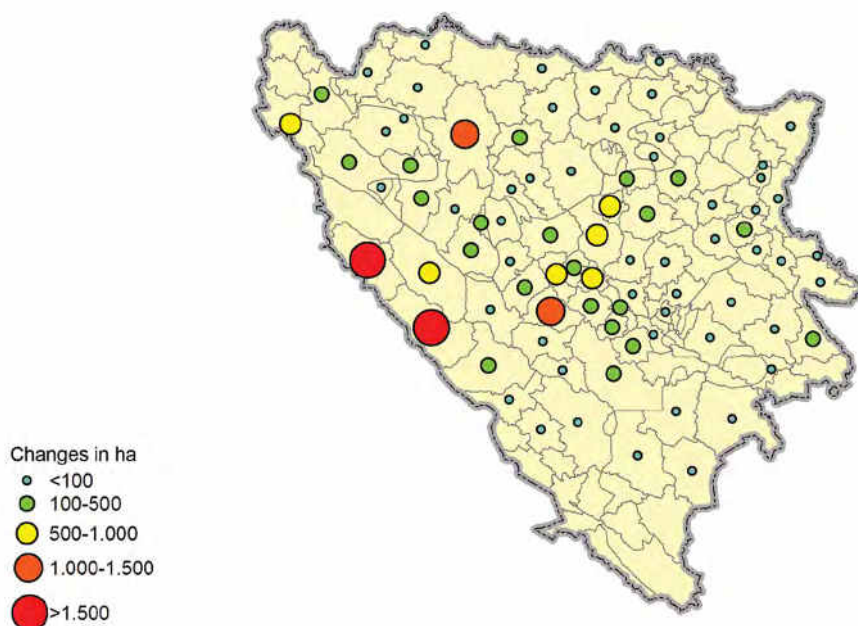
**Landfills** were expanded on the account of decrease in forest land in six municipalities: Tuzla (24.37 ha), Gacko (13.29 ha), Banovići (7.73 ha), Novi Grad Sarajevo (6.81 ha), Živinice (5.99 ha) and Zavidovići (5.34 ha).

*Figure 21:  
Areas of conversion of  
forest land into artificial  
surfaces (2000 – 2006.)*



In the context of forest land changes it is important to point out that 296.44 ha of forest land was converted into agricultural land and 18,566.18 ha into transitional woodland (out of that 15,475.18 ha of broad-leaved forest).

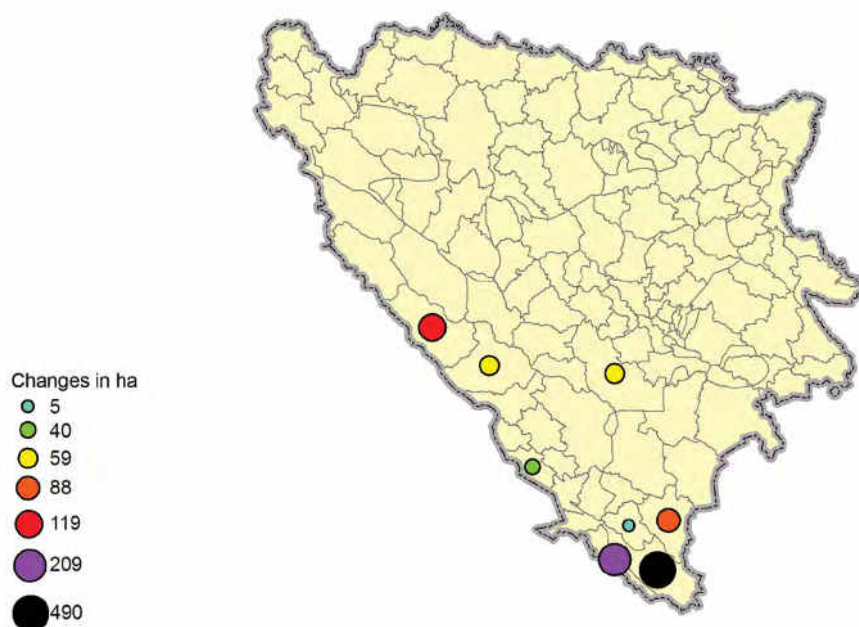
*Figure 22:  
Areas of conversion of  
broad-leaved, coniferous  
and mixed forest into  
transitional woodland -  
shrub (2000 – 2006)*



### Fires as a land degradation factor

Fires are a very common phenomenon in BiH and entail massive and incalculable damages (especially frequent and disastrous were **forest fires** that took place in 1999, 2000, 2003, and 2007). According to the mapped changes, 1,102.69 ha of forest land transitioned into the class Burnt Areas, that is, areas where the land has been put out of use temporarily. Direct damages from forest fires include loss of wood construction stocks, low vegetation and other forest products as well as costs of firefighting and post fire treatment of burnt

land. Indirect damages include the damages related to land degradation (in particular on limestone and ultra-basic rocks), all types of changes in habitats and loss of polyvalent functions of forests, and as such they are multiple times bigger than the direct damages, but are still not being calculated in our country.



**Figure 23:**  
Areas of transition of forest  
land into burnt areas (2000  
– 2006)

In BiH, 335 fires were recorded in 2009, covering the area of 2,406.60 ha, causing the damage in the amount of 1,712,330 KM<sup>64</sup>. According to the same source, the forest fire vulnerability level is shown in the Table 15, which indicates that the areas with the 3<sup>rd</sup> and the 4<sup>th</sup> level of vulnerability are much larger in the FBiH. In the process of planning of prevention and treatment measures, it is necessary to place the focus on areas at high risks of fires and carry out mapping thereof in order that the competent authorities (forest management companies, firefighting services) could react in a timely and appropriate manner in case of forest fires.

Entity	Forest fire danger levels				Total (ha)
	I	II	III	IV	
	Low forest fire danger	Moderate forest fire danger	High forest fire danger	Very high forest fire danger	
Federation of BiH	17.228	172.598	265.197	319.916	774.939
Republika Srpska	111.754	512.104	427.065	5.144	1,056.067
<b>Total</b>	<b>128.982</b>	<b>684.702</b>	<b>692.262</b>	<b>325.060</b>	<b>1.831.006</b>

**Table 15:**  
Level of forest fire danger  
(ha)

In accordance with the BiH Constitution and the Constitutions of the RS and the FBiH, as well as the Arbitrary Award on BD BiH, the competencies for natural resources management, including the land resources (that is, the development, conservation, utilization and protection from detrimental impact) rest with the Entities and BD respectively. In the Entities, land resources are within the competence of Entity Ministries of Agriculture, Water Management and Forestry, while in BD the competence is with the Government Department for Agriculture, Forestry and Water Management.

**At the level of BiH there is no system of monitoring the land use changes.** The CORINE Data may serve for this purpose. Given the fact that CORINE is implemented every five years, this source can be used but is not suitable for one-year reporting procedures. The existing data are of partial character, collected usually through various projects at municipality level. To this end, it is necessary to specifically emphasize the projects related to the development of a Land Use Value Map at the municipality level, establishing a system of monitoring the changes in the land area.



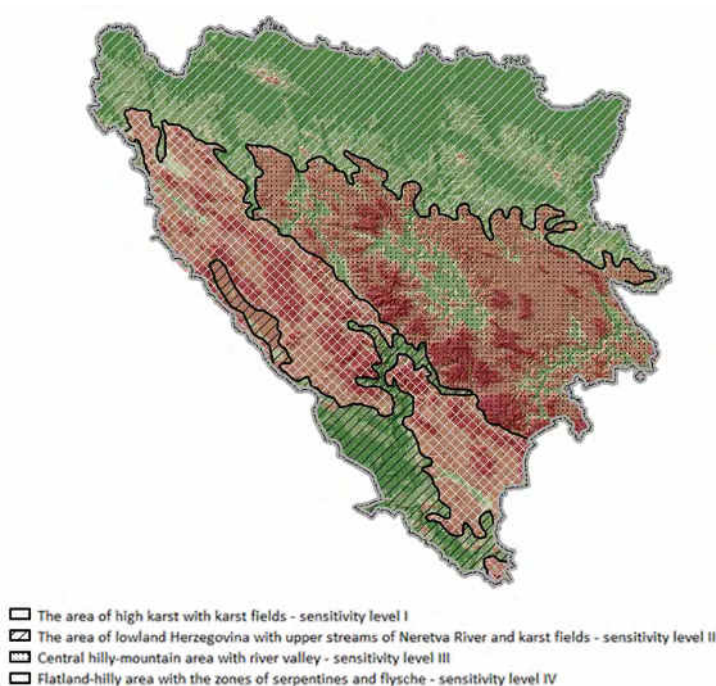
**INDICATOR: Land degradation level****Identification of high-risk areas affected by degradation and drought**

One of the AP objectives is maintaining the land degradation at zero level. That is the reason why it was important to select geo-morphological units of BiH, among which there are considerable differences and in which the soils are exposed to different or similar types of pressures, the intensity of which is not the same given the specific characteristics of the area. According to land degradation sensitivity level, focus is placed on the following geo-morphological units:

The area of high karst with karst fields;

- The area of lowland Herzegovina (including upper streams of the Neretva River and karst fields);
- Central hilly-mountain area with river valleys;
- Flatland-hilly area (including the zones of serpentines and flysches).

*Figure 24:  
Level of land sensitivity by  
geo-morphological units*



**1)** In terms of the state of the soil and land degradation processes, the **Area of high karst with karst fields** is categorized as belonging to the first level of sensitivity. This is a mountainous area above 800 m a.s.l., encompassing a considerable number of high mountains, of the so-called "Dinaric direction of stretching (NW-SE)" and with pronounced relief forms and slopes. The Dinaric region accounts for about 28,940 km<sup>2</sup> or 56.6% of the total surface of BiH, and is divided into the areas of external and internal Dinarides. The main characteristics of the Dinarides relief include deep river valleys and canyons, large karst fields, and mountain ranges from 1,000 to the highest mountain peak of Maglić (2,386 m above sea level)<sup>65</sup>. The following mountains are stretching from northwest direction, in the zone of external Dinarides: Plješevica, Dinara, Grmeč, Maglić, Čabulja, Prenj, Čvrstica, Velež, and then Viduša, Kamešnica, Vran and Ljubišnja which are of somewhat lower height distribution than the former ones and are more scattered and have more rounded peaks. Canyons of the Rivers Una, Sana, Vrbas, Pliva and Neretva are carved deeply in between these mountains, and there are also numerous karst fields scattered across the region, such as: Bosansko Petrovačko, Glamočko, Livanjsko, Dovanjsko – Šuičko, Kupreško, Gatačko, Nevesinjsko, and many karst plateaus. Given the conditions in which they form and the character of pedogenetic factors, all soils of this area are sensitive and vulnerable, either because they are shallow, or because they are in direct contact with the karst underground waters. Karst fields are closed karst valleys and look like green oases in the grey karst areas. Mainly shallow and very shallow soils are developed on the steep terrains of the surrounding mountains, and they are covered by pastures, shrub and degraded forests. In addition to that, they are exposed to severe erosion and

<sup>65</sup> Čičić, 2002.



to denudation processes. Activities in the higher areas have a direct impact on the state of soil in karst fields and ground waters. Karst fields are very sensitive and vulnerable ecosystems, on the one side due to the fact that they collect all materials arriving from shallow soils of the surrounding river basin area, and on the other, due to permanent flooding throughout the year. Specific attention should be paid to the issue of erosion and, to this effect, ensure sustainable management of these soils through application of good agricultural practices, economical use of forest resources, proper organization of grazing and improvement of conditions on pastures as well as by undertaking necessary prevention measures and practices aimed at ensuring adequate fire protection. It is also necessary to plan enlargement of protected areas, including various levels of protection depending on the level of sensitivity.

**2) Low Herzegovina Area (including the upper stream of the Neretva River and karst fields)** belongs to the area of *second level of sensitivity*. In terms of geomorphology, the area is also marked as Low, Mediterranean Herzegovina and encompasses the upper stream of the Neretva River, inlands up to Posušje, Stolac, Bileća and Livanjsko polje<sup>66</sup> which is, at the same time, the largest karst field in the world, and is situated on the transition toward high karst area. The whole region is cut through by mounts and hills and other relief forms the height of which vary from 500 to 700 m above sea level. It occupies about 10% of the BiH surface and is surrounded by the mountains Trtla, Viduša, and Ivan, and when it comes to karst fields on the upper terraces there are Mostarsko blato, Bejsko polje, Kočerinsko, Dabarsko, and some other smaller fields and plateaus. River and colluvial-deluvial deposits of Bijelo polje, Bišće polje and Hutovo blato can be found in the Neretva River canyon and in smaller fields in the Neretva River delta all the way down to Metkovići. At the very southern part of BiH, in the Trebišnjica River valley, there are two fields: Trebinjsko and Popovo polje. Also, karst erosion is also present here in addition to the other, above-mentioned karst phenomena. The fields are of a semi-closed or totally closed type, where hydrological regime is regulated by the capacity of sink zones to absorb precipitation surpluses in autumn-winter period. Droughts are frequent phenomena related to vegetation period, when water is most needed for plants, which has negative effects on agricultural production. On the other side, there is the problem of flooding and long periods of water retention from autumn till spring, which makes the situation even more difficult. Agricultural activities are relatively intensive, especially along the Neretva and Trebišnjica rivers and, as a result and due to irrigation practices, a sporadic and secondary salinization of soil takes place. Fields are sensitive ecosystems, open to external impacts and that is the reason why hydrology of the area is extremely important. Namely, karst is characterized by infrequent river network, concentrated mainly on karst fields, with numerous sinking rivers and low flows. Contamination risks of these waters are manifold, including residential settlements and industry (dot pollutants easy to control) traffic (line pollutants) and agriculture and tourism (surface pollutants difficult to control). Losses of productive soil due to the spreading of residential settlements and infrastructure, and degradation of land used for agricultural production, are also problems that should be resolved. Given the potential dynamic pressures, changes and processes, it is necessary to develop an inventory of the state of soil (content of all relevant substances, bio fertilizers, heavy metals, polycyclic aromatic hydrocarbons, pesticide residues, radionuclides, etc.), which should be the basis for designing mandatory measures of erosion and degradation control, application of good land treatment practices, land pooling or land consolidation, sustainable forest management and fire protection.

**3) Central hilly-mountain area with river valleys, third level of sensitivity.** This is the area of the northern border of karst, internal Dinarides, with the mountains Romanija and Javor, as well as Palaeozoic-age mountains such as Vranica, Bitonja, Bjelašnica, Jahorina, Treskavica, Visočica, Lelija, Zelengora, Maglić, northern slope. In the direction of Pannonia Plain the following mountains descend: Borja, Ozren, Konjuh, Javornik, Devetak, etc. When it comes to river valleys focus is placed on Sana, Vrbas, Bosna, sources of the Drina river, as well as valleys of Sarajevo, Zenica, Jajce, Donji Vakuf, Foča and Goražde, which are also transversal valleys. It should be pointed out that a large number of lakes is situated here as well, in particular on the mountain of Zelengora, where there are seven karst glacial lakes, four on Treskavica and one on Vranica. These lakes are also known colloquially as "mountain eyes" and have a specific value as natural phenomena. Geologically and geo-morphologically, this is a very complex region. Lower parts area is characterized by numerous watercourses along which fertile fluvial, fluvial-colluvial and colluvial soils could be found (like in the foothills of mounts closing the valleys) as well as vertisols on clay substrates. Depending on geological foundations and relief, pseudo-gley slope

<sup>66</sup> Ramsar area from 2008, [http://www.ramsar.org/cda/en/ramsarhome/main/ramsar/1\\_4000\\_0\\_\\_](http://www.ramsar.org/cda/en/ramsarhome/main/ramsar/1_4000_0__) (The Ramsar Convention on Wetlands)

soils occur on loam clay terraces above river valleys. The carbonate substrates contain unconsolidated soils prone to erosion such as regosols, rendzines, lothosols, black dirt and brown soils on limestone. Predominant on silicates are acid brown and pseudo-gley soils whereas eutric cambisols and gley can be found on magmatic rocks. The area is also rich in various ores but the land, and the overall area conditions, deteriorated due to exploitation, mining and construction of infrastructure. There are favourable conditions for livestock and fruit production but land use must be based on sustainable foundations and application of erosion protection measures, in line with the best practices in the field. In addition to that, it is necessary to initiate reclamation (remediation) of land degraded by exploitation of ores as well as to rehabilitation of abandoned industrial buildings and facilities. Due to the frequent flooding in the lowland parts of the terrain, the problems of potential contamination of watercourses are also very pronounced. Land contamination monitoring is one of the key priorities in this area.

**4) Lowland hilly area, including the zones of serpentines and flyche, fourth level of sensitivity.** This area is stretching from the southern edge of the Pannonian Plain, covers the Sava River lowland, the Punja and Lijevče polje up to the Drina River estuary, then the edge terrace of the Sava River that is sprawling toward the south and joins the younger mountainous ranges on the southern edge of the Pannonian basin (Kozara, Vučjak, Trebavac, and Majevisa). In addition to these, horst mountains Prosara and Motajica stretch along the Sava River. In between these mountains there are expanded river valleys and large areas of relatively flat lands such as: i) Sana and Prijedor Basin and terrains from Bosanski Novi up to Bosanska Dubica, as well as the area of Bosanska Krajina in the Una River Basin; ii) Lijevče polje – Nožičko-Srbačka ravan (plain); iii) Bosanski Brod – Derventa – Prnjavor; and iv) Brčanska posavina-Semberija. In younger tectonic plates there situated are Sprečko and Omarsko polje as well as a number of smaller fields of a fragmented relief. The zone of serpentines is characteristic of Ozren, Konjuh and other lower mountains while flyche is a feature of Majevisa, Trebovac, Vučjak and Kozara. In the river valleys of different span, particularly in Sava River valley but in broader tributaries as well (Una, Vrbas, Bosna, Drina), there is an almost flat Holocene terrace elevation, composed of multi-layered deposits (gravel, sand and clay materials) of very heterogeneous characteristics. Most fertile fluvial soils and different hydromorphic gley soils appear on them. Pleistocene terraces are dominating, built from deposits of non-carbonate acid Pleistocene clays on which stagnogley soils prevail, on which precipitation waters stagnate. This area is most important in BiH when it comes to cultivation of field crops, vegetables, industrial crops and fruit as well. Fruit production is especially developed on auto-morph soils of slightly wavy and hilly terrain soils but there are also favourable conditions for the development of vine, livestock and vegetable production. Agricultural production should be a priority and, in this context, soil/land protection measures should be designed including mandatory monitoring. As this area ends in an alluvial plain and terrace along the Sava River edge, it is under the greatest impact of pollutants and potential contamination. In other parts of the elevated relief and terraces it is necessary to apply erosion protection measures, proper treatment, increase the buffer capacity of acid soils, and protection from losses of fertile and productive soil. In addition, of importance are also surfaces that have been neglected due to war-time activities and, as a result, the fertile land is mostly under succession of dominant weed and forest plants.

## Erosion

One of the numerous definitions of erosion is that it is a general process or a group of processes whereby the materials of the Earth's crust are moved from one place to another by running water (including rainfall), waves and currents, glacier ice or wind, and include also gravitational processes as well (Gobin et al, 2003.). In addition to this general definition, erosion is also defined as a process leading toward destruction and removal, that is, loss of soil, induced by water and wind impact (Resulović et al, 2008; Gobin et al, 2003.). Erosion is caused by everything that moves: water, wind, vehicles, animals, and even glaciers. According to Šarić et al, 2003, it is considered as acceptable if the loss of land induced by erosion amounts to 5-7 tons per hectare. More than that is considered as extraordinarily unusual and indicates to the need of undertaking erosion prevention measures.

The main factors of water-induced erosion in BiH include precipitation, terrain sloping and wrongful use of soil. In addition to the quantity and distribution of rainfalls, of importance for erosion is also its intensity level, that is, the quantity per unit of time. With high precipitation intensity level (showers, downpours) soil is not able to absorb the entire quantity of water and, as a result, the surplus of water causes erosion, flood, etc.

Soils on slopes are susceptible to water erosion. The steeper and longer the slope, the greater the erosion. Erosion is particularly great if the slope lacks plant cover, if treated in a wrong manner, and if cultures, which do not protect soil properly, are cultivated in broad lines (broad-lined cropping). Wrong land use practices on slopes increase erosion much more in relation to proper land use on such terrains.

Hilly terrain and relatively huge quantity of precipitation in BiH mean that a significant proportion of the BiH territory is exposed to water-induced erosion. This phenomenon is most represented in central and southern parts of the country where annual quantity of precipitation amounts no less than 2,000 mm. As more than 80% of the terrain in BiH consists of slopes exceeding 13%, water-induced erosion is an increasingly present problem especially in surfaces that suffered from unplanned exploitation of forests and total deforestation of the terrain<sup>67</sup>. About two thirds of meadow land in BiH is exposed to erosion. Erosion is a reason behind large bare areas in our country (Šarić et al, 2003).



*Figure 25:  
Soil erosion*

In the northern part of BiH dominant are hydromorphic soils on flat and slightly wave-like terrains. In those areas erosion risk is on a much lower level from the point of view of potential erosion, but agricultural production is the basis of intensive development of erosion processes.

The central part of the country, which is characterized by hilly-mountainous landscapes, is covered to the largest extent by dystic cambisols, humus that overlies limestone and dolomites, as well as luvisols and diluvial soils, which are mainly covered by forests and pastures. The soils in the area are relatively protected from erosion as just a small proportion is under intensive cultivation processes.

The southern part of the country is dominated by shallow soils on limestone/dolomite substrata with extensive vegetation or without it and the risk of erosion is high. In addition, one should not forget the risks of eolic erosion. In addition to the sloped terrain and length of the slopes, climate changes are also of importance for the soil erosion in this area. The main characteristics of the climate in the area are dry and hot summers, causing drainage of soils that are extremely susceptible to erosion following the post-summer seasonal rainfalls. The soils in Herzegovina are at a very high risk of erosion due to specific mixture of pedogenetic factors (climate, substrata and vegetation). In order to resolve the problem of soil erosion in a timely manner it is necessary to define priority activities that, in this case, should be directed toward the development of a detailed map of erosion vulnerability for the entire country, and to identify priority and vulnerable areas, including the proposal of rehabilitation and monitoring measures.

**There are no official data on BiH level on the areas affected by erosion, and no erosion monitoring system is in place.** The current data are of partial character, usually collected at the municipality level through various project activities. To this end, it is necessary to point out the projects aimed at the development of a Land Use Value Map at the municipality level establishing a system of monitoring the changes in land area.

67 First National Report on the Implementation of UNCCD in BiH, 2007

**INDICATOR: Land under Sustainable Land Management (SLM)**

**Sustainable land management (SLM<sup>68</sup>)** can be defined as “the use of land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions” (UN Earth Summit, 1992).

SLM is crucial to minimizing land degradation, rehabilitating degraded areas and ensuring the optimal use of land resources for the benefit of present and future generations.

SLM is based on four common principles:

- Land-user-driven and participatory approaches;
- Integrated use of natural resources at ecosystem and farming systems levels;
- Multilevel and multi-stakeholder involvement; and
- Targeted policy and institutional support, including development of incentive mechanisms for SLM adoption and income generation at the local level.

SLM's application requires collaboration and partnership at all levels – land users, technical experts and policy-makers – to ensure that the causes of the degradation and corrective measures are properly identified, and that the policy and regulatory framework enable the adoption of the most appropriate management measures.

SLM is considered an imperative for sustainable development and plays a key role in harmonizing the complementary, yet historically conflicting goals of production and environment. Thus one of the most important aspects of SLM is this critical merger of agriculture and environment through twin objectives: i) maintaining long-term productivity of the ecosystem functions (land, water, biodiversity), and ii) increasing productivity (quality, quantity and diversity) of goods and services, particularly of safe and healthy food.

It is essential to understand drivers and causes of land degradation and to take into account issues of current and potential risks.

SLM encompasses other established approaches such as soil and water conservation, natural resources management, integrated ecosystem management and involves a holistic approach to achieving productive and healthy ecosystem by integrating social, economic, physical and biological needs and values.

It contributes to sustainable and rural development and requires great attention in national, entity and community level programmes and investments.

Thus, it needs an understanding of:

- The natural resource characteristics of individual ecosystems and ecosystem processes (climate, soils, water, plants and animals);
- The socio-economic and cultural characteristics of those who live in, and/or depend on the natural resources of individual ecosystems (population, household composition, cultural beliefs, livelihood strategies, income, education levels, etc.);
- The environmental functions and services provided by healthy ecosystems (watershed protection, maintenance of soil fertility, carbon sequestration, micro-climate amelioration, biodiversity preservation, etc.); and
- The myriad of constraints to, and opportunities for the sustainable utilisation of an ecosystem's natural resources to meet peoples' welfare and economic needs (e.g. for food, water, fuel, shelter, medicine, income, recreation).

SLM recognizes that people (human resources) and the natural resources on which they depend, either directly or indirectly, are inextricably linked. Rather than treating each in isolation, all ecosystem elements are considered together in order to obtain multiple ecological and socio-economic benefits.

68 <http://www.fao.org/nr/land/sustainable-land-management/en/>

This indicator includes several different types of data.

As regards **afforestation and forest management areas**, this is regulated at the Entity levels, within the Ministries of Agriculture, Water Management and Forestry. Forest farms and enterprises at different levels are responsible for implementation of policies and measures. National parks occupy the largest total space of all protected areas. The number of protected areas relative to the level of biodiversity and other natural values of BiH is very small. There are a total of 153 areas in BiH that enjoy some level of protection as of 1954. These usually include the protected landscapes, natural monuments or protected habitats (e.g. forest seed stands). However, classification and registration of these areas has not yet been harmonized with the new legislation. Status of decisions<sup>69</sup> on protection passed pursuant to the Law on Natural, Cultural and Historical Heritage of the SRBiH<sup>70</sup>, has not been resolved yet, therefore it cannot be considered that these areas are officially protected.

The onset of **organic agriculture** in the territory of BiH is linked to 2000, when the implementation of the first projects funded by international organizations commenced. The beginning in 2001 included 48 hectares, whereas in 2011, according to data from the certification companies, the total area under organic farming (certified and in conversion) covered 681 hectares of arable land. This area comprised 92 organic farms (36 certified and 56 in conversion), mainly producing grains, vegetables and medicinal herbs. Medicinal herbs and forest fruits with the organic certificate are collected from around 365,000 hectares. The statistics is still not monitoring the organic agricultural production. Furthermore, there is no register of organic producers, whereas the Law on Organic Production exists only in RS. Exports mainly relate to medicinal herbs, dried mushrooms and dried forest fruits, with the total value of exported organic products from BiH in 2011 (with the OK certificate) in the amount of EUR 2.34 million (internal data from the OK certification company). There is not a single one certified organic livestock-breeding farm in BiH, and only two such farms in FBiH are in the stage of applying.

From the perspective of use of **mineral fertilizers and pesticides**, some significant changes occurred as a consequence of war, and the process of transition, where agriculture is not a developmental priority. Changes in agriculture that occurred in BiH in the course of the past 20 years resulted in decreased use of mineral fertilizers. Thus, at the level of BiH, there are no reliable statistical records at one level of monitoring the inputs in agriculture; while, as a consequence of reduction in livestock, the application of organic fertilizers declined as well.

As for development of an efficient **irrigation system**, one should point out that its development is going on at the Entity level within the irrigation programme funded by the World Bank loan.

**Organic matter** plays a central role in maintaining the key soil functions and represents the essential, decisive factor in maintaining soil fertility and resistance to erosion. It ensures binding and buffering powers of soil thus contributing to reduced spreading of pollution from soil into water. Development of organic matter in soil is a slow process (much slower than reduction of organic matter quantity). This process is accelerated by constructive management techniques in agriculture such as conservation land cultivation including the sowing techniques on zero tillage surfaces, organic land cultivation, grass sown areas, surfaces under crops, covering soil with straw and manure, fertilizing with green beans, manure and compost, strip cropping and contour tillage. Most of these techniques have also proven efficient in prevention of erosion, increase in soil fertility and biodiversity. The agronomists consider that soils with less than 1.7% of organic matter are in a pre-degradation stage<sup>71</sup>.

Systematic monitoring of changes in the contents of the soil organic matter in the agricultural ecosystems in the territory of BiH has not been established to date. So far, there have been no projects which would in a planned and organized manner at the state level explore the impact of agriculture on changes in the contents of organic matter in the soil, as well as the impact of decline in organic matter in soil on agriculture. The

69 The International Union for Conservation of Nature (IUCN)

70 Official Gazette of the Socialist Republic of BiH, No 4/1965

71 Development of National Environment Monitoring System, 2005



assumption is that there is a decrease in the contents of organic matter, which for now cannot be quantified at the level of BiH, so this has to be included in soil monitoring in order to have this data available in the future.

**Soil compaction** is, potentially, the main threat to agricultural productivity. Deep soils with less than 25% of clay contents are most susceptible to subsoil compaction. Anthropogenic compaction of soil is a result of use of heavy machines, construction tools and vehicles under loads, heavier mechanical composition and increased compaction, and it is connected to factors of degradation of the structure with multiple consequences (disturbed water and air ratio in the zone of rhizosphere, weaker root growing, reduced infiltration of water, formation of a pan-layer, increased spreading of diseases, erosion, declined biological activity, etc.). Soil compaction is the main form of soil degradation in the EU, where it covers over 62 million hectares or 11 % of the total land surface in the analysed countries.

Soil compaction has not been systematically explored in BiH, therefore it is not possible to give an objective assessment of the situation at national level. **Nevertheless, we need to assume that this problem is displayed in agricultural soils where plants are regularly and intensely produced.** As stated above, exploration of soil compaction degree should be part of soils monitoring in BiH, in which case we would, in some foreseeable time, have exact measurements and data to serve for planning soil conservation measures.

As regards other data within this indicator (see Table 8.3.1), such data do not exist at any level in BiH, since we have yet to, or are in the process of filling in specific applications and meeting the requirements for EU accession in terms of environmental policy.

**At the level of BiH, there are no integrated official data on individual sub-indicators within this indicator.** A good portion of SLM indicators can be collected and monitored dynamically at the Entity levels, through Ministries (of agriculture and environment), as well as other supporting institutions competent for individual issues.

## 8.7 LESS IMPORTANT INDICATORS

### INDICATOR: Biodiversity

This indicator should be observed in integration and synergy between this Convention and the UN Convention on Biological Diversity. There are proposals for joint periodical reporting so as to better perceive the interaction of the impact of biodiversity status on soils and the impact of soils condition and its changes on biodiversity, regardless on the type of impacts.

As an important indicator of biodiversity in soils, there are increasing requests for monitoring of flora and fauna in them. This indicator is a very important for showing the dynamics of changes in soils and soil potential from the point of view of biological production.

**The biodiversity indicator should be observed from two levels: connection of biodiversity from the aspect of the UN Convention on Biological Diversity and the biodiversity of soil and life in it.**

Reporting on this issue within the UN Convention on Biological Diversity should subsume the soil condition and its impact on biodiversity. Parallel to this, within monitoring of terrestrial ecosystem at the level of BiH, we should as soon as possible expect development of indicators showing the potential and soil fertility for agricultural production, where this indicator will have an important place as an indicator of the soil ecosystem status.

## 8.8 ADDITIONAL INDICATORS IMPORTANT FOR BIH

### INDICATOR: Landslides

Heterogeneous geology of BiH is characterised by the existing sediments of various lithological features, metamorphic and magmatic rocks, whose properties give a general insight into tectonic deformations and physical and mechanical features significant for causing landslides. There are around 1,800 active landslides in BiH, of which 754 in the Federation BiH, over 1,000 in Republika Srpska and 43 in Brčko District BiH<sup>72</sup>. According to the same source, representative landslides in BiH are: Suljakovići-Maglaj, Mala Broda-Zenica, Bogatići-Trnovo, Čemerno-Gacko, Lopare, Zvornik and Banjaluka.



*Figure 26:  
Massive landslide in  
Bogatići (2010)<sup>73</sup>*

Landslide in Bogatići caused huge damage to the environment and buildings. Water flow of the river Željeznica was changed, the hydro-power plant was totally destroyed, as well as some buildings and a large forest area. Although this problem was localized in 2010, as stated in National State of the Environment Report in BiH, 2012, nothing has been done to recover this area and prevent future damages.

Depending on the climate conditions, BiH has more than 1,000 landslides annually, some of them old landslides that have reactivated, and some are new. These numbers have increased significantly in the past 20 years and it should be emphasised that landslides represent one of the priority environmental issues in BiH. In 2010, 30 landslides appeared in Banja Luka, 41 in Lopare, 50 in Zvornik. Sarajevo canton alone has 763 registered landslides, which is an enormous threat to human life and the environment. Geological properties of these areas are naturally suitable for landslides, thus the slightest human activity can cause great damages<sup>74</sup>.

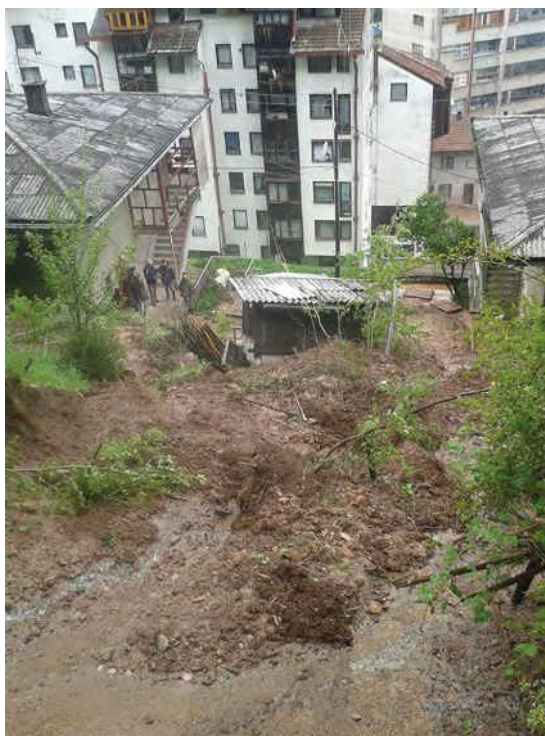
In mid-May 2014, large-scale flooding was caused by rainfalls that exceeded the record for the last 120 years. According to unofficial data, within 48 hours only (on 13<sup>th</sup> and 14<sup>th</sup> of May, 2014), rainfalls amounted to even 150 l/m<sup>3</sup> in some areas of BiH. Rivers Bosna, Drina, Sana, Sava, Vrbas and other rivers overflowed their banks. Orašje, Domaljevac, Šamac, Odžak, Brčko, Maglaj, Doboj, Derventa, Tuzla, Prijedor, Travnik, Janja, Bijeljina, Zenica, Živinice, Vareš, Zavidovići, Ključ, Banja Luka, Čelinac and many other towns and settlements were flooded. The area along the River Sava was endangered. Numerous landslides were activated and residential buildings destroyed. The official Report on the assessment - joint activities of three international organizations: European Union, World Bank and the United States, with participation of all government levels in BiH – is in drafting phase.

<sup>72</sup> Risk Assessments of Bosnia and Herzegovina regarding Natural or Other Disasters, 2011

<sup>73</sup> Taken over from <http://www.novosti.rs/vesti/planeta.300.html:306147-Kliziste-test-za-Bosnu>

<sup>74</sup> State of the Environment Report in BiH, 2012

*Figure 27:*  
*Landslide in Vareš (2014)*<sup>75</sup>



**Due to enormous economic and social consequences of landslides, it is necessary to develop detailed landslide hazard maps for the entire country, and identify priority and vulnerable areas as well as recovery measures.**

#### **INDICATOR: Contamination**

Soil is a collector of organic and inorganic chemicals originating from various sources and in different ways. Such loaded soil can become a secondary cause of contamination of other parts of the ecosystem, plants and air. To successfully protect from contamination, one needs to know the contamination sources, quantity and characteristics of the pollutants, and their harmful effects. The number and types of environmental pollutants are limitless, they continuously change and upgrade depending on the way of use of natural resources, applied technologies, urbanization, traffic, etc. The most significant forms of contamination in BiH will be elaborated below.

#### **Chemical and industrial soil contamination in BiH**

The basic soil contaminants are primarily agrochemicals (fertilizers and pesticides). Out of fertilizers, nitrogen fertilizers represent a big problem, which can cause loss and abating of nitrogen in a nitrate form that can have adverse effects on water pollution, but they are also very harmful for human and animal health if their intake in a food chain exceeds the allowed quantities. The greatest risk of contamination is unprofessional and uncontrolled use of pesticides. Generally, it can be stated that in the areas with intensive agricultural production there is a higher risk of soil contamination with pesticides relative to the areas with extensive agriculture. Corn growing regions are exposed to highest risk due to the excessive use of the herbicide "atrazine" in these areas, which has been banned in the past several years because of its toxicity. Consequences of soil contamination with pesticides reflect in harmful effects of the pesticides' residues in soil on growth and development of the next culture in crop rotation, narrowing of crop rotation, decline in biological diversity, accumulation in plant organs serving for human consumption, and also have adverse impact on microbiological soil activity. The pesticides' residues also wash out in deeper layers of soil and thus contaminate the underground water, which is often used in water supply as drinking water for population.

Soil is the final and most important recipient of heavy metals in terrestrial ecosystems. Not only that it accumulates the pollutants, but it also represents a buffer to control transmission of chemical elements and compounds in the atmosphere, hydrosphere

<sup>75</sup> Taken over from <http://www.novosti.rs/vesti/planeta.300.html:306147-Kliziste-test-za-Bosnu>

and living substance. Soil, however, has a limited capacity for retention of heavy metals. Getting close to or exceeding this capacity can cause a series of negative effects in some ecosystems, including the increased mobility in the soil. In the system soil – plants – animals, it is best not to exceed this capacity, for it leads to bio-toxicity.

In regions with developed industry, a particular risk is posed by chemical industry waste and wastes from processing ores. There are accumulations of combustion residues of various combustible substances and other residues of incomplete combustion in the vicinity of power plants. Ash-fills represent a particular problem, which often cover large soil surfaces close to power plants.



*Figure 28:  
Slag and ash landfill  
Divkovići – Tuzla (photo  
by: H. Čustović, 2012)*

Potentially the largest and the most vulnerable areas are located in the central and north-eastern part of BiH (Tuzla and Zenica Cantons), and on surfaces of all urban agglomerations due to high density of industries, mining, etc. In BiH, coal is exploited at the area of 18,000 ha, whereas the area for disposal of waste materials covers almost 6,000 ha<sup>76</sup>. The largest mining areas are in the Municipalities Tuzla, Ugljevik, Gacko, Kakanj, Stanari and Prijedor. Coal mines in BiH are: Banovići, Đurđevik, Kakanj, Zenica, Breza, Bila, Kreka, Sanski Most, Livno, Gračanica, G. Vakuf/Uskoplje, Ugljevik, Miljevina, Gacko and Stanari. There are presently nine metal and non-metal mines: Veovača, Olovo, Bužim, Vareš, Jajce, Čitluk, Posušje, Široki Brijeg and Bosanska Krupa<sup>77</sup>.

Dump sites of bulky waste are usually created in the vicinity of major urban settlements: furniture parts, household appliances, cars, packaging materials, demolition debris, construction and demolition inert materials or construction site remains – glass, ceramics, plastic. There are also significant wastes after water purification, sewage and other effusions, gases, solid waste resulting from mechanical filtering such as sediment and sludge. Municipal waste disposal sites are mainly of an open type. The National State of the Environment Report in BiH, 2012, states that the number of registered waste disposal sites in function in 2010 was the following: 49 in FBiH, 41 in RS, 91 in BD. Also, it is estimated that around 1,100 illegal (“wild”) dumpsites were still in use. Although we are aware of the negative impact of all forms of contamination on the environment and soils in BiH, there have been only a few studies to date. Nevertheless, it is encouraging that, in the territory of FBiH, the Federal Institute for Agropedology established monitoring of contamination levels in soil with heavy metals and organic pollutants.

Soil monitoring in the Federation BiH covers 260 locations. The focus of research in FBiH is on the contents of the following heavy metals in soil: lead (Pb), cadmium (Cd), zinc (Zn), copper (Cu), nickel (Ni), chrome (Cr), cobalt (Co), manganese (Mn). Monitoring was conducted in the period 2008 – 2011, so that the research was carried out in 2008, 2009 and 2010 with monitoring of the main chemical soil properties, total contents of

<sup>76</sup> Energy Sector Study in BiH, 2008

<sup>77</sup> State of the Environment Report BiH, 2012

heavy metal forms, and contents of organic pollutants. It is noted that out of the total of 260 tested locations there are 26 with the established high contents of heavy metals whose values several times exceed the limited value level and thus can be characterized as contaminated areas. It is considered that a significant portion of this contamination is of lithological origin, which will be further explored in the coming period. Based on the conducted analyses, it is established that on the studied locations there was not any over the limit contamination with organic pollutants (PAHs) as compared to the limit value of 2.0 mg/kg of soil, in the course of any of the years of testing<sup>78</sup>.

In RS, control of the contents of organic and inorganic toxic substances in soil so far has not been regulated in an organized way in the system of soil fertility control. One of the reasons for such a situation was the absence of an institution with adequate staffing and technical equipment for a high quality performance of this kind of research and its introduction into practice. In the course of the past several years the Agricultural Institute of RS has made some significant investments in staff training and equipping with instruments to be able to respond to the issues related to control of contents of organic and inorganic toxic substances in soil (pesticides, PCBs and heavy metals). It can be concluded from the aforementioned that there are still no concrete data in RS on the state of organic and inorganic hazardous substances in soil, so the implemented measures in this regard are mainly of preventive nature<sup>79</sup>. Studies of the Faculty of Agriculture in Banja Luka on the 140 soil samples from the north-western part of RS in order to determine the contents of heavy metals – nickel (Ni), zinc (Zn), copper (Cu) and lead (Pb) show that the total contents of nickel in 78.50% of the samples exceeded the maximum permitted limit of 50 mg/kg; the total contents of zinc in 22.86% of the samples exceeded the maximum permitted limit of 100 mg/kg; whereas the total contents of copper and lead exceeded the maximum limit in a small number of the samples.

**With regard to soil contamination with agrochemicals, heavy metals and organic pollutants, there is no data collected for the entire BiH. There is monitoring of heavy metal and organic pollutants contents in the FBiH, whereas in RS and BD there are no such activities but only partial studies.**

### Landmine contamination

The level of landmine and other residual explosive materials contamination represents a special problem for BiH. Unexploded mines placed in the range of two to five kilometres on both sides of the demarcation line deserve special attention in consideration of this issue. However, data on the number of mines and minefields in BiH are neither reliable nor complete. In the database of the Mine Action Centre BiH there are 19,000 registered reports on minefields. It is estimated that they represent only around 50-60% of their realistic number. According to MAC's data, the current size of mine suspected area is 1,262.82 km<sup>2</sup> or 2.5% relative to the total country surface: 938.90 km<sup>2</sup> in FBiH, 298.89 km<sup>2</sup> in RS, and 25.03 km<sup>2</sup> in BD<sup>80</sup>. Given the regular daily demining activities, the landmine contaminated area is decreasing. However, considering the large-scale flooding in May 2014, it is estimated that landmine fields were shifted but there are no official data yet.

<sup>78</sup> Monitoring of Soil in the Federation BiH in 2008, 2009 and 2010 year, 2011

<sup>79</sup> Basis of protection, use and regulation of agricultural land of Republika Srpska as a component of the process of planning the use of land, 2011

<sup>80</sup> Mine Action BiH Operational Plan for 2013, 2013



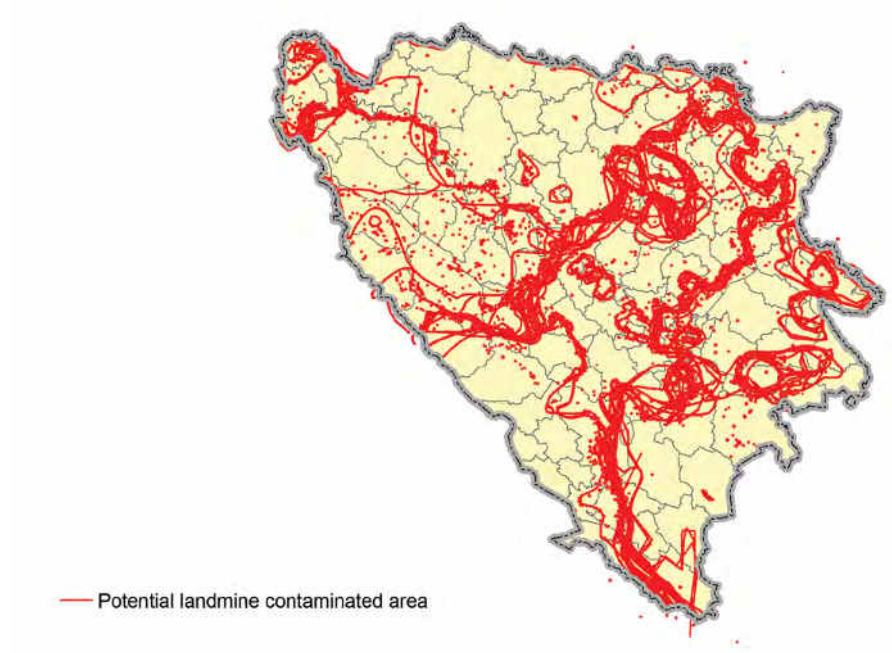


Figure 29:  
Potential landmine  
contaminated areas<sup>81</sup>

81 Mine Action BiH Operational Plan for 2013, 2013

## 9 ACTIVITIES OF LAND DEGRADATION COMBATING IN BOSNIA AND HERZEGOVINA





## 9.1 STRATEGIC AND OPERATIONAL OBJECTIVES OF AP

According to the main objectives, the Strategic Plan guides the UNCCD Parties to address in their national action plans the impact of land degradation on social and economic processes of each individual country, with development of adequate institutional capacities and legislation, promotion and awareness raising and development of education and science, establishment of adequate sector-based policies, public involvement in all important decision making processes, as well as creation of the needed synergy with other land degradation relevant Conventions. To this end, we can identify the following unavoidable components:

- **Capacity building through strengthening legislation, institutions and the land management system**
  - Based on National Capacity Self-Assessment (NCSA)
  - Strengthening of the existing institutions and implementation of the existing regulations, as well as establishment of new institutions and development of new regulations
  - The need to harmonize national legislation with the relevant international Conventions, protocols and agreements is emphasised here (“pakta sunt servanda”);
- **Creating a policy framework for functional linkage between desertification/land degradation and drought**
  - With relevant sectors such as: urban development and spatial planning; environmental and biodiversity protection; climate change; agriculture and rural development; forestry; energy generation; mining; with adequate integration into development and investment plans and policies
- **Promoting land degradation issues, raising public awareness and developing education, namely educational curricula in this regard**
- **Land monitoring in BiH with all the indicators important for specific areas**
  - development of a single database on land accessible to everyone
- **Science, technology and knowledge, as important factors to combat land degradation**
  - adaptation to climate changes and mitigation of their effects
  - In addition to sophisticated achievements, it is important to point out the use of traditional knowledge and practice that can help in mitigating land degradation
- **The issue of financing and technology transfer**
  - where each developing (underdeveloped) country, along with mobilization of its own resources, can rely on international assistance, as well as bilateral exchange between developed countries, as well as through the funds (GEF, etc.)

Furthermore, each country Party to the UNCCD has its own specific predispositions that significantly affect the development of the national action plan. Here we particularly imply the following: (1) constitutional and legal system, the existing institutions, adopted legislation and strategic and planning documents; (2) natural, social and economic characteristics; (3) education system and organization of scientific and professional institutions; (4) level of civil society organization (NGO), public awareness issues, etc.

Based on the conducted analysis, defined present situation of the land area in BiH, and after identification of the areas affected by degradation and drought, particularly highly vulnerable areas, the following general objective of AP is defined:

**To combat land degradation and mitigate the effects of drought by implementation of preventive measures in the high risk areas, and recover degraded land by applying melioration and protection measures**

According to the general objective, we defined the following strategic operational objectives (priority actions):

<b>Strategic objective 1: Improvement of the legal framework in order to protect land resources and sustainable land management</b>
<b>Operational objective 1.1.</b> To adopt regulations and plans pertaining to land protection from degradation
<b>Operational objective 1.2.</b> To ensure implementation of the adopted regulations, strategic documents and international commitments
<b>Operational objective 1.3.</b> To harmonize the existing regulations with the EU and UN legislation
<b>Strategic objective 2: Efficient institutions and administration able to respond to the requirements of sustainable land management</b>
<b>Operational objective 2.1.</b> To strengthen and reform institutions dealing with land issues
<b>Operational objective 2.2.</b> To strengthen cross-sectoral and institutional cooperation
<b>Strategic objective 3: Improvement and implementation of melioration measures, remediation and sustainable land management in BiH</b>
<b>Operational objective 3.1.</b> To develop sustainable monitoring systems and establish adequate data bases
<b>Operational objective 3.2.</b> To protect land and recover the function of degraded land
<b>Operational objective 3.3.</b> To adopt strategic documents pertaining to land protection and rehabilitation from degradation
<b>Strategic objective 4: Public awareness raising and the role of education in combating land degradation and the effects of drought</b>
<b>Operational objective 4.1.</b> To improve collaboration between scientific and professional institutions and transboundary cooperation
<b>Operational objective 4.2</b> Public awareness raising and the role of education

The abovementioned strategic and operational objectives of the AP are harmonized with main commitments, directions and objectives of UNCCD, that is, with objectives of UNCCD Strategy (Table 16). Strategic objective 3 of BiH AP, with its operational objectives and proposed measures, will contribute to the improvement of living conditions of affected population (UNCCD Strategy, Strategic objective 1). As regards strategic and operational objectives and measures, the focus is on the improvement of legal framework and establishment of efficient institutions responsible for sustainable land management, which will directly contribute to the improvement of conditions of affected ecosystems (UNCCD Strategy, Strategic objective 2), as well as the improvement of living conditions of affected population. Implementation of measures and operational objectives of the AP will contribute, at global level, to the improvement of living conditions of population in rural and urban areas, environmental protection and creation of conditions for a humane life, which is in line with Strategic objective 3 of the Convention titled Generate global benefits through effective implementation of UNCCD. Implementation of Strategic objective 4 of the AP will contribute to establishment and strengthening of partnerships between different stakeholders operating in the field sustainable land management. Special emphasis is on the strengthening of cooperation between local institutions, but also on transboundary cooperation between institutions and stakeholders (UNCCD Strategy, Strategic objective 4).

Table 16:  
UNCCD Strategic and  
Operational objectives

<b>Strategic objective 1:</b> To improve the living conditions of affected populations
<b>Strategic objective 2:</b> To improve the condition of affected ecosystems
<b>Strategic objective 3:</b> To generate global benefits through effective implementation of the UNCCD
<b>Strategic objective 4:</b> To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors
<b>Operational objective 1:</b> Advocacy, awareness raising and education
<b>Operational objective 2:</b> Policy framework
<b>Operational objective 3:</b> Science, technology and knowledge
<b>Operational objective 4:</b> Capacity-building
<b>Operational objective 5:</b> Financing and technology transfer

Strategic and operational objectives, and measures (projects) presented below should be adapted to specific requirements of priority areas. For smoother implementation of planned activities, it is necessary to define and apply a special set of measures and activities for the high-risk and affected areas other than those applied in areas not affected or less affected by these problems. Annex 6 presents the projects that are currently being implemented in BiH and that contribute to achievement of the AP objectives.

The below stated measures (projects) should be implemented, to a large extent, by 2018 when the UNCCD Strategy will expire, provided that some program objectives and measures will be continuously implemented for a prolonged period of time, particularly when it comes to monitoring and reporting requirements. After this period, the BiH AP will be harmonized with future objectives and commitments of the UNCCD, along with a breakdown of the AP implementation by then.

In addition to regular annual reporting to the UNCCD, the objectives set the BiH AP will also be revised, which should contribute to harmonization with the actual needs and situation in the field. Furthermore, we should expect unplanned events like disastrous flooding that struck BiH in May 2014. Consideration of these issues is an imperative, primarily at the level of the National Coordination Board (NCB), which should take the leading and active role in fulfilment of the AP strategic objectives. Considering that this coordination body is composed of representatives of the most relevant public, political and scientific milieu, its authority toward official institutions is unquestionable. Such approach enables better integration of the set strategic objectives of BiH AP into strategic development objectives of the state and Entities. This approach also implies measures for prevention and adaptation to emerging changes which are expected become more vigorous, to facilitate a more efficient harmonization with other Conventions and international obligations in terms of sustainable land management and other environmental aspects. Establishment of the NCB should be agreed upon between all relevant institutions and levels, and harmonized with relevant Entity regulations and recommendations.

The NCB has a function of a catalyst in drafting, implementation and evaluation of action programs, priorities and projects in BiH. Its task includes, inter alia, the support to the National Focal Point. The Board's composition is of the key importance. In addition to National Focal Point, the Board should, in addition to representatives of the line Ministries, also include the local community and NGO sector in order to ensure transparency in fulfilment of the Board's tasks.

The NCB shall have the following tasks:

- In consultations with local community, define measures and participants to contribute to the implementation of measures, set objectives to the satisfaction of donors, governmental and nongovernmental sectors, and local community.
- To analyse the existing limitations, needs and resources that can effect development, implementation and sustainability of the project. During the implementation of projects, it is important to define practical measures, eliminate duplication and promote application of results.
- The Board shall play the role of a facilitator in planning the activities and projects on the basis of flexible and interactive criteria, in order to ensure broad participation of population in the affected zones and minimize adverse effects. Also, the Board shall define the needs for financial and technical cooperation and shall establish the list of priorities for implementation.
- The Board shall set relevant indicators that are measurable and easily checked in order to better assess and evaluate projects and fulfil set objectives of the AP.
- The Board's task is to monitor and promote the AP implementation.
- To prepare reports on the AP achieved progress.



## STRATEGIC OBJECTIVE 1: IMPROVEMENT OF THE LEGAL FRAMEWORK IN ORDER TO PROTECT LAND RESOURCES AND SUSTAINABLE LAND MANAGEMENT

Operational objective 1.1. To adopt regulations and plans pertaining to land protection from degradation

Activity 1.1.1. Adoption of regulations on good agricultural practice (Code of Good Agricultural Practice)	
<b>Activity Description</b>	<p>Code of Good Agricultural Practice provides minimum standards for farming. The Codes explain, inter alia, why and how an agricultural profile should be selected according to the area-specific soil and climate conditions; land degradation should be reduced while the earlier degraded soil has to recover gradually; soil fertility should be maintained, etc.</p> <p>Regulations pertaining to good agricultural practice are developed by the state institutions, NGOs and private sector. They are in line with the needs of producers, specific requests of consumers and environmental capacities. In many cases the international and national rules of good agricultural practice are amended and adjusted to the local needs within the framework of specific agro-ecological systems.</p> <p>The producers are not sufficiently aware of environmental protection and sustainable production. On the other hand, the EU accession requires harmonisation and adoption of a great number of laws and regulations. Thus, the adoption of legislation on good agricultural practice is one of the priorities.</p>
<b>Responsible for implementation</b>	MoFTER BiH – Administration of BiH for Plant Health Protection /Entity Ministries in charge of agriculture, relevant service (Department) in BD BiH, Entity ministries in charge of environment, and Services of BD BiH Government in charge of agriculture and environment
<b>Sources of financing</b>	State/entity budgets, international projects
Activity 1.1.2. Adoption of regulations on the treatment and application of biodegradable waste in agriculture	
<b>Activity Description</b>	<p>Animal waste and other non-hazardous materials that do not pose high risk can be used to improve agricultural activities, if used in a way that is not harmful to human health or causing damage to the environment. Biodegradable waste can be used in agriculture only after being composted, namely biodegraded to the level where the decomposed substance can be used in open, agricultural surfaces without disrupting the appearance, quality of the environment, or human health. Composting has to be performed in a way not to threaten the soil quality, surface and underground water, and human and animal health.</p> <p>The regulations should establish the types of animal waste and other non-hazardous substances that can be used for agricultural purposes, conditions under which they can be used, methods of disposal and types of animal wastes and other substances whose use in agriculture is prohibited. This would prevent or reduce hazardous effects of waste on human health and the environment. Furthermore, the EU accession requires the harmonisation and adoption of a great number of laws and regulations.</p>
<b>Responsible for implementation</b>	MoFTER BiH/Entity Ministries in charge of agriculture, relevant service (Department) in BD BiH
<b>Sources of financing</b>	State/entity budgets, international projects

Operational objective 1.2. To ensure implementation of the adopted regulations, strategic documents and international commitments

<b>Activity 1.2.1. Ensure conditions for testing and introducing individual indicators from the aspect of monitoring the state of the terrestrial ecosystems in the monitoring system</b>	
<b>Activity Description</b>	The state of the land resources and the environment is monitored based on the defined land degradation indicators presented in this document. The indicators will be set on a differentiated basis, depending on sensitivity and specific features of regions presented in this document. The analysis showed that most indicators are not monitored in BiH, namely that there is no monitoring system with developed indicators. Data is usually partial, sometimes of doubtful quality, collected mainly by the previously implemented projects. Given the great number of indicators, they first need to be tested to determine how relevant they are for BiH, and then introduce the system of continuous monitoring. We need to ensure regular sources of financing for these activities. The developed indicators are necessary both from the aspect of establishing the state of land resources, defining the policies and measures, and from the aspect of the reporting commitments.
<b>Responsible for implementation</b>	MoFTER BiH / competent Ministries at Entity level, relevant service in BD BiH
<b>Sources of financing</b>	State/entity budgets, GEF, international projects
<b>Activity 1.2.2. Preparation of regular reports on AP implementation in BiH to the UNCCD Secretariat</b>	
<b>Activity Description</b>	As a Party to UNCCD, BiH is obligated to submit regular annual reports in accordance with the required reporting template.
<b>Responsible for implementation</b>	MoFTER BiH/Entity Ministries of Agriculture and Environment, competent bodies of Brčko District of BiH
<b>Sources of financing</b>	State/entity budgets, GEF
<b>Activity 1.2.3. Ensure conditions for implementation of the adopted strategic documents</b>	
<b>Activity Description</b>	There are numerous adopted strategies and strategic documents in BiH. In order to implement them, we have to ensure necessary conditions, primarily political will for their implementation, close collaboration and coordination among all participants, particularly strong state level coordination, as well as financial sources for implementation of the identified activities. Strong, well trained, and properly equipped administration at all levels is the imperative for enforcement and implementation of the adopted strategic documents. Ensure that all strategic documents related to environmental protection also include the issue of land protection and combating land degradation and drought.
<b>Responsible for implementation</b>	Parliament of BiH, entity governments, competent ministries at all levels
<b>Sources of financing</b>	State/entity/BD budgets, EU funds, GEF
<b>Activity 1.2.4. Ensure conditions for more efficient enforcement of the existing regulations pertaining to land resources, as well as other regulations effecting land at all levels</b>	
<b>Activity Description</b>	In order to ensure the enforcement of the existing regulations directly or indirectly effecting land, we primarily need to harmonise regulations (where applicable) among different administrative levels, which are often not harmonised. It is also necessary to strengthen the inspection services and enhance control to prevent misuse of any kind. We should, in this respect, particularly emphasise the need to ensure regular financing of this activity and capacity-building. Strong, well trained, and properly equipped administration at all levels is the imperative for enforcement and implementation of the existing regulations.
<b>Responsible for implementation</b>	Parliament of BiH, entity governments, competent ministries at all levels
<b>Sources of financing</b>	State/entity/BD budgets, EU funds, GEF

Operational objective 1.3. To harmonise the existing regulations with the EU and UN legislation

<b>Activity 1.3.1. Harmonisation of the existing land-related and environmental regulations with the relevant EU and UN legislation</b>	
<b>Activity Description</b>	In the process of the European integration, harmonisation of legislation with EU legislation is the most complex and time-consuming challenge. The EU environmental acquis contains over 200 key pieces of legislation that cover both horizontal (cross-sectoral) and sector-based legislation (quality of air, waste management, quality of water, environmental protection, control of industrial pollution and risk management, chemicals, climate change, protection from noise, and civil protection). Harmonisation with the EU acquis requires significant investments, and we should not forget the need for investments in terms of alignment with relevant UN regulations too. Strong and well-equipped administration is the imperative for transposition and implementation of the EU acquis and all other regulations.
<b>Responsible for implementation</b>	MoFTER BiH / DEI BiH / competent Entity Ministries
<b>Sources of financing</b>	State/entity/BD budgets, EU funds, GEF

## **STRATEGIC OBJECTIVE 2. EFFICIENT INSTITUTIONS AND ADMINISTRATION ABLE TO RESPOND TO THE REQUIREMENTS OF SUSTAINABLE LAND MANAGEMENT**

Operational objective 2.1. To strengthen and reform institutions dealing with land issues

<b>Activity 2.1.1. Strengthen inspection services in order to enhance supervision of land protection in all areas</b>	
<b>Activity Description</b>	One of the BiH strategic objectives is to strengthen the position and capability of inspection bodies responsible for control of compliance with legal regulations. There is a great need, inter alia, for immediate actions aimed at upgrading knowledge of the inspectors, i.e., capacity-building of the inspection services in general, in order to enhance control over land protection. It is also necessary to develop a common information exchange network.
<b>Responsible for implementation</b>	MoFTER BiH/ competent Entity and Cantonal Ministries, relevant services in BD BiH, Entity and BD BiH Administrations for inspection issues
<b>Sources of financing</b>	Budgets of the Entities, Cantons and BD BiH, EU, international projects
<b>Activity 2.1.2. Establish Sector for land protection from degradation and economic instruments for land use on the principle "consumer pays" in the Environmental Protection Funds</b>	
<b>Activity Description</b>	There are two Funds in BiH: the Environmental Protection Fund of FBiH and the Environmental Protection and Energy Efficiency Fund of RS. Given the activities and structure of the Funds, there is a need to establish a department which would be responsible for land issues and land degradation protection. It is also necessary to develop economic instruments for land use on the principle "consumer pays"
<b>Responsible for implementation</b>	Entity environmental ministries
<b>Sources of financing</b>	Entity Environmental protection Funds

Activity 2.1.3. Strengthening professional capacities of employees in the relevant institutions in accordance with the ESD (Education for Sustainable Development)	
<b>Activity Description</b>	ESD (Education for Sustainable Development) means including key sustainable development issues into teaching and learning, such as climate change, poverty alleviation, biodiversity, and in our case, land protection too. For relevant institutions in BiH to have the required human resources able to support the activities planned in AP, they need to understand the purpose and importance of land conservation, to be able to react timely and to provide continued contribution.
<b>Responsible for implementation</b>	Environmental protection institutions at all government levels in BiH
<b>Sources of financing</b>	State budget, budgets of the Entities, Cantons and BD, EU funds, international projects

Operational objective 2.2. To strengthen cross-sectoral and institutional cooperation

Activity 2.2.1. Mutual cooperation on implementation of all Conventions	
<b>Activity Description</b>	In 2002, the Council of Ministers of BiH adopted a new institutional and organizational structure for environmental management and coordination of implementation of the international environmental agreements ratified by BiH, as well as development of GEF programme for 6 key UN Conventions in BiH. However, there have been very few activities so far to implement the commitments undertaken by signing the Conventions – the main reason is believed to be lack of capacities. A successful implementation of the Convention and the complexity of the sectors, require mutual cooperation and synergy of all actors involved in implementation of the Conventions. It is also necessary to ensure information sharing and data exchange, which is frequently very poor.
<b>Responsible for implementation</b>	Competent Ministries at all levels
<b>Sources of financing</b>	Budgets of the state, entities, cantons and BD BiH

### STRATEGIC OBJECTIVE 3. IMPROVEMENT AND IMPLEMENTATION OF MELIORATION MEASURES, REMEDIATION AND SUSTAINABLE LAND MANAGEMENT IN BiH

Operational objective 3.1. To improve living conditions of population in vulnerable and affected areas

Activity 3.1.1. Address the problem of mine contaminated land	
<b>Activity Description</b>	BiH is faced with the issue of landmines as one of the most serious consequences of war activities in this region, and belongs to numerous countries in the world with high environmental UXO and mine contamination. Mine contamination causes a series of developmental, environmental and social disturbances, as well as population safety in the areas affected by war activities. Large agricultural land surfaces, forest complexes, border belts and parts along riversides are inaccessible due to mine contamination or suspected contamination.

	According to data from MAC, the current mine suspect area covers 2.5% of the total country size. This indicator unequivocally shows the danger that a great number of inhabitants is exposed to on a daily basis. The largest portion of the mine affected areas covers agricultural and forest land. This problem is most pronounced at the territory following the entity border. To address the mine problem permanently and put these areas timely back into their function, the mine clearance activities have to be carried out continuously in cooperation with the competent ministries and other relevant institutions. Demining priority should be given to the areas of importance from the security, socio-economic and environmental aspects.
<b>Responsible for implementation</b>	BH MAC, Ministry of Civil Affairs BiH, relevant Entity institutions and Services in BD
<b>Sources of financing</b>	International Trust Funds, budgets of the Entities and Entity Environmental Protection Funds, EU funds, international projects
<b>Activity 3.1.2.</b>	<b>Develop waste management plans, particularly at the local community levels</b>
<b>Activity Description</b>	Local communities in BiH have mainly adopted their local environmental action plans, whose priority projects and planned activities are most usually implemented according to the budgets. An adequate and environmentally friendly system for waste disposal is the need of the majority of local communities in BiH. This activity will significantly contribute to reduction of land contamination and improving the living conditions of local population. Development and adoption of the waste management plans at the local community level should be a priority in the coming period, and the line Ministries, in collaboration with local communities, should initiate development of these plans.
<b>Responsible for implementation</b>	Responsible municipal bodies, relevant scientific and professional institutions
<b>Sources of financing</b>	Competent Ministries, Entity Environmental Protection Funds, EU funds, international projects
<b>Activity 3.1.3</b>	<b>Remediation and removal of illegal dump sites at local community level</b>
<b>Activity Description</b>	Illegal dumpsites pose a threat to land, local population health and drinking water resources. The issue of unplanned waste disposal results in the occurrence of wild disposal sites that usually pose a threat of infections, which are most frequently formed in the vicinity of drinking water sources and close to settlements. Removal of illegal dumpsites should be addressed systematically and permanently through adoption of waste management plans at the local level, but also education of population on the hazards of this approach. This activity should be implemented at the initiative of local communities, in collaboration with the Environmental Protection Funds.
<b>Responsible for implementation</b>	Local communities, NGO sector
<b>Sources of financing</b>	Environmental Protection Funds, EU funds, international projects
<b>Activity 3.1.4</b>	<b>Protection of drinking water resources against negative anthropogenic impact (construction of settlements, lack of water supply and sewage network) in rural areas</b>
<b>Activity Description</b>	Drinking water resources are threatened by multiple factors. A particular risk is posed by wastewater from old and outdated sewage systems the contents of which flow directly into aquifers in the settlements. A significant problem is also the absence of the sewage network systems in rural settlements and the existence of a large number of cesspits whose content is in direct contact with soil, and indirectly with aquifers too. The objective of the activity is to establish quality systems of water supply and sewage networks in rural areas, which will significantly contribute to drinking water supply to population, but also to soil protection. It is also necessary for responsible inspection bodies and local self-governance units to increase measures of control and sanctions for pollution of sources.
<b>Responsible for implementation</b>	Local self-governance units, relevant ministries
<b>Sources of financing</b>	Public water management companies, loan funds, entity sources, EU funds, international projects



<b>Activity 3.1.5</b>		<b>Rehabilitation of landslides in the most affected residential areas</b>
<b>Activity Description</b>	This activity implies rehabilitation of the priority and active landslides that pose a direct risk to life of population in BiH.	
<b>Responsible for implementation</b>	Relevant professional institutions, Entity Ministries and BD, local communities	
<b>Sources of financing</b>	Entity Ministries and BD, EU funds, international projects	
<b>Activity 3.1.6</b>		<b>Water resources management in the area of Dinaric karst aimed at conserving the terrestrial ecosystems (flood prevention and irrigation)</b>
<b>Activity Description</b>	<p>Total precipitation in karst areas of the Dinarides is high, and exceeds 1,000 mm per year. Distribution of precipitation is very unbalanced, thus 70% of rainfall occurs during autumn and winter period, and as little as 30% in spring and summer period when soil heavily needs moisture. Additionally, karst is porous, relief sloping, while the soil layer on its surface is shallow. Karst fields are flooded during winter and autumn, while they suffer from drought during the vegetation summer period. Karst fields are also the greatest reservoirs of wetland habitats and peat in BiH. From the perspective of all ecosystems, water management in the karst area is a crucial problem and a great challenge. Moisture conservation in soil is particularly important, as well as water collection for vegetation needs during dry periods, and flood protection. Water is also the most important factor of rural development and keeping people in this area. In hilly and mountainous areas, above the altitude of 700 m, there are great potentials for development of livestock breeding and associated production of field and fodder crops. For agriculture and life in these areas to be sustainable, it is necessary to explore the most rational ways of collecting and conserving water for the needs of agriculture, population, and other most important plant and animal ecosystems. Flood protection is also an integral part of a comprehensive addressing of this issue. Studies like this one can be of key importance for adequate decision making and support to the process of rehabilitation and sustainable management and return into this extremely vulnerable ecosystem. This approach can be put in a context of the Project „Dinaric Arc Initiative“ that the UN agencies initiated in this area.</p>	
<b>Responsible for implementation</b>	Entity Ministries of Agriculture and Water Management and the relevant service in DB	
<b>Sources of financing</b>	GEF, Entity budgets, agencies for water resources and the environmental protection funds, EU funds, international projects	

Operational objective 3.2. To develop sustainable monitoring systems and establish adequate databases

<b>Activity 3.2.1.</b>		<b>Establish monitoring of the state (quality) of soil and establish a common database on land threatened by various forms of contamination</b>
<b>Activity Description</b>	<p>BiH and its Entities need to establish a systematic soil quality monitoring, in order for this natural resource to be best studied and protected. The existing results on the soil quality in BiH were mostly obtained by different projects implemented by scientific and research organizations, and these data are often incomparable since there are no harmonized sampling methods. Monitoring would be carried out at the Entity level. Within the framework of soil quality monitoring, the existing soil analysis laboratories should be adjusted and additionally equipped for soil sampling. It is also necessary to select the locations for on-going monitoring of precisely defined parameters.</p>	

	Urban soils, as compared to rural, are often more exposed to anthropogenic impact (due to a higher density of population, traffic intensity, proximity to industry, etc.), therefore, in some cases, collection and analysis of additional parameters will be carried out too, where applicable. Availability of information on the soil quality in terms of the contents of organic and inorganic pollutants determines the possibility of risk assessment, identification and rehabilitation of contaminated sites, as well as planning in terms of identification and dislocation of contamination sources.
<b>Responsible for implementation</b>	National Focal point, Universities, Entity Institutes for Agropedology and the responsible services in DB
<b>Sources of financing</b>	Budgets of the Entities and BD/ Entity Environmental Protection Funds, EU funds, international projects
<b>Activity 3.2.2. Surveying, mapping and protecting vulnerable soil types</b>	
<b>Activity Description</b>	To protect geodiversity and land resources as a whole, it is necessary to identify locations of rare and threatened soil types in BiH (such as, for instance, podzol, brunipodzol, peat, etc.), study their properties, and propose their protection. If the forest soil types are concerned, then the surface they cover has to be separated from regular management measures, and conserved. This activity should be implemented through collaboration of Faculties for forestry and agriculture, public forestry companies, and the Entity Ministries relevant for land issues.
<b>Responsible for implementation</b>	Entity Ministries of forestry and agriculture, Faculties for forestry and agriculture
<b>Sources of financing</b>	Budgets of the Entities and BD, environmental protection funds, EU funds, international projects
<b>Activity 3.2.3 Monitoring of land quality along the roads</b>	
<b>Activity Description</b>	Transportation and transport infrastructure can adversely affect land and environment. Fuel combustion products, particularly in urban parts of BiH, affect the increased emission of greenhouse gases, reduced quality of air, as well as of soil. Road transport of goods has the greatest impact on the state and the quality of soil and the entire environment, since the other forms of transport (rail, air and water transport) are significantly less used. Monitoring of the state and the quality of soil in the sector of transport in BiH does not exist. Also, there is no statistical monitoring of the state of the environment in the transport sector in BiH either, such as land, water and air pollution caused by transport. In order to protect land and expose it to pollution to the least possible extent, in urban areas and along the road infrastructure, we need to install stations for monitoring soil quality along the roads where average annual daily traffic frequency exceeds 8,000 vehicles. The goal is to establish the land contamination level caused by transport, and to plan remediation measures according to priorities.
<b>Responsible for implementation</b>	Bodies responsible for the environmental issues, Ministries and other bodies competent for traffic
<b>Sources of financing</b>	Funds of the Directorate for Roads
<b>Activity 3.2.4 Develop land-use value map for local communities at the level of BiH</b>	
<b>Activity Description</b>	<p>Land-use value maps development for the needs of local communities is a legal requirement in FBiH, and it has been uninterruptedly implemented since a fairly long time.</p> <p>Within the process of map development, thematic baselines are prepared in GIS; the surface of municipality is analysed; balances of land use ways are established and individual forms of land damage; land is evaluated through the value of capability classes and analysis of pedological properties of the soil classes. This method enables us to review the land/soil value from the point of view of different sectors and their needs. From the perspective of rational use, this means practical spatial planning, urban development and environmental protection. Thus, the main point of rational land utilization is realized, that every area should be used in an optimal way – which means that what is suitable for one type of production does not have to be suitable for some other.</p>

	<p>In FBiH, we should continuously work on development of the map in the municipalities that do not have it.</p> <p>Municipalities in RS do not have this obligation, which is a huge disadvantage with the consequences reflecting in several important aspects of land conservation: inappropriate use, construction of buildings on a high quality land, reduced crop yields, etc. Ministry of Spatial Planning, Construction and Ecology of RS should initiate a procedure to change and amend relevant laws that regulate this field in order to incorporate the obligation of developing land-use value maps, after which the local communities would be required to draft these maps; this will contribute to identification of the land cover problems and its future targeted use.</p>
<b>Responsible for implementation</b>	Entity Ministries of Spatial Planning and Agriculture; Entity institutes (administration) responsible for land issues and relevant service in BD BiH, Faculties of forestry and agriculture
<b>Sources of financing</b>	Relevant ministries and local communities
<b>Activity 3.2.5 Develop a landslide register</b>	
<b>Activity Description</b>	<p>Developing a landslide register in BiH is necessary due to the fact that there are presently 1,800 active landslides in BiH (not taking into account newly-created landslides caused by flooding in 2014). Depending on climate conditions, there are approximately 1,000 landslides occurring annually in BiH, some of them known from before that have reactivated, and some of them are new. These numbers have increased significantly during the past 20 years, and it should be emphasised that landslides are one of the priority environmental issues in BiH. Geological properties of some areas are naturally suitable for landslides, and even the slightest human activity can cause great damages. Identification of the existing landslides will provide a necessary baseline for collection of information required for planning recovery measures for the priority landslides that jeopardize life of local population.</p>
<b>Responsible for implementation</b>	Relevant Ministries, Universities and local communities
<b>Sources of financing</b>	Entity budgets and BD, EU funds, international projects

Operational objective 3.3. To protect land and recover the function of degraded land

<b>Activity 3.3.1 Protection of the high quality soil/land from urban development and negligent use</b>	
<b>Activity Description</b>	<p>Urban development has been identified as an important factor of soil degradation. The best quality agricultural soils are usually used for construction of residential and business facilities, whereas the funds received from conversion are not allocated to projects of remediation, melioration and re-cultivation of degraded land areas in the territory of local community. This trend is particularly evident in larger urban centres in BiH. It is necessary to initiate protection of the best soils/land from urban development and negligent use, so as to prohibit construction at the best quality land areas. In addition, the funds obtained from conversion of agricultural to construction land have to be allocated to land protection projects in line with the local community priorities.</p>
<b>Responsible for implementation</b>	Local communities, Federal Institute for Agropedology; Institute for Agriculture RS, relevant service in DB, relevant bodies for spatial planning
<b>Sources of financing</b>	Budgets of the Entities and BD, local communities

<b>Activity 3.3.2. Control of use of protective agents and mineral fertilizers – establishing a pilot programme of systematic fertility control and integral protection at three most vulnerable locations</b>	
<b>Activity Description</b>	Mineral fertilizers and protective agents are not used in an uniform manner throughout BiH. This depends on production intensity, developed technological approach, as well as farmers themselves. There are no accurate records on consumption of mineral fertilizers and pesticides. On the other hand, the best agricultural practices (BAP) are not being implemented in BiH yet. The EU Directive on Water Resources has not been applied, too and neither the regulation on the quantity of soil intake of nitrates through manure and other nutrients such as sewage sludge. In terms of the EU accession process, BiH is in the red zone in terms of this issue. Soil fertility control and recommendations for mineral fertilizers use in both Entities are occasionally performed by the Federal Institute for Agropedology and the Institute for Agriculture of RS. There are some other institutions dealing with these issues too (faculties, institutes, etc.) but not systematically and only when commissioned. However, there is no public reporting on this issue or the opportunity to get a full overview of the scope of this problem. As for the pesticides, the situation is even worse. Pesticide residues in soil are not monitored almost at all. Through this research, we propose establishment of three pilot programmes for systematic soil fertility control and integrated protection at three locations, namely the northern plain lowland area of BiH with the most intensive agricultural production; in the central part of BiH with alluvial soils along some of the rivers; and the area of some of the karst fields or the river valley plateau in Herzegovina. These surveys could forerun the covering of the entire area of BiH and establishing a monitoring system of systematic soil fertility control and the pesticide residue control, which would be very significant from the practical aspect of land degradation caused by contamination.
<b>Responsible for implementation</b>	Entity Ministries of Agriculture and the relevant service in DB/Plant Health Protection Authority BiH /Associations and cooperatives
<b>Sources of financing</b>	State, Entity and BD budgets
<b>Activity 3.3.3 Ensure sustainable use of forest land and pastures through the FSC normative framework</b>	
<b>Activity Description</b>	The FSC principles and criteria are applied worldwide and are relevant for regions with different political, legal, cultural and environmental systems; and they are voluntary. It is generally accepted that the wealth of forests and forest land should be managed by appreciating sociological, economic, environmental, cultural and spiritual needs of present and future generations. RS has introduced the FSC certification system, where forest management holdings are certified every 5 years by the independent certification body. This concept has not yet been introduced in the Federation BiH. If forests are managed in line with the FSC certificate, this, from the aspect of protection of forest land and grazing pastures means that in the course of forest exploitation, there is no bare land left exposed to erosion, plant and animal habitats are not endangered, and that forest harvesting does not lead to depopulation, etc. We should insist on increased control of the application of the FSC standards in forest management holdings in RS, and their introduction in FBiH and BD BiH. This would provide adequate protection to the forest land and pastures in the high-mountain areas.
<b>Responsible for implementation</b>	Entity Ministries in charge of agriculture and forestry, public forest management companies
<b>Sources of financing</b>	Budgets of the Entities, Cantons, Municipalities and BD
<b>Activity 3.3.4 Develop and implement forest land management systems under the extreme conditions in the identified high-risk areas</b>	
<b>Activity Description</b>	Forest and forest land management systems should be planned and implemented according to the natural conditions of a specific area and the purpose of management. However, when we talk about the forest land under the extreme conditions (karst, high mountainous region, etc.) it is necessary to modify these management systems,

	namely adjust them to environmental rather than economic requirements. First of all, it is necessary to identify high-risk areas, and subsequently plan protection measures to protect soil from a specific type of degradation in a given area. The objective is to conserve vulnerable and high-risk land resources in BiH.
<b>Responsible for implementation</b>	Entity Ministries in charge of agriculture and forestry, public forest management companies
<b>Sources of financing</b>	Budgets of the Entities, Cantons, the Environmental Protection Funds, BD, EU funds, international projects

Operational objective 3.4. To adopt strategic documents pertaining to land protection and rehabilitation from degradation

<b>Activity 3.4.1. Development of Land Protection Strategy at the state and Entity levels</b>	
<b>Activity Description</b>	To manage land resources in a sustainable manner, we need to take a well-planned and careful approach that will include all aspects of preservation of this vulnerable resource, depending on its conditions and the type of pressures that are most pronounced in a specific zone. This document should point to the key tasks in strategic and modern land management, as well as give measures and recommendations for conservation, purposeful use, and land protection, particularly in sensitive and vulnerable areas. The initiative for development of the Strategy should start from the Ministries of Agriculture and Environment at the Entity level, and the MoFTER BiH at the state level.
<b>Responsible for implementation</b>	Entity Ministries of Agriculture, Forestry and Environment
<b>Sources of financing</b>	Budgets of Entities and BD, Environmental Protection Fund, EU funds, international projects

## **STRATEGIC OBJECTIVE 4. PUBLIC AWARENESS RAISING AND THE ROLE OF EDUCATION IN COMBATING LAND DEGRADATION AND DROUGHT**

Operational objective 4.1. To improve collaboration between scientific and professional institutions and transboundary cooperation

<b>Activity 4.1.1 Establish drought monitoring in compliance with the Drought Management Centre (DMC SEE) and the priorities in BiH</b>	
<b>Activity Description</b>	BiH has not established drought monitoring despite facing the drought issues for a long period. Drought monitoring in compliance with the Drought Management Centre is an activity that has to be implemented in the areas of BiH threatened by this phenomenon. The collected data would serve for planning the irrigation measures, for the purpose of reducing damages and control of losses in agriculture and improving the life of the population by conservation of soil. This is a long-term project that needs to be implemented continuously, while the data would be collected according to DMC SEE methodology and AP priorities in BiH. Relevant Ministries should initiate the establishment of monitoring, which would be the basis for opening possibilities of forecasts and timely response to occurrence of drought in the affected areas.
<b>Responsible for implementation</b>	MoFTER/Entity Ministries of Environment
<b>Sources of financing</b>	State and Entity budgets, international funds
<b>Activity 4.1.2 BiH joining the DMCSEE</b>	
<b>Activity Description</b>	The region of the South-Eastern Europe (and of BiH as well) is marked by DMC SEE as a drought threatened area. BiH needs to meet the required conditions to join the DMCSEE and as a full member participate in all future activities and measures related



	to monitoring, drought assessment and drought risk assessment as well as soil vulnerability to drought. The joining process should be initiated by the NFP, in collaboration with the relevant institutions.
<b>Responsible for implementation</b>	MoFTER, NFP
<b>Sources of financing</b>	International funds, state budget
<b>Activity 4.1.3 Initiate establishment of a Regional Centre to Combat Land Degradation</b>	
<b>Activity Description</b>	The environmental and land-related problems surely cannot be addressed and observed only at the local, but at the regional level too. Establishing a Regional Centre to Combat Land Degradation is a significant step forward to connect BiH with the countries in the region, to meet the conditions for planning and coordination of future steps in line with the implementation of the activities planned under AP. The main objective concerns preparation and implementation of joint regional and sub-regional projects, collecting information, analyses, as well as staff training and re-training according to the needs. In addition, the Centre should provide assistance to institutions and other participants included in the land protection process.
<b>Responsible for implementation</b>	Responsible Ministries
<b>Sources of financing</b>	State budget, international funds, GEF
<b>Activity 4.1.4 Application and implementation of joint initiatives and research projects</b>	
<b>Activity Description</b>	The objective is to link the scientific-research and other relevant institutions from the state level down to the local community, through development of joint project proposals targeted to addressing the issue of land degradation. In order to intensify cooperation, in addition to the project proposal quality, priority should be given to financing those projects, which include as many interested parties from both Entities and BD as possible.
<b>Responsible for implementation</b>	MoFTER and other relevant Entity Ministries, local communities, NGOs
<b>Sources of financing</b>	Budgets of the Entities, Cantons and BD, Entity funds and international funds
<b>Activity 4.1.5 Improve cooperation through joint activities via the Soil Science Society in BiH</b>	
<b>Activity Description</b>	The Soil Science Society in BiH is the only NGO that gathers relevant experts and other stakeholders in this area. Given the capacities and significance of civil sector participation in implementation of AP activities, this organization should be an unavoidable link in the future joint activities, as well as an equal partner to institutions in decision making, and adoption of regulations and rule pertaining to land issues. Relevant institutions should implement all future activities in collaboration with the Society and its members. The goal is active participation of professional civil sector in addressing the issue of land/soil degradation.
Responsible for implementation	Responsible Ministries, Environmental Protection Funds, the Society
Sources of financing	Budgets of the Entities, Cantons and BG, Entity funds

## Operational objective 4.2 Public awareness raising and the role of education

<b>Activity 4.2.1</b>		<b>Introduce a component of protection of land and its functions in formal education as well as all aspects of environmental protection</b>
<b>Activity Description</b>	Initiating the introduction of new modules and teaching units in formal education dealing with the basic functions of land and its protection is one of the priorities – due to the fact that land/soil is not studied enough, the issue of its degradation is almost invisible in lower levels of education, which certainly has to be changed. This activity should be initiated by relevant Ministries of education and culture in collaboration with primary and secondary schools. This will largely contribute to raising awareness of the importance of land conservation through all levels of education.	
<b>Responsible for implementation</b>	Relevant Ministries of education, science and culture	
<b>Sources of financing</b>	Budgets of the Entities, Cantons and BD, Entity funds	
<b>Activity 4.2.2</b>		<b>Introduce new study programmes in higher education institutions to study land protection (natural resources) from all forms of degradation, spatial planning and land-use</b>
<b>Activity Description</b>	Curricula and syllabi of the higher education institutions in BiH dealing with the issues of land and soil within the existing study programmes are mostly restricted to studying the general properties of land, and do not take into account the problem of different forms of its degradation in BiH. The introduction of new study programmes should be initiated (adding to the existing ones) to deal with different forms of land degradation (according to the land-related problems in BiH), which will serve as the basis for education of qualified and competent professionals in this field. The key institutions for implementation of this activity are competent Ministries, Universities and Faculties.	
<b>Responsible for implementation</b>	Competent Ministries of education and science; education and culture,  Universities	
<b>Sources of financing</b>	Budgets of the Entities, Cantons and BD, Entity Environmental Protection Funds, EU funds, international projects	
<b>Activity 4.2.3</b>		<b>Regular organization of trainings, courses, seminars and conferences on land/soil (about degradation, conservation, status) and marking the international environmental protection days in collaboration with the BiH Soil Science Society</b>
<b>Activity Description</b>	The issue of land degradation is still not sufficiently visible in BiH. The population first needs to get information on the existence of land degradation, possible consequences and losses we are currently faced with in this field. Raising public awareness about this issue is one of the priorities that should be implemented through various trainings, courses, seminars and conferences on land, campaigns and promotions along with the marking of international environmental protection days (World Day to Combat Desertification – Land Degradation, International Environment Day, International Forestry Day). The above celebrations should be organised in collaboration with the BiH Soil Science Society, as well as other civil society environmental organizations, at the initiative of relevant institutions.	
<b>Responsible for implementation</b>	Competent Ministries of the environment, agriculture, education, civil sector, local communities, public forestry companies	
<b>Sources of financing</b>	Budgets and Entity Environmental Protection Funds, EU funds, international projects	

# 10 COORDINATION AND MONITORING





## 10.1 REPORTING TO UNCCD

By ratifying the Convention, the UNCCD Parties, *inter alia*, committed to a reporting process and submission of National Reports to the UNCCD Secretariat, based on the defined dynamics and planned reporting cycles. So far, there have been four reporting cycles, while the first part of the fifth cycle has been planned for the first half of 2014. On the basis of the defined indicators, the member countries report to the UNCCD using the online portal - Performance Review and Assessment of Implementation System (PRAIS portal). Based on the submitted information from all the Parties, the Secretariat of the Convention compares and analyses the global values, whose ultimate goal is to enhance combating land degradation/desertification in the world.

The reporting system to the Secretariat is functioning in a way that reports are submitted according to the abovementioned indicators, that is, every two years based on reporting indicators and every four years based on progress indicators. The responsible reporting body collects information based on defined indicators and informs the Secretariat in accordance with the schedule.

### 10.1.1 PREPARATION OF REPORT THROUGH PARTICIPATORY PROCESS

Preparation of National Report is implemented through a consultation and participatory process before the formal approval by a national body responsible for implementation of the Convention in BiH.

A body responsible for reporting is the National Focal Ministry for UNCCD, in charge of submission of the official report on the implementation of the Convention, i.e. the Ministry of Agriculture, Forestry and Water Management of RS. The Ministry is responsible to set out an administrative framework for preparation and elaboration of national reports, and to identify, collect and analyse data on the mechanisms and activities pertaining to the UNCCD implementation, as well as to identify all stakeholders that can influence the process.

BiH has prepared three national reports on the implementation of the UNCCD by now (2007, 2010, and 2012 – the fourth reporting cycle).

In the coming reporting period, the emphasis will be on the preparation process for national reporting that ensures participation of stakeholders at different levels, for instance, state bodies involved in decision-making, academic community, management of natural resources and environmental protection, private sector, and the NGOs dealing with the land management issues.

### 10.1.2 VALIDATION OF THE REPORT AT THE STATE LEVEL

Following the collection of data for the subsequent reporting process, National Focal point communicates the National Report to relevant stakeholders to consider, comment and approve the draft before its submission to the National Focal Ministry of BiH for the UNCCD, which reviews and validates the Report and submits it to the UNCCD Secretariat (uploads using PRAIS portal).

National reports should, *inter alia*, include:

1. Progress indicators
2. Performance indicators
3. Financial Annex
4. Project and AP summary

AP is the implementation tool, while the National Report deals with the effectiveness of tools through the above mentioned indicators. Therefore, the developed indicators have to be a part of harmonized AP.

Within the coming, Fifth Reporting Cycle, National Reports in the first part of this cycle are prepared on the basis of the performance indicators. All National Reports should be submitted electronically, using the PRAIS portal.

At the beginning of 2014, the first 6 month part of the Fifth Reporting Cycle commenced, where all Parties are invited to develop their National Reports that are of crucial importance for assessment and review of the country-based process of the implementation of the Convention.

## 10.2 REQUIREMENTS TO ALIGN AP WITH THE UNCCD 10 –YEAR STRATEGY

According to recommendations of the UNCCD Secretariat, a template for AP alignment has been created. The template makes it easier to monitor whether all Strategy requirements were met and how, what are the possible obstacles in AP implementation, and invites to identify tools for its better integration into the institutional and legal framework of the country.

Key issues related to work on Operational objective 2 (Outcome 2.2)		
Requirements		AP BiH
1. Alignment review - Strategic document	Is the presented AP a strategic document as defined under the Decision 3/COP.8?  If not, what steps need to be taken to align it?	Yes.
2. Baselines - Socio-economic - Biophysical	Is AP supported by baseline socio-economic information?  Is it supported by baseline biophysical information?  How to incorporate the baseline information in an integrated investment framework?	AP is supported by the baseline socio-economic and biophysical information based on which we defined priorities for land protection in BiH. Priorities are a part of the Action Plan for which we created an integrated financial strategy.
3. Monitoring assessment	Is there a monitoring system of desertification assessment in the country? Has it been considered in AP?	BiH does not have a developed monitoring system of land degradation assessment, which we defined as a priority activity in AP.
4. National self-assessment	Has there been an analysis of needs (human resources, funds, technical assistance)?	BiH has a self-assessment of the national capacities in implementation of multilateral environmental agreements from 2012, where we analysed the needs for AP implementation.
5. Links between national, regional and sub-regional action programmes (APs, RAPs and SRAPs)	Are they inter-linked?  Have regional cooperation priorities been defined?	There are currently no projects for development of RAPs and SRAPs, but we defined this as a need in AP.
6. Process of AP review	How often is it going to be carried out?  Who is involved?  Does AP address local and the needs at the level of BiH?	Following the expiration of Strategy validity period (2018), the BiH AP will be harmonised with future objectives and commitments of UNCCD, including a review of the previous AP implementation.  In addition to regular annual reporting to UNCCD, revision of set objectives within the framework of AP BiH will also be made, which should contribute to harmonization with the actual needs and situation in the field. NFP, with the support of NCB, will be directly responsible for the review of the AP process and it should play the leading and actively participate in the implementation of the AP strategic objectives.



		Through consultations with local community, NCB defines measures and participants who should work on the implementation of measures and contribute to set objectives in accordance with needs of donors, governmental and nongovernmental sectors, and local community.
7. Indicators - Socio-economic - Biophysical	Is a series of indicators and measures established for each broader category? Are there datasets and information on the physical and socio-economic factors? What are their sources? Can this be used as a baseline?	Indicators have been established for every broader category as requested by the UNCCD. The existing datasets and their sources are referred in the indicator section. Available information is used as a base for defining the indicators.
8. Objectives and deadlines - Time frame	Is the time frame defined? Are financial sources linked to time frames?  Does AP include objectives and deadlines?	There is an Action Plan within the AP framework with defined time frames for implementation of priority activities. Action Plan was used to develop an integrated financial strategy.
9. Strategy of financing - Sources - Investment priorities	Does the country have an integrated strategy for financing AP implementation?  Does AP receive financial resources from the government institutions?  Have the priorities been defined in AP?	BiH has not had an integrated financial strategy, it will be adopted together with AP. Council of Ministers of BiH is co-financing AP development.
<b>Key issues related to work on operational objective 2 (Outcome 2.3)</b>		
10. Integration in national development plans	Is AP incorporated in national development strategies with the budget, objectives and deadlines?	One of the AP objectives is to incorporate the proposed measures into national development strategies.
11. Links with other programmes: climate change, food safety, scarcity of water, and forest protection	Has AP considered other programmes such as poverty reduction, climate change, food safety, scarcity of water, forest protection, or other?  Are there institutional links present?	There is a Chapter in AP considering the links with other conventions and environmental agreements and possible synergies. Process of AP development established institutional linkages.
12. Cross-sectoral cooperation - Overlapping - Mandates	Is there a national coordination board with representation of all key Ministries? If yes, how often do they meet?  To what extent do the mandates of the key ministries overlap or conflict? Is it possible to resolve potential difficulties through inter-sectoral coordination?	In addition to NFP, the Board includes the representatives of relevant Ministries as well as representatives of local community and NGO sector in order to ensure transparency in fulfilment of the Board's tasks.  The NCB's task is to analyse the existing limitations, needs and resources that can effect development, implementation and sustainability of the project. During the implementation of projects, it is important to define practical measures, eliminate duplication and promote application of results. The NCB's task is to prevent mandate overlapping of different institutions dealing with land protection, as well as to ensure cross-sector cooperation and coordination.

<p>13. Who are the key stakeholders?</p> <p>- Are they included in review and implementation of AP?</p>	<p>Have all state bodies representatives and all major stakeholders, including the NGOs, community based organizations, trade unions, organizations of women, academic community and private sector representatives involved in development and implementation of AP?</p> <p>Is there an institutional mechanism for integration of all these factors, such as a National Commission?</p>	<p>All key stakeholders have been involved in review and revision of AP. AP project also has a Steering Board comprising the key stakeholders, that is, entity Ministries of Environment, the Entity Environmental Protection Funds and the Ministry of Foreign Trade and Economic Relations of BiH, involved during the entire project period. In addition to the abovementioned institutions, representatives of technical institutions dealing with the land degradation and sustainable land management issues were also involved</p>
<p>14. Legislation and policy framework</p> <p>- Enabling environment</p>	<p>Is there a favourable environment for implementation of AP? What needs to be done to improve it?</p>	<p>Given that land management is regulated by institutional and legal framework at the Entity level, while coordination of these issues is managed by the Department in charge of environment and agriculture within MoFTER, there is still a need to strengthen both horizontal and vertical coordination and link institutions dealing with land issues, for the purpose a better data exchange and creation of harmonized policies.</p>
<p>15. Role of science and technology</p>	<p>To what extent is scientific and technological community involved in combating desertification, land degradation and the effects of drought?</p> <p>Does the R&amp;D sector actively participate in finding the solutions for soil issues in terms of land degradation and the effects of drought?</p>	<p>Land issue in BiH is currently neither topical nor extensive funding is allocated to address the issues of land degradation. Regardless of this, scientific community is independently working on research and development of certain approaches through individual projects, mainly financed by donors. There is no strategic approach to finding the solutions to land issues in terms of land degradation by academic community.</p>
<p>16. Sources of financing</p> <p>- Budget allocations: where, how</p>	<p>Is GM involved in mobilization of resources?</p> <p>Have you ever received any funds from bilateral or multilateral agencies, have you received funds from the state, entity, cantonal or local governments?</p> <p>Have the funds been allocated from the ministry budget or some dedicated fund?</p>	<p>The Council of Ministers of BiH supported the implementation of this project, but there are no systematic allocations for land-related issues.</p>





# 11 RECOMMENDATIONS



**L**and degradation has assumed global proportions. All relevant scientific and other sources indicate that fertile soil is becoming a limiting factor in development of modern civilization, both at global and national-local levels. Pressures on the land are enormous. They take various forms such as degradation processes, decrease in its fertility and permanent shrinking of fertile soil surfaces as a result of construction of infrastructural facilities, industry, rapid expansion of cities, hydro-reservoirs etc. Efforts have been made at the global, national and even local level to impose respective measures for land protection and conservation. Professional and scientific public unanimously believe that soil is a true, vital natural resource. By connecting air and water, the soil provides for essential benefits and services and, as such, it represents the fundamental part of the terrestrial ecosystem. There is no need to further argue the importance of this thin epidermis of the Earth's Crust for the existence of mankind and life on Earth.

BiH, as the entire region of the Western Balkans, is characterised by extreme diversity of geomorphology. Apart from geology and relief (more than 70% of the area is at inclination over 14%), Alpine (mountainous), continental and sub-Mediterranean climate considerably affect the soil formation processes, and degradation processes, too. Soils are very divergent by their physical and chemical characteristics. The largest areas are covered by shallow and rocky land, land on slopes and impermeable clay substrata, while there are much less fertile, deep soils in river valleys and flattened terraces. Natural soil fertility has a series of limitations, which is confirmed by the fact that there are around 50% of acid soils.

Land in BiH is facing the same threats as land in other parts of the European continent. Nevertheless, it should be pointed out that lands in BiH developed on karst-dolomite substrata, in the area of Dinaride karst and Mediterranean climate, are particularly sensitive to anthropogenic effects and climate change. The consequences of irrational use of these lands, droughts, and flooding considerably contribute to the process of their degradation. Degradation processes have also been recorded in other parts of BiH due to the lack of spatial planning and due to poorly planned construction, deforestation and lack of sustainable management of land as a resource.

It can be concluded from the above that, unfortunately, there is much more land with poor properties, vulnerable to pressures and with a low productivity than deep, fertile and pressure-resistant land. Therefore, the area of BiH is classified into four geomorphological units with significant differences among them. In differentiated geomorphological soils are exposed to different or similar types of pressures the intensity varies depending on specific features of the area. According to the degree of vulnerability to land degradation processes, the following geomorphological units have been identified:

- High karst area with karst fields,
- Lowland Herzegovina (including upper streams of the River Neretva and karst fields),
- Central hilly-mountain area with river valleys,
- Flatland-hilly area (including zones of serpentine and flysch).

Although the original objective of UNCCD was to protect lands of Sub-Saharan Africa, that is, to mitigate the consequences of land desertification and land damages in arid, semi-arid and sub-humid areas, it has been accepted by almost all countries worldwide and is already recognized as a global agreement on land protection.

The implementation of the Convention in BiH started on December 26, 1996 and since then the international community has been informed on the situation and the manner of land resources management at the state and Entity levels. Within the scope of the Convention, BiH is a member to Annex 5 of the countries of the Middle and East Europe, although regardless of this membership, it was originally listed also in Annex 4 with countries of the Northern Mediterranean.



The purpose of APs development and regular reporting requirement is to ensure a long-term commitment of State parties to the UNCCD requirements regarding sustainable land management with regard to all forms of actions and at all levels in the framework of a legal process and legally binding documents at the national level. Parts of the Earth affected by land degradation have been provided with an international legal framework for operations in cooperation with donors, mostly industrially developed countries, and access to funds in the implementation of APs, and programmes and measures this documents contains. The international institutions which monitor this problem area, consider AP as the only relevant document for deciding on the allocation of assistance for rehabilitation and dealing with consequences of land degradation. The Convention is a very powerful instrument for sustainable management of natural resources as well as for ensuring a long term external assistance.

The purpose of UNCCD as well of this strategic document (BiH AP) is to identify facts and processes which cause land degradation, and to establish a management system and adopt legislation which will prevent or minimise such damages. One of the strategic objectives of both UNCCD and AP, is to maintain the land degradation at zero level, in other words further degradation and rehabilitation processes must be balanced.

The ten-year UNCCD Strategy (2008-2018) emphasises that, through development of aligned AP at the national level, implementation strategy should primarily be put in focus of the Convention. It is necessary to set strategic plan of implementation the way the issues and problems have been recognised within the scope of AP results. The revised AP seeks to recognise objectives and synergies between areas, define priority activities, define the needs for capacity building and drafting action plans by 2018, and beyond, through the use and maintenance of the existing and development of new capacities.

Main weaknesses, problems as well as expectations resulting from the implementation of the Convention can be identified based on the fact that there is a lack of funding, a lack of required instruments at the state and Entity levels, but also at the level of local community for combating land degradation. The lack of funding is the consequence of the following: i) scares and insufficient local funding sources, ii) deficient international cooperation and mutual coordination, and iii) lack of interest of wider community in land degradation issues.

It should also be noted that one of the reasons for lack of financial support is the fact that land issues and land degradation, have not been recognized as crucial issue among the public. In addition to mentioned financial problems BiH is facing, there are some other problems too, which are very important from the viewpoint of implementation of UNCCD strategic objectives and the AP as such. This primarily includes development of institutional capacities for implementation of the Convention. Division of powers and lack of consistent policy to deal with land degradation and monitoring are the key challenges. As a result, there is no system in place to enable smooth and prosperous development of human resources in the field. Casual and haphazard approaches to these issues are typical. In order to move forward, it is necessary to have awareness of the importance of land as a natural and irreplaceable resource, educated public and human resources. Land degradation need to be brought in synergy with Conventions on climate change (adaptation and mitigation) and biodiversity (conservation measures) in order to enable communication at the international, national and local levels. These problems are amongst the priorities and efforts should be made to eliminate them in the forthcoming period. The issue of awareness of land degradation should be addressed in relevant international forums, including those dealing with food trade and transport, adaptation to climate change, conservation procedures for various forms of biodiversity, rural development and reduction of poverty. Civil society and scientific community can significantly contribute to awareness raising efforts and education of population on problems causing land degradation and on land degradation consequences.

There is no framework for the application of policies for land protection against various types of land degradation at the level of BiH, and they are also poorly developed at the Entity level. Some land protection measures such as conversion of agricultural land into construction land and further fragmentation of plots on the principle of inheritance are effective at the Entity level. There are some other regulations governing the rehabilitation of land affected by degradation, particularly in the field of mining. However, given the fragmented jurisdiction, the implementation of protection measures and land rehabilitation is inadequate and uncoordinated, and the consequences of inadequate land use can be seen throughout BiH. Institutional, financial and socio-economic drivers of land degradation are the biggest barriers to sustainable land management system application. The recommendation of this strategic document is to identify problems and eliminate them in the forthcoming period. Efforts should be made to integrate the revised AP into other strategic documents at the state and Entity levels in order to achieve harmonized objectives. This would ensure the inclusion of certain projects and AP measures in investment and development frameworks. The AP objectives can best be achieved through the inclusion of land degradation into development-investment plans of relevant sectors and their policies. Regional and transboundary cooperation in these plans, in particular if international donor funds are required, is always a huge advantage and benefit for all countries partners in the project. One of the methods is the development of a regional action plan within the framework of Annex 5 to the Convention.

Without active participation of scientific and professional institutions, application of emerging and developing technologies and knowledge at the global level, the AP implementation will not be possible. Therefore, a public and political dialogue on these issues is encouraged, as well as support to research projects aimed at achieving the final objectives of the AP BiH, and thus of UNCCD Strategy until 2018.

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# 13 ANNEXES

## ANNEX 1

### 10 PRACTICAL STEPS FOR DEVELOPMENT OF AP

Step I: Preliminary organization
Objective: Securing initial leadership for the process
Process / activities:
<ul style="list-style-type: none"> <li>■ Designate relevant government agency with necessary political power to set the process in motion (this is of vital importance);</li> <li>■ Design an initial communication / advocacy strategy;</li> <li>■ Determine and contact other possible partners;</li> <li>■ Ensure ample representation of stakeholders (government institutions, civil society organizations, media, others);</li> <li>■ Establish an initial body that will lead (coordinate) the process.</li> </ul>
Result: Coordinating body established.
Step II: Start of the process
Objective: Develop initial strategic plan of activities with timeline and ensure resources (funds)
Process / activities:
<ul style="list-style-type: none"> <li>■ Brief overview of the AP / SLM process thus far;</li> <li>■ Determine what needs to be done and how as regards mass public involvement;</li> <li>■ Establish the precise objectives and role of the Coordinating body;</li> <li>■ Design a plan of action with key objectives and a road map for achieving the same;</li> <li>■ Identify and mobilize the initial resources needed to implement the plan.</li> </ul>
Result: Plan and timeframe of activities.
Step III: Involving the public
Objective: Raising public awareness and creating the feeling of ownership / identification over the National Coordination Body (NCB)
Process / activities:
<ul style="list-style-type: none"> <li>■ National awareness raising activities;</li> <li>■ Reaching out to key stakeholders (service beneficiaries);</li> <li>■ Identifying necessary capacities to support the process;</li> <li>■ Initiating a people's ownership process;</li> <li>■ Establishing a broad-based NCB.</li> </ul>
Result: Fully-fledged and fully-representative NCB established.
Step IV: Initiating actual alignment process
Objective: Building the key columns of alignment
Process / activities (actions):
<ul style="list-style-type: none"> <li>■ Ensure effective functioning and constant outreach of the NCB;</li> <li>■ Review all available SLM projects with the aim of aligning them;</li> <li>■ Identification of specific technical guidance</li> <li>■ Collection/compilation of relevant data, including inter alia: <ul style="list-style-type: none"> <li>■ Diagnosis of the situation with respect to DLDD,</li> </ul> </li> </ul>

<ul style="list-style-type: none"> <li>■ Defining the baselines (starting lines),</li> <li>■ Establishing relevant indicators,</li> <li>■ Issues of resources (financial and others).</li> </ul>
Result: necessary data, structure, equipment and process are prepared and designed to ensure the alignment process.
<b>Step V: Preparing the aligned AP</b>
Objective: Writing the draft aligned AP for broad consumption
Process / activities:
<ul style="list-style-type: none"> <li>■ Selecting a broad-based Drafting Board (Team);</li> <li>■ Appointing one coordinator to be responsible for the development of AP draft document;</li> <li>■ Appointing members of the team for the development of individual parts of AP;</li> <li>■ Development of the draft document (the first draft);</li> <li>■ Consultations and applying the AP development guidelines;</li> <li>■ Ensuring that specific technical advice is provided when and where needed.</li> </ul>
Result: The first draft of the aligned AP developed (prepared).
<b>Step VI: Public insight into the First Draft</b>
Objective: Improvement of the draft aligned AP
Process / activities:
<ul style="list-style-type: none"> <li>■ Public circulation of the First Draft of the document and inviting the public to provide comments and the like;</li> <li>■ Meeting with the key stakeholders in the development of the First Draft;</li> <li>■ Thematic meetings on the Draft (particular stakeholders);</li> <li>■ National exercises for considering the draft;</li> <li>■ Changes made to the draft document based on the comments received.</li> </ul>
Result: Second Draft of AP is prepared.
<b>Step VII: Expert/technical review of the Second draft</b>
Objective: Ensuring draft meets all requirements of an aligned AP.
Process / activities:
Establishing an expert technical team (working group) that will check if AP:
<ul style="list-style-type: none"> <li>■ is built on a platform of synergy,</li> <li>■ is mainstreamed in all relevant sectoral/development policies,</li> <li>■ has socio-economic bases (baselines) and relevant indicators,</li> <li>■ has a monitoring and evaluation mechanism,</li> <li>■ has an adequate legal and policy framework (base),</li> <li>■ has a feasible IFS, and</li> <li>■ is aligned with the guidelines and national priorities of the country.</li> </ul>
Result: A technically correct and aligned AP
<b>Step VIII: Finalization and adoption of the aligned AP at the state level</b>
Objective: Public adoption and assuming the ownership of the aligned AP
Process / activities:
<ul style="list-style-type: none"> <li>■ Submitting the Second Draft for a public insight into the document;</li> <li>■ Awareness raising as the key element for adopting the Draft;</li> <li>■ Local and national level presentations for approval of the document.</li> </ul>
Result: Aligned AP approved by the public.

**Step IX: Official adoption of the aligned AP**

Objective: The aligned AP gains full official support by the Government

Process / activities:

NCB ensures that aligned AP successfully passes through administrative and legislative processes of the country concerned, for example:

- Focal Point Ministry took into consideration / approved the AP;
- Minister's Cabinet approval granted;
- Parliamentary approval granted (AP adopted by the Parliament).

Result: The aligned AP is an official legal document and appears as the national policy in the field of sustainable land management (SLM).

**Step X: Printing and Circulation of the aligned AP**

Objective: Increasing knowledge of and support for AP and its implementation

Process / activities:

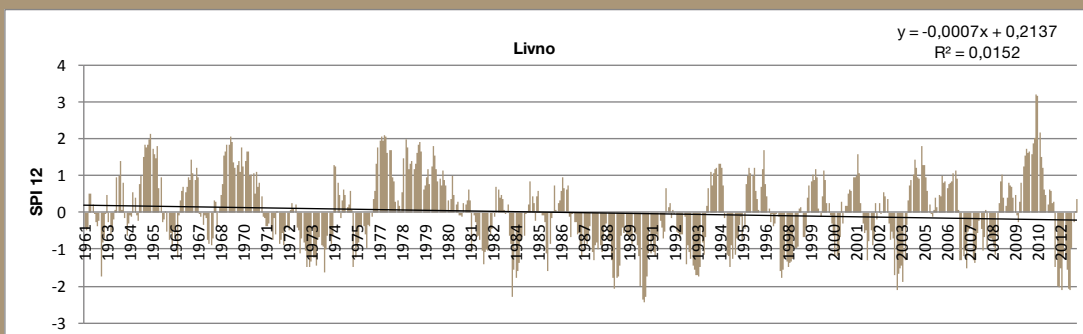
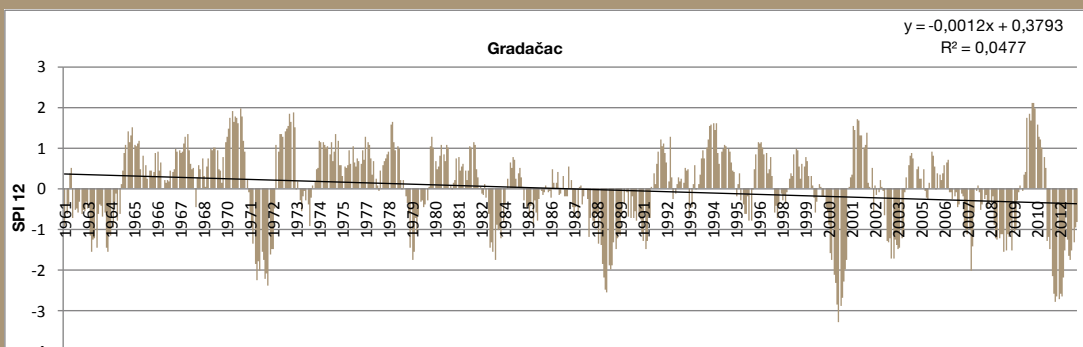
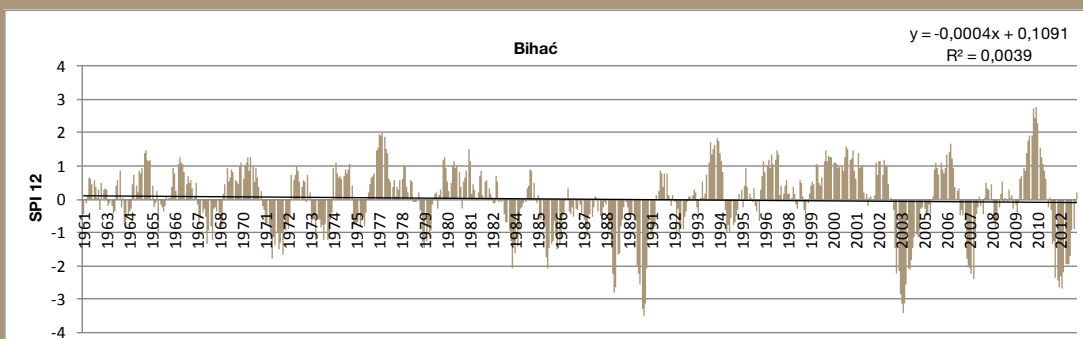
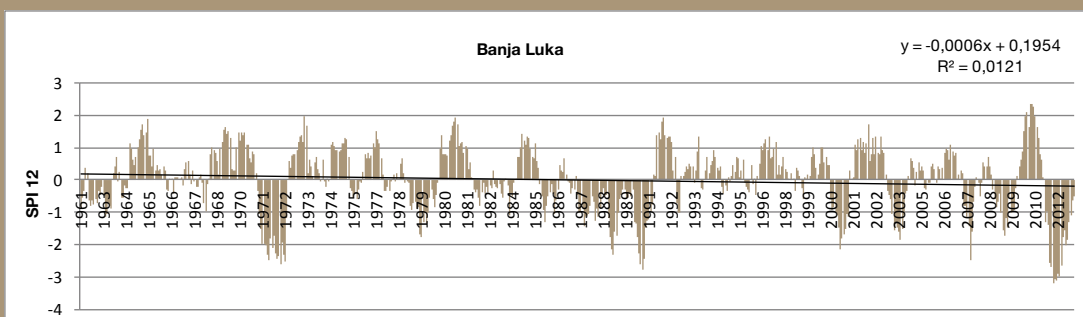
Dissemination of the document to:

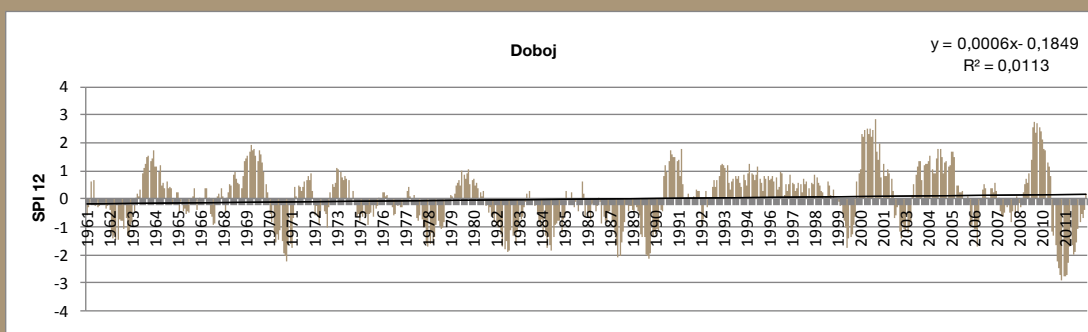
- all government sectors,
- all relevant civil society organizations, NGOs, educational and scientific institutions,
- specific stakeholders (e.g. farmers organizations),
- Bilateral, multilateral, sub-regional and regional partners, and
- UNCCD secretariat / Global Mechanism (GM).

Result: A network established to support implementation of AP.





SPI<sub>12</sub> in the area of Livno (1961 – 2012)SPI<sub>12</sub> in the area of Gradačac (1961 – 2012)SPI<sub>12</sub> in the area of Bihać (1961 – 2012)SPI<sub>12</sub> in the area of Banja Luka (1961 – 2012)



SPI<sub>12</sub> in the area of Doboj (1961 – 2012)

## Environmental laws in BiH

## BiH

Full title of the law	Official Gazette BiH, No.
Law on Concessions	32/02
Law on Amendments to the Law on Concessions	56/04
Law on Veterinary Medicine BiH	34/02
Law on Plant Protection	23/03
Law on Genetically Modified Organisms	23/09
Law on Animal Protection and Welfare	25/09
Law on Agriculture, Food and Rural Development in BiH	50/08
Law on Radiation and Nuclear Safety	88/07
Law on Food	50/04

## Environmental laws in FBiH

## FBiH

Full title of the law	Official Gazette FBiH No.
Law on Requirements for and Manner of Carrying Out Woodcutting	27/97
Law on Changes and Amendments to the Law on Requirements for and Manner of Carrying Out Woodcutting	25/06
Law on Water Resources	70/06
Law on Protection Against Ionizing Radiation and Radiation Safety	15/99
Law on Veterinary Medicine	46/00
Law on Forestry	20/02
Law on Amendments and Modifications to the Law on Forestry	32/03, 37/04
Law on Concessions	40/02
Law on Amendments to the Law on Concessions	61/06
Law on Waste Management	33/03
Law on Changes and Amendments to the Law on Waste Management	72/09
Law on Air Protection	33/03
Law on Changes and Amendments to the Law on Air Protection	4/10
Law on Environmental Protection	33/03
Law on Changes and Amendments to the Law on Environmental Protection	38/09
Law on Nature Protection	33/03
Law on the Environmental Protection Fund in FBiH	33/03
Law on Freshwater Fisheries	64/04
Law on Inspections in FBiH	69/05
Law on Spatial Planning and Land Use in FBiH	2/06
Law on Changes and Amendments to the Law on Spatial Planning and Land Use in FBiH	72/07, 32/08, 4/10, 13/10
Law on Hunting	4/06
Law on Changes and Amendments to the Law on Hunting	8/10

## FBiH

Law on Agriculture	88/07
Law on Changes and Amendments to the Law on Agriculture	4/10
Law on the "Una" National Park	44/08
Law on Agricultural Land	52/09
Law on Geological Research in FBiH	9/10
Law on Mining	26/10
Law on Protection from Noise	110/12

## Environmental laws in RS

## RS

Full title of the law	Official Gazette RS, No.
Law on Environmental Protection	71/12
Law on Nature Protection	20/14
Law on Air Protection	124/11
Law on Waste Management	111/13
Law on the Environmental Protection Fund and Financing RS	117/11
Law on Hunting	60/09
Law on Concessions	25/02
Law on Changes and Amendments to the Law on Concessions	91/06, 92/09
Law on National Parks	75/10
Law on Organic Food Production	75/04
Law on Changes and Amendments to the Law on Organic Food Production	71/09
Law on Geological Research	51/04
Law on Changes and Amendments to the Law on Geological research	75/10
Law on Mining	59/12
Law on Protection against Non-Ionizing Radiation	2/05
Law on Water Resources	50/06
Law on Changes and Amendments to the Law on Water Resources	92/09
Law on Agriculture	70/06
Law on Amendments to the Law on Agriculture	20/07
Law on Changes to the Law on Agriculture	86/07
Law on Changes and Amendments to the Law on Agriculture	71/09
Law on Agricultural Land	93/06
Law on Amendments to the Law on Agricultural Land	86/07
Law on Changes and Amendments to the Law on Agricultural Land	14/10
Law on Veterinary Medicine in RS	42/08
Law on Forestry	75/08
Law on Genetically Modified Organisms	103/08
Law on Animal Protection and Welfare	111/08
Law on Chemicals	25/09
Law on Plant Health Protection in RS	25/09
Law on Biocides	37/09
Law on Energy	49/09
Law on Fisheries	72/12

## RS

Law on Plant Protection Products	52/10
Law on Beekeeping	52/10
Law on Spatial Planning and Construction	55/10
Law on the National Park "Kozara"	121/12
Law on the National Park "Sutjeska"	121/12
Law on National Parks	75/10

## Environmental laws in BD

## BD

Full title of the law	Official Gazette BD, No.
Law on Air Protection	25/04
Law on Amendments to the Law on Air Protection	19/07
Law on Changes and Amendments to the Law on Air Protection	1/05, 9/09
Law on Nature Protection	24/04
Law on Changes to the Law on Nature protection	1/05, 19/07
Law on Changes and Amendments to the Law on Nature Protection	1/05, 9/09
Law on Concessions	41/06
Law on Changes and Amendments to the Law on Concessions	19/07, 2/08
Law on Water protection in BD	25/04
Law on Changes and Amendments to the Law on Water Protection in BD	1/05, 19/07
Law on Spatial Planning and Construction	29/08
Law on Freshwater Fisheries	35/05
Law on Changes and Amendments to the Law on Freshwater Fisheries	19/07
Law on Forestry in BD BiH	14/10
Law on Waste Management	25/04
Law on Changes to the Law on Waste Management	19/07
Law on Changes and Amendments to the Law on Waste Management	1/05, 2/08, 9/09
Law on Environmental Protection	24/04
Law on Changes to the Law on Environmental Protection	19/07
Law on Changes and Amendments to the Law on Environmental Protection	1/05, 9/09
Law on Agricultural Land	32/04
Law on Changes to the Law on Agricultural Land	20/06, 19/07

## Environmental Decrees in FBiH

## FBiH

Full title of the decree	Official Gazette FBiH, No.
Decree on Classification Waterflows	(Official gazette of SRBiH, No. 19/80)
Decree on Categorization of Waterflows	(Official gazette of SRBiH, No. 42/67)
Decree on Single Methodology for Preparation of Documents Related to Spatial Planning	63/04
Decree on Hazardous and Harmful Substances in Waterflows	43/07
Decree on Selective Waste Collection, Packaging and Labelling	38/06



## FBiH

Decree on Building Structures and Interventions Important for FBiH and on Building Structures, Actions and Interventions that Can Largely Affect the Environment, Life and Health of People in FBiH and beyond it, for which the Urban Development Permit is Issued by the Federal Ministry of Spatial Planning	85/07
Decree on Changes and Amendments to the Decree on Building Structures and Interventions Important for FBiH and on Building Structures, Actions and Interventions that Can Largely Affect the Environment, Life and Health of People in FBiH and beyond it, for which the Urban Development Permit is Issued by the Federal Ministry of Spatial Planning	29/08
Decree on Types, Composition and Quality of Biofuel in Motor Vehicle Fuels	26/08
Decree on Forests	83/09
Decree on the Type and Contents of Plans for Protection against Harmful Effects of Water	26/09
Decree on Changes and Amendments to the Decree on Forests	26/10, 38/10
Decree on the Use of Renewable Cogeneration Energy Sources	36/10
Decree on Requirements for Discharge of Waste Water into the Natural Receiving Bodies and the Public Sewage System	4/12

## Environmental Decrees in RS

## RS

Full title of the decree	Official Gazette RS, No.
Decree on Classification and Categorization of Waterflows	42/01
Decree on Threshold Limit Values of Air Pollutants' Emissions	39/05
Decree on Phasing-Out of Ozone Depleting Substances	94/05
Decree on Projects Subject to Environmental Impact Assessment and Criteria for Deciding on Mandatory Implementation and the Extent of the Environmental Impact Assessment	7/06
Decree on Facilities whose Construction and Operation Requires a Valid Environmental Permit	7/06
Decree on Forests	83/09
Decree on Changes and Amendments to the Decree on Forests	26/10, 38/10
Decree on the Use of Renewable Cogeneration Energy Sources	36/10
Decree on Determination of Zones and Agglomerations	100/12
Decree on the Red List of Protected Species of Flora and Fauna in RS	124/12
Decree on Conditions for Air Quality Monitoring	124/12
Decree on the Limit Values of Air Quality	124/12
Decree on Installing the Republic Network of Measuring Stations and Measuring Points	124/12
Decree on the Management of Packaging and Packaging Waste	50/11, 7/12, 38/13
Decree on Fees for Pollution of Environment by Packaging Waste	101/12, 38/13

**A. Operational objective 1:** Advocacy, awareness raising and education

To actively influence relevant international, national and local processes and actors in adequately addressing desertification/land degradation and drought-related issues.

**1. Indicator CONS-O-1**

Outcome 1.1: Number and size of information events organized on the subject of DLDD and/or DLDD synergies with climate change and biodiversity, and audience reached by media addressing DLDD and DLDD synergies.

**Required data:**

- Information on events/media concretely dealing with DLDD and/or DLDD synergies with climate change and biodiversity.
- Only DLDD-related events organized by the main national stakeholders that national focal points have been informed on should be taken into account.
- Media products of only five leading national TV/radio channels and five most relevant national newspapers should be taken into account.

**Sources of data** – List of participants in the events (meetings, workshops, seminars), programme/project documents, main national media (TV/radio stations, newspapers), internet, organizers of events.

**2. Indicator CONS-O-3**

Outcome 1.2: Number of civil society organizations (CSOs) and science and technology institutions (STIs) participating in the Convention processes.

**Required data:**

- List of organizations included in programmes/projects in the reporting country applied in the PPS<sup>82</sup>.

**Sources of data** – PPSs submitted to UNCCD as part of the reporting exercise.

**3. Indicator CONS-O-4**

Outcome 1.3: Number of civil society organizations (CSOs) and science and technology institutions (STIs) in the field of education.

**Required data:**

- Information on initiatives in the field of education that can be found in: written communication of OCD and NTI with the national focal point; documents related to agreement and/or programme and/or project; archive of academic bodies and their curricula (plans and programmes); internet sources provided by OCD and NTI.
- Only those initiatives in education field undertaken in the country and that are directly related to DLDD issues will be considered.

**Sources of data** – Civil society organizations and science and technology institutions acting in the country.

## B. Operational objective 2 : Policy framework

To support the creation of enabling environment for promoting solutions to combat desertification/land degradation and mitigate the effects of drought.

### Indicator CONS-O-5

Outcomes 2.1, 2.2 and 2.3: Number of affected country Parties, sub-regional and regional entities that have finalized formulation/revision of APs/SRAPs/RAPs (Action programmes/Sub-regional action programmes/Regional action programmes) aligned to the Strategy, taking into account biophysical, socio-economic information, national plans and policies, and integration into investment frameworks.

#### Required data:

- UNCCD AP. Only the Action Programme (AP) officially approved by the relevant national authorities is to be considered as “Finalized”.
- Other relevant planning documents

**Sources of data** – UNCCD NFP.

### Indicator CONS-O-7

Outcome 2.5: Number of initiatives for synergetic planning/programming of the three Rio Conventions or mechanisms for joint implementation, at all levels.

#### Required data:

- Documents related to planning/programming and legal/regulatory documents.
- Information on operational mechanisms exclusively targeted to ensure joint implementation, synergies and alignment, as well as introduction or strengthening mutually reinforcing measures among the Rio Conventions.

**Sources of data** – Relevant national Ministries.

## C. Operational objective 3. Science, technology and knowledge

To become a global authority on scientific and technical knowledge pertaining to desertification/land degradation and mitigation of the effects of drought.

### Indicator CONS-O-8

Outcomes 3.1 and 3.2: Number of affected country Parties, sub-regional and regional entities that have established and supported a national/sub-regional/regional monitoring system for DLDD.

#### Required data:

- Information on monitoring systems established within national Ministries or other bodies/institutions.
- Programme/project documents and interim or final reports.

**Sources of data** – Relevant national Ministries, programme/project management units, other non-governmental sources.

### Indicator CONS-O-9

Outcomes 3.1 and 3.2: Number of affected country Parties, sub-regional and regional entities reporting to the Convention along the revised reporting guidelines on the basis of agreed indicators.

#### Required data:

- Reports of the UNCCD country Parties in 2012 and 2016.
- Information for reporting on this indicator will be prepared by affected country parties every four years along with reporting on strategic objectives that require biophysical and socio-economic information (i.e. SO1, SO2 and SO3). Reports on this indicator should be submitted only in 2012 and 2016.

**Sources of data** – UNCCD NFP

**Indicator CONS-O-10**

Outcomes 3.3 and 3.4: Number of revised national, sub-regional and regional action programmes (APs/SRAPs/RAPs) reflecting knowledge of DLDD drivers and their interactions, and of the interaction of DLDD with climate change and biodiversity.

**Required data:**

- Action programme (AP) aligned with the Strategy
- Consulted scientific literature in formulating/revising AP

**Sources of data** – UNCCD NFP

**Indicator CONS-O-11**

Outcome 3.5: Type, number and users of DLDD-relevant knowledge-sharing systems at the global, regional, sub-regional and national levels described on the Convention website.

**Required data:**

- Information from websites.
- Only DLDD-relevant knowledge-sharing systems will be taken into account.

**Sources of data** – Relevant organizations and Ministries providing space and maintenance of the knowledge-sharing system and networks on their websites.

**D. Operational objective 4: Capacity building**

To identify and address capacity-building needs to prevent and reverse desertification/land degradation and mitigate the effects of drought.

**Indicator CONS-O-13**

Outcomes 4.1 and 4.2: Number of countries, sub-regional and regional reporting entities engaged in building capacity to combat DLDD on the basis of national capacity self-assessment (NCSA) or other methodologies or instruments.

**Required data:**

- Information on initiatives for DLDD-related capacity-building; only those programmes/projects that are stated in the programme and project sheets that target DLDD-related capacity-building will be taken into account.

**Sources of data** – PPSs submitted to UNCCD as part of reporting exercise, programme/project documents and their interim or final reports that are established within PPSs to have targeted DLDD-related capacity-building.

**E. Operational objective 5: Financing and technology transfer**

To mobilise and improve the targeting and coordination of national, bilateral and multilateral financial and technological resources in order to increase their impact and effectiveness.

**Indicator CONS-O-14**

Outcome 5.1: Number of affected country Parties, sub-regional and regional entities, whose investment frameworks, established within the IFS (integrated Financing Strategy) devised by the GM or within other IFSs, reflect leveraging national, bilateral and multilateral resources for combating desertification and land degradation.

**Required data:**

- Investment framework documents.
- Only investment frameworks prepared along the guidelines devised within IFSs will be considered.

### Indicator CONS-O-16

Outcome 5.2: Degree of adequacy, timeliness and predictability of financial resources made available by developed country Parties to combat DLDD.

This is a qualitative indicator requiring the perception-based assessment by developing affected country Parties of the adequacy, timeliness and predictability of bilateral contributions received from developed country Parties for the implementation of the Convention. “Adequate”, “timely” and “predictable” resources are frequently referred to in the Strategy as being necessary to ensure proper planning and effective implementation. Sub-regional and regional reporting entities will complement the information provided by affected country Parties by reporting on their perception-based assessments.

**Only affected country Parties entitled to receive assistance under the UNCCD are requested to report on this indicator.**

### Indicator CONS-O-17

Outcome 5.3: Number of DLDD-related project proposals successfully submitted for financing to international financial institutions, facilities and funds, including the GEF.

#### Required data:

- PPSs and SFAs (Standard Financial Annex) submitted to UNCCD as part of reporting exercise.
- PPS requires specifying the “status” of the project and thus enables the identification of relevant projects to be considered under this indicator, as well as monitoring the status of their approval.
- SFA requires specifying the amount allocated to the approved projects.

**Sources of data** – State the sources used to obtain the above information:

PPSs and SFAs.

### Indicator CONS-O-18

Outcome 5.5: The amount of financial resources and type of incentives, which have enabled access to technology by affected country Parties.

#### Required data:

- Budgets of relevant programmes and projects
- Information on policy/regulatory, financial and fiscal incentives. Incentives facilitating access to technology are those established and implemented at the national level, not necessarily only within the framework of DLDD-related cooperation.

**Sources of data** – Financial documents of programmes and projects submitted as PPSs to the UNCCD as part of the reporting exercise; national policy, regulatory and economic/financial documents.



No.	Title of the documents
1	Action Plan on Sustainable Management of the Flood Risk in the Basin of the River Danube with an Application to the Sub-Basin of the River Sava for the Area of Republika Srpska 2010 – 2021, 2010
2	Action Plan for Implementation of the Study for Sustainable Development of Irrigation Surfaces in the territory of RS, 2008 – 2017, 2008
3	Federal Waste Management Plan, 2011.
4	State of the Environment Report of BiH, 2012
5	Cantonal Environmental Action Plans (KEAP) in FBiH
6	Local Environmental Action Plans (LEAP) in BiH
7	National Environmental Action Plan (NEAP) of BiH, 2003
8	Municipal Waste Management Plans
9	Phare - Solid Waste Management Strategy in BiH, 2000.
10	Spatial Plan of FBiH for the period 2008 – 2028, 2008
11	Spatial Plan of RS for the period 2008 – 2015, 2008
12	Strategy of Development of BiH, 2011
13	National Capacity Self-Assessment of BiH in the Implementation of Multilateral Environmental Agreements – NCSA, 2012
14	Climate Change Adaptation and Low Emissions Development Strategy for Bosnia and Herzegovina, 2013
15	Strategy of Development of the Brčko District BiH, 2008 – 2012, 2008
16	Strategy of Development of FBiH, 2010 – 2022, 2009
17	Poverty Reduction Strategy Paper, 2004
18	Environmental Protection Strategy FBiH, 2008
19	Strategy of Nature Protection RS, 2011
20	Strategy of Rural Development, Municipalities and Regional Development Strategies
21	Strategic Plan of Rural Development of RS, 2009 – 2015, 2009



Stakeholder	Importance (low / high)	Influence (low / high)	Participation in implementation (information / consultation / direct participation)
Ministry of Foreign Trade and Economic Relations of BiH	high	high	direct participation
Federal Ministry of Agriculture, Water Management and Forestry	high	high	direct participation
Ministry of Agriculture, Forestry and Water Management RS	high	high	direct participation
Federal Ministry of Environment and Tourism	high	high	direct participation
Federal Ministry of Spatial Planning	high	high	direct participation
Ministry of Spatial Planning and Environment RS	high	high	direct participation
Environmental Protection Fund RS	high	high	direct participation
Environmental Protection Fund FBiH	high	high	direct participation
Federal Institute for Agropedology	high	high	direct participation
Agricultural Institute RS	high	high	direct participation
Federal Institute for Agriculture Sarajevo	high	high	direct participation
Federal Agromediterranean Institute Mostar	high	high	direct participation
Cantonal ministries of agriculture, water management and forestry	high	high	direct participation
Cantonal ministries of environment	high	high	direct participation
Faculty of Agriculture and Food Science, Sarajevo	high	high	education, consultation, direct participation
Faculty of Agriculture, Banja Luka	high	high	education, consultation, direct participation
Faculty of Agronomy and Food Technology of the University Mostar	high	high	education, consultation, direct participation
Agromediterranean Faculty, Mostar	high	high	education, consultation, direct participation
Biotechnical Faculty, Bihać	high	high	education, consultation, direct participation
Faculty of Agriculture, East Sarajevo	high	high	education, consultation, direct participation
Agricultural Institute, Bijeljina	low	low	information
Agricultural Institute, Doboј	low	low	information
Agricultural Institute, Bihać	low	low	information
Agricultural Institute, Tuzla	low	low	information
Regional Environmental Centre for Central and Eastern Europe (REC)	low	low	information
Soil Science Society in BiH	low	low	information
Union of Cooperatives BiH	low	low	information
Society of Agricultural Engineers and Technicians	low	low	information
Chamber of Agronomy FBiH	low	low	information
Organization Fondoko	low	low	information



Title of project	Project duration	Financing source	Main results	Budget
Development of small-scale commercial agriculture	2010-2014	IDA and RS Government	Project development objective and its objective related to global environment is to ensure mechanisms for efficient and fair water distribution among consumers of Neretva and Trebišnjica river basins at transboundary level, and to improve the conditions of ecosystems and biodiversities in watersheds through improved water resources management.	Amount: US\$ 12 mil. <ul style="list-style-type: none"> <li>■ Repayment period: 20 years, grace period of 10 years, cost of service is 0.5 + 0.75%/y</li> <li>■ Total value of project for BiH: US\$ 14 mil.</li> <li>■ Project for RS: US\$ 6.1 mil.</li> </ul>
Project of sustainable forest and landscape management	2014 – project start, duration 60 months, operability is expected by mid-2014	GEF, implementation via the World Bank	Overall development goal of the project (PDO) and general environmental objective (GEO) of project of sustainable forest and landscape management is capacity building and demonstration of approaches for sustainable management of forests and land through integrated management of affected forest, intact forest and pasture landscapes  <u>Component 1</u> - Improve planning and control for the purpose of sustainable forest and landscape management  <u>Component 2</u> – Demonstration and replication of techniques of sustainable forest and landscape management in affected areas  <u>Component 3</u> - Project management	US\$ 4.2 mil for RS
Project of irrigation systems construction	2013 - 2017	International Development Associations (DA), RS Government and local community and users	Project includes the implementation of the first phase of Action Plan for implementation of the study of sustainable development of irrigation areas in RS (min. 5000 ha of installed irrigation systems) and support to strengthen the institutional capacities in the field of irrigation. Project implementation is in progress on two locations: Pelagićevo (202 ha) and Novo Selo (622 ha). Works are carried out as scheduled and it is expected that these two irrigation systems should be constructed before the beginning of irrigation season.	KM 35.4 mil.



Title of project	Project duration	Financing source	Main results	Budget
EIB – Water supply and sanitation in FBiH	2012 - 2017	<p>EIB loan, IPA grant, SIDA grant, Municipality and Environmental Protection Fund</p> <p>Total investment costs amount to EUR 121 mil. including preparation of project documents and management, price and technical reserves, as well as the interest rate during construction. Thus, local users' share in funding is 50% of their own funds.</p> <p>Financial agreement between EIB representatives and BiH representatives (MoFT BiH), Federal Ministry of Agriculture, Water Management and Forestry) was signed on 18 August 2008.</p>	<p>General objectives of this loan arrangement focus improvement of existing living conditions of population, establishment of adequate hygienic conditions in the field of water supply and waste water discharge, and introduction of measures for environmental protection in accordance with obligations related to EU accession and EU acquis, in particular the Framework Directive on Waters, Directive on Drinking Water and Directive on Municipal Waste Waters.</p> <p>The project covers priority investment sub-projects in water supply and waste water discharge sector in FBiH, the purpose of which is improvement of public health and environment. Individual projects cover the following Municipalities in the first phase: Usora, Doboj Jug, Široki Brijeg, Velika Kladuša, Bosanski Petrovac, Orašje, Tomislavgrad, Bosanska Krupa and the City of Mostar. Second phase includes Jajce, Bosansko Grahovo, Glamoč, Kupres, Prozor-Rama, Konjic, Čitluk, Stolac, Tešanj, Gračanica and Lukavac.</p> <p>The project also includes the preparation of projects related to program of measures for integrated management of water resources environment the Modrac reservoir, particularly with respect to waste water treatment plant to be constructed in the territory of Živinice.</p> <p>Technical components of each sub-project are as follows:</p> <ul style="list-style-type: none"> <li>■ Studies, design</li> <li>■ Reconstruction, upgrading or new construction (infrastructure of water supply systems, waste water treatment plant)</li> <li>■ Efficiency measures/ water and energy savings</li> <li>■ Supervision and technical assistance</li> </ul>	EUR 121 mil

Title of project	Project duration	Financing source	Main results	Budget
GEF – Water quality protection	30 September 2005 – 28 February 2011  Extended until 2015	GEF grant – US\$ 8.9 mil. (43.9%)  - Local share - US\$ 6.19 mil (30.60%)  - Foreign funding US\$ 5.18 mil (25.6%)	GEF is co-financing activities aimed at preventing: <ul style="list-style-type: none"> <li>■ Loss of biodiversity</li> <li>■ Degradation of international waters</li> <li>■ Risks of climate change acceleration</li> <li>■ Contamination with persistent organic pollutants</li> </ul> <p>GEF – Quality water protection project</p> <p>The project's objective is further strengthening of capacities of local utility companies and reduction of contamination from municipal sources in the Rivers Neretva and Bosna. The project will enable development of regional approach to contamination reduction, along with intensifying international cooperation in international waters; it will also diminish contamination of water from municipal sources in Neretva and Bosna Rivers. The project includes four utility companies: Mostar, Živinice, Trnovo and Odžak.</p>	Total value of the Project was US\$ 20.27 mil at the beginning.  Now it amounts to US\$ 40 mil since Mostar and Živinice were granted additional loans. Mostar will be at third stage and Sarajevo at second stage of financing, i.e. with additional funds in the amount of US\$ 400,000.
GEF – Management of Neretva and Trebišnjica Rivers	2010 – end of 2014	GEF, FBiH, Municipalities Ljubuški and Konjic, Environmental Fund	Development objective of the project and its objective related to global environment is to ensure mechanisms for efficient and fair water distribution among users of the Neretva and Trebišnjica river basins at the transboundary level, and for the improvement of the conditions for ecosystems and biodiversity in watersheds through improved management of water resources.	US\$ 6 mil for FBiH IFAD: US\$ 11.1 mil OPEC: US\$ 6 mil  Entity Governments: US\$ 2.5 mil  Users: US\$ 3.9 mil  Financial institutions: US\$ 2.1 million
Project of improvement rural living conditions (2010-2015)				US\$ 25.7 million
Project of cattle breeding and rural financing				IFAD loan for BiH: US\$ 12 million  RS Ministry of Agriculture: US\$ 2 million

Title of project	Project duration	Financing source	Main results	Budget
Project of forest development and conservation			<p>The project objective is to support implementation of mandatory reforms in forestry organization and forest management, which is expected to contribute to better managements of forests, increase of income from forest resources and participatory approaches to planning of use of forest land, through pilot learning activities.</p> <p>This three-year project consists of four components:</p> <p>Speed up the implementation of new legal, institutional and economic frameworks;</p> <p>Strengthen technical capacity for sustainable forest management;</p> <p>Promote biodiversity and forest conservation in both Entities;</p> <p>Implementation, monitoring and evaluation of the project.</p>	World Bank/IDA (loan): KM 2.84 mil
Special purpose funds for forests (continuously every year)	2010 – 2012			Ministry of Agriculture, Forestry and Water Management of RS: KM 16,293,961.81
FMPAP forest and mountainous protected areas				<p>World Bank: US\$ 1.7 mil</p> <p>Ministry of Spatial Planning, Construction and Ecology of RS: US\$ 1.255 mil</p>
Land use value map (Municipal, Cantonal levels)	Continuous	Ministry of Agriculture	<p>The main purpose of the project is to prepare thematic bases and maps, research and to analyse the area of a Municipality/Canton using GIS and remote sensing information sources (satellite and orthophoto) and, on the basis of these, define balances of land area use methods, identify certain types of land damages and make verification through capability classes, and analysis of pedological characteristics of soil types. In addition, the purpose is to analyse and research basic socio-economic factors affecting the methods of use of land area, primarily use of land.</p>	

