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AND NATURAL HABITATS

**Bern Convention Group of Experts
on Biodiversity and Climate Change**

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**COMPILATION OF NATIONAL REPORTS
ON ACTIVITIES RELATED TO
BIODIVERSITY AND CLIMATE CHANGE**

*Document prepared by
the Directorate of Culture and of Cultural and Natural Heritage*

CONTENTS / SOMMAIRE

1. Armenia / Arménie	3
2. Bosnia and Herzegovina / Bosnie-Herzégovine	5
3. Czech Republic / République tchèque.....	15
4. European Commission / Commission européenne.....	18
5. Latvia / Lettonie.....	20
6. Spain / Espagne	22
7. Sweden / Suède.....	26
8. United Kingdom / Royaume-Uni	28

1. ARMENIA / ARMENIE

PROGRESS IN IMPLEMENTING MEASURES ON BIODIVERSITY AND CLIMATE CHANGE IN ARMENIA

Preventing forest degradation, forest fires, pest invasion, and fostering collaboration between different actors involved in the forest protection and use are all targets addressed in the scope of the “Adaptation to Climate Change Impacts to Mountain Forest Ecosystems of Armenia” UNDP/GEF project in Armenia. The project is implemented by the Ministry of Nature Protection of the Republic of Armenia with assistance of UNDP. The project duration is 2009-2012. Financed through the Strategic Priority on Adaptation (SPA) as part of the Global Environment Facility’s Trust Fund, the Armenia’s project is in the global spotlight. The SPA is a pilot program with a total funding of US\$ 50 million allocated to 23 projects worldwide.

Armenia’s forest ecosystems are of a global conservation priority, listed by the WWF as a Global 200 Eco-region, and by Conservation International as a biodiversity hotspot. Containing nearly every plant community found in the Caucasus the protection of the Armenia’s mountain forest ecosystems is of critical importance as they are strongly vulnerable to climate change impacts. The forests are home to over 300 species of trees and bushes and include more than half the region’s floral diversity. Armenia’s forests also possess rare species found nowhere else on earth and form a vital eco-corridor that extends through the region.

Targeting 75,000 hectares of forest land to benefit, efforts are underway to protect sensitive and unique ecosystems. The project’s objective is to improve resilience of forests to increasing pressures posed by climate change. In cooperation with scientists, government officials, forestry enterprises, and local communities, the project is working in the fragile forests to reduce their vulnerability to climate change while helping communities to participate in and benefit from the adaptation efforts.

As part of the project, establishment of enabling environment for integrating climate change risks into management of forest ecosystems, introduction of innovative technologies for forest restoration, pest management and forest fire prevention is planned. Introduction of measures to reduce forest fragmentation and improve ecological restoration as means to improve resilience is underway: one pilot project is in the area with fragmented forests, another one is in the area of burnt forest. The experience of both pilot projects is unique for Armenia. Particularly the second project is designed to rehabilitate burnt juniper forest with no similar local experience over the last decades. Implementation of the third forest rehabilitation pilot project in the area affected by pest outbreaks and forest fire and is in the planning phase yet.

On national level substantive efforts are recently done in extending forest coverage under the protection to improve forest resilience. An obvious need identified is the improvement of pest monitoring system along with planned testing of an innovative pest control approach. An early fire warning and response system is going to be set up, in parallel with efforts to improve forest fire prevention measures. The staff of corresponding agencies is to be trained to increase their capacity.

Strong cooperation links are established with scientific community. Particularly, a study on forest pests and pestholes exacerbated by climate change and climate variability in along with identification of the most applicable environment friendly prevention measures for improving forest health management practices is underway.

Additionally, the project is working on advocating the importance of sustainable forest use practices and addressing climate change adaptation among governmental agencies, local communities, educational institutions, non-governmental and community based organisations. besides, the project plans raising awareness on forest fire prevention and working with local forest enterprises, tourist organizations, farmers and communities to reduce activities that lead to forest fires.

Guided by the principle of prevention, collaboration, and cooperation, the project may have important consequences for local and regional forests, and will serve as an example for other ecosystems in need of conservation.

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2. BOSNIA AND HERZEGOVINA / BOSNIE-HERZEGOVINE

B&H development scenarios should include expected changes of biodiversity (B&H development is significantly based on biodiversity), as well as assess expected changes in nature, especially in nature as a resource (for example, changes in precipitation and hydrology, as a natural element, as well as changes in usage of waters in energy, agriculture and supply of the population and industry).

ASSESSMENT OF VULNERABILITY

1. Natural Ecosystems

Bosnia and Herzegovina is characterized by very high degree of biodiversity. The latest data point out that there are 5134 types of vascular flora in the area of Bosnia and Herzegovina, which places it at the very top of the European countries in terms of the ratio between its surface and the number of flora species.

In B&H, there are developmental endemic centers, in which processes of development of new species have occurred.

From this aspect, particularly significant are highly mountainous areas, such as the endemic center of Herzegovina (Prenj, Cvrstica and Cabulja mountains), as well as canyons of the rivers Una and Neretva and their tributaries in the river heads, which are at the same time very sensitive to disturbances.

The biggest value have species of plants which are precisely related to these areas, which include numerous paleoendemics, neoendemics, as well as tertiary and glacial relics which have been kept in refugia in these areas.

The assessment is that there are around 450 endemic taxa in the flora of tall plants, at which the biggest value have numerous stenoendemics, i.e. taxa that have very limited distribution zone.

1.1. Biodiversity and geodiversity in B&H

Bosnia and Herzegovina has a particularly rich biodiversity due to its location in three distinct geological and climatic regions: The Mediterranean region, the Euro Siberian-Bore American region and the Alpine-Nordic region. According to some authors, it is divided to four main biogeography regions: (1) mountains and river valleys (1.28 million ha), (2) lowlands in the Pannonian region (2.25 million ha), (3) Mediterranean region (0.5 million ha), and (4) Karst region (1.08 million ha). According to this, it may be concluded that geographic, geologic, climate and historical diversities and factors have provided for development of a very diverse spectrum of ecosystems on a horizontal and vertical profile, from the sea level to the highest top of the Maglic Mountain at 2386 m.

It is home to a number of endemic species and habitats, and the location of relict centers-refuge of tertiary flora and fauna, preserved today in the specific conditions of paleo-climate. B&H is one of the countries in Europe with the greatest diversity of species of plants and animals. Vascular flora counts for about 5 000 confirmed taxa of species, subspecies, and variety and form level. As much as 30% about of the total endemic flora on the Balkans (1 800 species) is contained within the flora of Bosnia and Herzegovina. There are still no reliable data on the number of bacteria, blue-green bacteria or blue-green algae, but they are estimated to more than 2 000 species. Lichen and moss are poorly documented, as are fungi, although it is estimated there are several thousand fungi. Fauna inventories are more advanced and indicate that the animal kingdom is rich and diverse, particularly in comparison to other countries in the Balkans and in Europe. This rich biodiversity is endangered. Today there is a large number of registered domesticated plants in fruit growing, wine growing, tillage, vegetable growing and horticulture that are only preserved in certain parts of the country. There were previously a number of indigenous breeds of bovine cattle, sheep, goats, horses, donkeys and dogs. These are now decreasing and some are becoming extinct. B&H has extremely high level of diversity of biotopes (habitats), i.e. geodiversity. This is contributed by specific orography, geological surface, hydrology and ecoclimate. Given the area of the country and the number of registered

geological rarities, Bosnia and Herzegovina is one of the countries with the greatest diversity in Europe and worldwide. Even though it is under significant anthropogenic pressure, geodiversity is still locally preserved, and it requires an adequate sustainable management regime. Centuries of coexistence and a broad range of interactivity between biological and geologic diversity, are best reflected in extremely high diversity of landscapes, in the whole area of Bosnia and Herzegovina. However, many landscapes are now changed, devastated, and degraded through different anthropogenic activities and transformed into lower forms of ecological organization (NEAP, 2003).

1.2. Direct impact on biodiversity and ecosystems

Global climate change impact on recent biodiversity is more exposed and many studies are published on that subject. But, there has been lack of studies that are treating climate changing problem and their regional and local influences on biodiversity. Few studies about climate changes influence on agriculture and forestry in Bosnia and Herzegovina has been published. As far as the author of this text has known there haven't been studies which are treating problem of climate changing influence on biodiversity, their sensitivity and adaptation. There haven't been created models that could be used for valuation possible change areals on plants and animals communities in Bosnia and Herzegovina too. In biodiversity protection strategy in Bosnia and Herzegovina is pointed on climate changing problem and possible influence on some landscaping systems in Bosnia and Herzegovina. Therefore, there haven't given concrete examples for some species, and models of changing areals haven't been created for specific ecosystems, plants and animals communities. Based on existing researches and available literature we will valuate climate changes and the valuation of possible influence on agroecosystems in Bosnia and Herzegovina. Applying fast socio-economical development scenario with balanced usage of energetic sources and applying technological advancement in all forms of productions and extreme consumption of energy, with all significant differences in projections of future emitting green house gases, in the region of Southern east Europe which includes Bosnia and Herzegovina, in the end of 21st Century can be expected increase of mean annual air temperature for about 3.5 °C comparing with year average temperature in last decade of previous Century. Temperature increase like that would be followed with rainfall reduction on a year level of 12% with the most reducing during spring and summer seasons for about 16-24%. Beside these regional climate changes caused by global climate changes, significant changes could be expected in a local area. In that context, following that scenario of partially application of measures for declining emitting of greenhouse gases, on the territory of Bosnia and Herzegovina could be also expected the increase of air temperature for 3-4 °C under the average by the end of 21st Century. In that thermal conditions, in next few decades could be expected significant reduction of days with snow, reduction of rainfall in warm half of the year which would be resulted with reduction of soil humidity and availability of water resources. Reduction of summer rainfall on territory of Bosnia and Herzegovina would be under 20% by the end of the century, and towards climate models in the worst possible scenario (continuing the usual practice of emitting of greenhouse gases), the increase of air temperature would be even bigger and rainfall deficit could reach 40% during the summer. Based on Predic T. (2001.b) in FAO project is fortified frequency and extension of dry period for climatology station Banja Luka in two periods (1962-72 & 1992-2000) which averagely had equal quantity precipitation quantity per year. There have been compared lands with capacity of 50 mm (shallow land) and 100 mm (deep land). Results pointing on the fact that in period 1962-1970 dryness appeared three times, and in period of 1992-2000 even five times. Therefore, it is alarming the fact that that in 1998, 1999 and 2000, the dryness is appearing every year. Dryness period, for shallow land with water capacity of 50 mm which are mostly on sand (euteric and distric cambisol) and there are dispersed in the area of Bosnian Posavina, and there will be under the more influence.

Fig.1.2.1. Number of dry days in period 1962-1970 and 1992-2000 for land with 50mm and 100 mm water capacity.

It is evident that the number of dry days is increased in period 1992-2000., even the average precipitation quantity on a year level is not significantly increased. Precipitation regime for months is significantly disturbed, meaning that for agroecosystems is more improper because the lack of precipitation is evident in vegetation period. Increasing dryness period trend is continued after 2000 and as an example we can point and last year (2007) which was the warmest year in Bosnia and Herzegovina for last 100 years. Beside, from previous text results that land with more capacity for

water in the same climate conditions has shorter dryness period. Researches of Trbic, G. et al, 2007 pointing that the vegetation period in Bosnia and Herzegovina is increased in one month period and also natural vegetation starts fenofaze development a month before, so it matching with spring on calendar. Increasing of intensity and dryness frequency ,as precipitation regime changing on Bosnia and Herzegovina territory is pointing on necessity of detail researches of climate changes and possible influence, not only on biodiversity but also on food production, water resources, natural ecosystems etc. which are indirectly related to biodiversity, and intending of mitigation of negative consequences.

0 50

100

150

200

250

501mm 1002 mm

Capacity lands for water

No day

1962-1970.

1992-2000.

1.3. Impact on ecosystems services

The areas of Bosnia and Herzegovina which are the most sensitive to global climate changes are defined by the strategy for the protection of biodiversity, inhere including an action plan. High-mountainous and mountain ecosystems, on the basis of an up to now conducted research on global climatic changes in B&H, are exposed to the biggest impact. In other words, the areas whose altitude is higher than 1 500 meters above sea level have a faster increase of an average temperature than when compared with the areas of different altitude. Beside that, extremes in temperature represent the biggest pressure that is being exerted on the areas, what is especially visible in warmer season of the year, leading to melting and drying, and with it, to a threat that many glacial and boreal relicts and their habitat would be destroyed. On a biodiversity of high-mountainous and mountain areas negatively impact acid rains, which appear as a result of over-pollution of the atmosphere. Acid rains, to a large extent, change the PH value of a habitat, especially of surface layers composed of accumulated humus, with which are again connected the most intensified processes of decomposition of organic matter and active part of risosphere. Decreasing of the PH value in basic species lead to a reduction in their number, what has an impact on the cycles of reproduction. In that way it may happen that

some stenovalent species and forests disappear, especially those growing at dolomites and dolomit lime-stones. When we talk of forest ecosystems, the most endangered ones are the fir-tree forests, which, taking into account the temperature and humidity, have a very narrow ecological valence. Contrary to them, the beech-tree forests have a very broad ecological valence, and it is expected that they become more prevalent in forests which are composed of a combination of both beech-tree and fir-tree. Ecosystems of submediterranean forests and underwoods, and of karst caves and basins, as a result of global climate changes, are exerted the pressure by the soil becoming sour. Peripannonian and hilly ecosystems are the most in danger only after highmountainous and mountain ecosystems. If we take into account the calculated changes of temperature, the biggest pressure would be exerted to the oak-tree forests, that means the cork-oak-tree and English-oak-tree forests. The cork-oaktree forests are the lowest forests at the territory of Bosnia and Herzegovina, and the scope of altitude they grow at is from 280 to 860 m. (altitude amplitude is very low – 580 m). Moving of the cork-oak-tree and English-oak-tree onto the areas of higher altitude is disabled due to their heavy seed. (Burlica, C., Travar, J., 2001). Beside that, in case the increase in temperature is accompanied by an increase in dryness that will result create the conditions for slowing down of the decay of forest ground vegetation, which, under those conditions, would decompose slowly. As a result of that, a layer of raw humus would be formed, what would for a consequence lead to the process of subsolation in the soil, and a significant decrease in biodiversity in a lower layer of vegetation.

Pannonian ecosystems (natural and cultural) are endangered the most by the floods, as one of the main factors which significantly change the quality of a habitat. In itself, the floods have a high

percentage of nutrients, what brings to the nitrification of the soil and underground waters. Changes of PH values that appear as a result of that cause acidiphil plants and pedofauna to disappear. The floods are one of the dominant factors in the expansion of invasive species. In this way, at the area of Bosnian Panonija many species of weeds have found their habitat. With the aim to prevent from flooding, along the river Sava, the levees have been raised, which significantly changed the shape of the natural surrounding of those areas.

A key problem of an impact of climate changes onto biodiversity and ecosystems in B&H represents an adaptation of forest ecosystems to climate changes which happen very quickly. Undertaking of responsive measures in terms of maintaining the forests can to a certain amount lower social and economic consequences of a decay of forests under the influence of global climate changes. Defining of the protection measures for forest ecosystems require more advanced research of an impact of regional climate changes on the forests, and an analysis of the socioeconomic potentials leading to a decay of forests.

In the area of Bosnia and Herzegovina, the following main groups of climate change effects on biodiversity are to be expected:

1. Shift of vegetation zones (layers) in a horizontal and vertical direction,
2. Shift and changes in areals of individual taxa of flora and fauna,
3. Extinction of individual species,
4. Changes in the quality and quantity composition of biocenoses,
5. Fragmentation of habitats,
6. Changes in functioning of ecosystems.

Impact on plant species

Impact on biocenosis of the soil

Impact on biocenosis of fresh waters

Physiological and ecological impact on fauna

Impact on coastal ecosystems

With impact of changes in the regime of temperature and precipitation on biodiversity of coastal ecosystems of the Adriatic coast, the change of the sea level will also make an impact. For the Mediterranean area, projection of the sea level increase is from 34 – 52 cm. Habitats and biocenoses which will be directly exposed to these impacts are low coastal areas, for example, coastal sand, salina and estuaries. Changes in physical, hydro-dynamic, biological and chemical parameters may be expected, with accompanying quality and quantity changes in the components of biocenoses. Serious consequences to biocenoses of fresh waters may cause warming of water surface layer and deeper breakthrough of brackish water into estuaries. Damage or disappearance of certain valuable coastal habitats in these erosive processes may be expected. Direction of changes or impact on individual taxonomic groups is hardly predictable. Rivers of the Dinara catchments basin will be very much affected, particularly the Neretva and Trebišnjica rivers. The Neretva River area has been, due to its biological specificities, protected and included in the list of valuable swamp habitats according to the RAMSAR Convention (Hutovo Blato), possible negative trends are extremely negative.

Impact on protected areas

Application in the areal of individual species and communities may have impact on locations under protection. This may lead to the need to change the borders of national parks: NP “Tjentište” (Foca), NP “Kozara” (Prijeedor) and newly founded NP “Una”. “Mitigating circumstance” is that borders of these parks have not been precisely defined even today, and they have also not been determined in accordance with biological criteria. However, as these long-term processes and possibilities of correcting these failures are in question, potential need to take into account climate change effects on these borders may be pointed out. Aggravating circumstance is that only around 2% of the B&H territory was categorized of protected areas.

Most vulnerable ecosystems and areas

Bosnia and Herzegovina has a particularly rich biodiversity due to its location in three distinct geological and climatic regions: The Mediterranean region, the Euro Siberian-Bore American region and the Alpine-Nordic region. According to available data and their analysis, climate change will affect all the three macroregions in Bosnia and Herzegovina. In the context of negative trends on biological diversity, i.e. decrease of number of species per unit of space, the most endangered are the Alpine-Nordic region and the Mediterranean region. The area of the Dinaride will be particularly endangered, as a very important and rich center of endemic species of the Balkan Peninsula. This mountainous chain is recognizable because of exceptional biological and geomorphological significance. The rivers of the karst areas and ecosystems developed along these may be particularly endangered, such as the areas of karst rivers.

Priorities of future policy frameworks

In line with, the following gaps and limitations have been identified for the purpose of prioritising future policy frameworks, measures and actions:

- Incoherency and incongruity between strategic and development documents (in forestry, agriculture and water management) and biodiversity management;
- Lack of well-defined socio-related research addressing the current problems in the fields of biodiversity and implementation of relevant international conventions and directives;
- Very low level of public awareness of the importance of biodiversity for preservation of fundamental environmental values, in particular in climate change management;
- Extremely low number of scientists, experts and institutions focusing on biodiversity and its preservation,
- Lack of financial resources and funds for scientific research in the field of climate change and biodiversity as well as the environment as a whole.

Priority tasks:

- Carry out the Initial National Communication on Climate Change and to identify in it the impact of climate change on biodiversity and adaptation measures;
- Establish a framework setting down long-term activities aimed at addressing the problem of climate change;
- Establish a framework for adoption of a national climate change adaptation strategy as a general adaptation plan;
- Define measures and activities for mitigation of the impact of global climate change on biodiversity and ecosystems in BiH;
- Improve the body of knowledge on global climate change, especially in connection with the anthropogenic effects on global climate change and their potential impact on biodiversity in BiH;
- Develop and perform vulnerability analysis for ecosystems (including agro-ecosystems) and habitats against projected climate change;
- Develop a set of recommended adaptable monitoring measures for conservation and restoration;
- Assess the existing environmental monitoring programme for the purpose of determining whether there is a need for additional monitoring of biodiversity and communication of new climate change information;
- Develop scientific tools for assessing the impact of climate change on local fish and wildlife populations and habitats;
- Assess the vulnerability of forest resources to climate change (special attention will be given to the understanding and development of management practices so as to reduce, to the extent possible, the risk of forest fires and insect pest outbreaks);

- Comprehensive training assistance to small landowners, increased possibility for fire control planning and proper management of public land;
- Develop a database on the effects of climate and products on forestry practices (e.g. reforestation techniques and pest control) which are considered most adaptable to climate change as well as information on how to reduce the risk of forest fires and insect pest outbreaks;
- Ensure that the actors in South-East Europe and national adaptation teams are provided with up-to-date information on the impact of climate change on forests and the preservation of forests through relevant seminars, workshops and media outlets.

PRIORITY PROJECT PROPOSALS

The priority projects to be financed focusing on obstacles and methods for overcoming them can be grouped as follows:

- ✓ Projects relevant for increasing energy efficiency,
- ✓ Projects focusing on the use of renewable energy sources,
- ✓ Projects aimed at removing obstacles to efficient energy use,
- ✓ Projects in agriculture.

It is necessary to develop the Climate Change Mitigation Strategy and Action Plan. The Strategy containing short-, mid- and long-term objectives with regard to implementation of the Convention and the Protocol will set a framework for the Action Plan. The Action Plan should identify the policy tools, technical and other measures, organisation, responsibilities, costs, funding options and implementation timeframe. It is necessary to involve all stakeholders and the general public in the development of the Strategy and the Action Plan. The Strategy should:

- define the national policy on mitigation of climate change in BiH and the relationship with the national economic and development plans;
- define the policy, measures and activities that are necessary for implementation.

The issue of climate change refers to a series of economic areas and requires changes to the behaviour of each individual as a user of natural resources. The process of developing the national strategy is an opportunity to increase general knowledge on climate change issues, discuss open issues and make progress towards integration of the climate change policy in different sectors in line with national developmental priorities and principles of sustainable development. It is necessary to:

- Carry out a needs assessment with the aim of:
 - making an in-depth analysis of institutional, legislative, organisational, HR and financial needs for the purpose of developing capacities of the UNFCCC and Kyoto Protocol implementation system.
 - gathering information about good practices in the transition countries and developed countries of the European Union that have adopted the strategy and action plans for implementation of the UNFCCC and the Kyoto Protocol.
- Ensure that implementation monitoring mechanisms are put in place
- Ensure the improvement of knowledge on causes and effects of climate change in BiH
 - Establish international cooperation with the countries that are already implementing the Convention and the Kyoto Protocol, encourage the transfer of knowledge, experience and good practices in capacity development, and promote cooperation in projects focused on reducing GHG emissions.

BiH is certainly adversely affected by CC and will be affected even more in the future. As a Contracting Party to the UNFCCC¹, BiH must cooperate in order to adapt to the impacts of CC and it has to address CC in its sectoral policies, in order to minimise its effects on the environment.

The NEAP does not take CC into consideration very much² and no specific programme or activity on CC and biodiversity has been undertaken in BiH yet. As previously mentioned, there is a general lack of monitoring and reporting in the field of biodiversity. This is especially the case for the most vulnerable biotopes and species.

Considering BiH's ecological and socio-economical context, it is recommended to focus CC activities related to nature and biodiversity, on forest and water resource management. Priority should be given to the mountain regions and wetlands, which constitute a major part of the nature and biodiversity in BiH; CC will probably affect these ecosystems the most.

The ECCP Working Group on biodiversity outlines the position of the EU and indicates priorities for action in the area of biodiversity, which is reflected in the following list of EU policies:

- the Birds, Habitats, WF, EIA and SIAs Directives;
- the Countdown 2010 programme;
- the biodiversity strategy and communication.

The working group also recommended paying more attention to the integration of biodiversity into sectoral policies, especially in the field of agriculture and in relation to invasive species. It emphasises the necessity to set up ecological networks³ and promote all measures that seek to provide connectivity between natural habitats and that mitigate the fragmentation of the EU landscape. These conclusions confirm the necessity for BiH to set up a network of PAs, as well established (?) ecological corridors that secure the functional connectivities between areas of high biological values. They also emphasise the need to establish a monitoring system that gathers all data and information on the state and trends of nature and biodiversity. These activities should be carried out in accordance with the Pan-European Biological and Landscape Diversity Strategy (PEBLDS).

The discussions and meetings conducted with local stakeholders during the project, at all levels of responsibility, national, entity and local, led to conclusions that can be summarized as follows:

- **a lack of reliable data and the absence of monitoring system for biodiversity;** efforts were made which partly fill this gap but work still needs to be done to gather, up date and complete the statistics and data on nature and biodiversity, and to build a Nature Information System (NIS) as required by EU and national regulations;
- **a lack of long-term vision on the values and functions of natural resources and ecological services;** nature and biodiversity are still not considered as important assets for the welfare and economy of the country. The concept of ecological services, a central concern of the EU strategy on biodiversity, should be promoted and better understood by the local actors. There is a need for information and awareness raising measures that should be targeted at the economic values of biodiversity;
- **insufficient PAs and the absence of a coherent functional network of PAs, in compliance with the CBD decisions and the EU regulation;** few PAs meet international criteria and these areas only represent a very limited part of BiH's biodiversity. Furthermore, these PAs do not have enough human, technical and financial capacities to be appropriately managed and they do not build a functional network as required by international and EU regulations;

¹ Date of ratification : 7 September 2000 ; date of entry into force: 06 December 2000 (Source : UNFCCC). BiH has also acceded to the Kyoto protocol 16 April 2007 (date of entry into force: 15 July 2007) and would ratify it in the very near future.

² "Future research will be directed towards this issue and growth of consumption of natural resources (water resources above all)" (Source: BiH, 2003, p 27).

³ Ex.: Natura 2000 for the EU States, the Emerald network for the other European States, the Pan European Ecological Network (PEEN).

- **weak governance, illustrated by a complicated institutional framework and a lack of coordination between entities;** an inter-entity coordination body should be set up to ensure a coordinated approach of the activities undertaken at the national level in the field of nature and biodiversity;
- **lack of capacities, at all levels and in both, public and private sectors;** it is crucial to strengthen local capacities and to increase local expertise on EU policies and legislation;
- **inadequate legislation and weak enforcement of mechanisms, combined with a partial transposition of EU Directives;** in the light of the conclusions of the review of the transposition of EU regulations on the environment, BiH should make efforts to comply with the legal requirements of the EU, in the field of nature and biodiversity. All regulations that may have an adverse impact on nature and biodiversity should be further assessed and priority actions to be carried out should be determined in order to harmonise entity regulations and to make BiH legislation in full compliance with the EU directives. This effort should be accompanied by a strong political commitment to enforcement of this legislation;
- **absence of a cross-sectoral approach between national and entities policies and strategies;** this is a crucial issue. Most of the public policies adversely affect but can also significantly contribute to the preservation of natural resources and to the maintenance of the ecological services. The IPA project should foster an holistic approach and promote activities seeking to strengthen cooperation between the different socio economic sectors;

Before going into further detail on the recommendations, a few additional comments are made:

- as said in the introduction of this report, the recommendations here do not respond to all needs arising from the current situation. They seek to contribute as much as possible to fill the identified gaps and focus on the main legal obligations of the EU Members States, in the field of nature and biodiversity;
- this project proposal should only be understood as a contribution of the EU, parallel to other donors, with the aim to facilitate further accession of BiH to the EU;
- particular attention was paid to the follow up of the many activities in BiH, aimed at preserving natural heritage and the wise use of biological resources, which are on going or have already been completed.

The gaps identified in this report constitute the baseline for an IPA project design, in addition to:

- the IPA design, which can provide support for activities in BiH relevant to transition assistance and institution building;
- the EU commitments for 2010, its action Plan, and its ten priority objectives, which aim at halting the erosion of biodiversity in Europe by 2010 and beyond.

CONCLUSION

BiH hosts a unique biodiversity, which has in many cases, still good conservation status. The need to protect its natural resources in the long-term is a constraint as well as a heavy responsibility for BiH. However, nature and biodiversity also have important values and functions and they provide BiH with opportunities for the development of many socioeconomic activities in the future.

If the authorities take the decisions needed to develop the country in a sustainable way, activities based on the use of nature and biodiversity can contribute to the well being of local people and the development of the country.

According to the terms of reference, it was required to make a gap analysis of the implementation of BiH international obligations and existing BiH legislation in the field of nature and biodiversity. It was also required to assess BiH's situation with regard to EU policy and legislation.

The analysis led to the identification of many weaknesses that are described in this report. General objectives and priority activities are recommended to strengthen BiH capacities and to assist BiH in meeting the challenge of nature and biodiversity protection in compliance with EU requirements.

The recommendations in chapter 3 of the report indicate selected and very concrete activities although some of them have a more strategic character and will need a longer preparation and implementation process. This report has been designed to facilitate the development of a EU project potentially funded by IPA resources. It draws a roadmap for a comprehensive programme of activities on nature and biodiversity that would prepare BiH for its accession to the EU. These activities cannot all be completed in the three years period of the IPA project. However, most of them can at least be initiated during this period of time, if sufficient funding is available.

Regarding the protection of nature and biodiversity in line with EU commitments, it is not only a matter of vision, strategy and policy but it is also a matter of day to day activities at the local level. That is what this report tries to put forward, the necessity to work very practically, in the field, in close cooperation with all local stakeholders.

To conclude, according to the terms of reference of this project, a draft IPA fiche for the development of a “**Nature and Biodiversity Programme and Action Plan in BiH**” based on the results of the present assessment must be developed. This fiche will be finalized by mid-July 2008 after discussions with the main stakeholders at a workshop to be held in BiH, on 9 July. This fiche will contain proposals for the contents, budget and timetables to implement the activities recommended in this report.

Ecosystems and biodiversity

Changes to BiH's climate are already occurring over natural variability (e.g. long-term spatial and temporal changes in rainfall and temperature patterns), and these changes are expected to have an impact on the country's biological diversity. BiH is one of the richest countries in Europe in biological diversity, in particular in wild plants and animals. Unfortunately there are a number of risk factors endangering the biodiversity in BiH. Amongst them are: illegal construction of buildings, manufacturing facilities, infrastructure, and others, excessive exploitation of natural resources, Non-participation in international projects such as Natura 2000, pollution, and many others.

More information on the impacts of climate change on the nature and the response measures envisaged could be found in “Assessment of Biodiversity and Nature Conservation Capacities in BiH according to EU Standards”.

In order to implement successfully the adaptation measures, BiH needs to take full advantage of the available **donors' support**. The UNFCCC provides a variety of support mechanisms to encourage the implementation of adaptation actions in developing countries. Negotiations on the operationalisation of these mechanisms are ongoing under the UNFCCC and there are already sources of funding for adaptation through the Global Environment Facility (GEF). These include: the GEF Trust Fund, the Special Climate Change Fund, and the Least Developed Countries Fund. Adaptation projects implemented under these funds are being operationalised through the implementing and executing agencies of the GEF. Additional funding is forthcoming through the Adaptation Fund under the Kyoto Protocol. The current available funding under the UNFCCC process, however, is not likely to be sufficient to cover adaptation needs of the developing countries. There is a clear need for allocating national resources to adaptation measures.

International and intergovernmental organisations are increasingly undertaking work on climate change impacts, vulnerability and adaptation. Such organisations include: the United Nations Development Programme, the United Nations Environment Programme, the World Bank, the Food and Agriculture Organization of the United Nations, the United Nations International Strategy for Disaster Reduction Secretariat, the United Nations Department of Economic and Social Affairs, the World Health Organization, the World Meteorological Organization, the Asian Development Bank, the World Conservation Union, the Organisation for Economic Co-operation and Development, the South Pacific Regional Environment Programme, and the International Federation of Red Cross and Red Crescent Societies.

The EU provides support to agriculture under the EU Instrument for Pre-Accession Assistance for Rural Development. If used wisely, it could simultaneously help facilitate the transition process in the agriculture sector and advance the EU integration agenda.

When developing the BiH First National Communication with the support of the UNDP, general aspects of the vulnerability are going to be assessed and adaptation measures identified. On the basis of the outcomes of the National Communication, a policy framework for implementing adaptation measures should be developed.

3. CZECH REPUBLIC / REPUBLIQUE TCHEQUE

BIODIVERSITY AND CLIMATE CHANGE –REPORT OF THE CZECH REPUBLIC

The amended **State Nature Conservation and Landscape Protection Programme of the Czech Republic** was approved by the Government of the Czech Republic in November 2010 (MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC 2009a). Under Chapter *Landscape* there is formulated a target concerning biodiversity and climate changes - to preserve and improve ecological stability (*e.g.*, resistance and resilience) of the landscape by maintaining a network of biologically and ecologically significant elements, through a mosaic of connected biologically functioning elements (habitat patches) which are able – to some extent - to resist external negative effects including climate change. One of the key actions is up-dating of the Territorial System of Ecological Stability of the Landscape (TSES, a national multi-level ecological network, *cf.* MACKOVČIN *et al.* 2005) documentation. The network provides preservation of natural heritage including its richness, diversity and heterogeneity, favourable impact on the surrounding less healthy parts of the landscape, and forming a basis for multiple use of the landscape.

In May 2009, a draft version of the **Climate Protection Policy of the Czech Republic** was presented by the Ministry of the Environment of the Czech Republic (MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC 2009b). Since August 2009 a Strategic Environmental Assessment of the Policy has been under preparation and it is expected that the official statement from the above procedure on the topic will be released in June 2010. The final document should be adopted by the Government of the Czech Republic by the end of 2010 (most likely). Climate change has been already occurring in the Czech Republic and as projected, it will have further negative impacts. It is therefore necessary to adopt measures that will keep the undesirable consequences of climate change within acceptable limits. The document deals particularly with the urgent need to stabilize and reduce greenhouse gas concentrations in the atmosphere.

The purpose of the Policy is to propose functional measures and procedures, but not to replace other policies and strategies. The target of the Policy is to reduce greenhouse gas emissions by 20 % between 2005 and 2020 (*i.e.* by 40 % compared to 1990 level). Meeting the target is ambitious but feasible with full and timely use of suitably chosen measures and instruments. The shift in energy mix of the Czech Republic should lead up to 50 % reduction of CO₂ emissions of the energy sector (depending on the decision on use of nuclear power). The second highest potential is in reduction of the buildings energy intensity, the use of more energy-saving appliances and the installation of more efficient lighting. Various other measures to support increase in energy efficiency and reduce greenhouse gas emissions should be introduced in the transport, industry and agriculture sectors. The cumulative reduction potential of all included measures was calculated to be 28 million tones of CO_{2-eq.} a year by 2020.

The Policy addresses the adaptation issue only in general terms. Regarding the agricultural and forestry sectors the Policy deals particularly with following measures: reduction of methane production in agriculture, reforestation/afforestation, soil carbon sequestration, better efficiency of agricultural production and support of sustainable agriculture. Specific measures relating to biodiversity conservation will be included in the Strategy of Adaptation to Climate Change in the Czech Republic which has been under preparation, as mentioned below.

The Ministry of the Environment of the Czech Republic has prepared an outline of the **Strategy of Adaptation to Climate Changes in the Czech Republic** (MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC 2009) based on the draft of the **Strategy on Adaptation Measures in Nature and the Landscape** ((MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC 2009c).), which was also approved by the Government of the Czech Republic in November 2010. By late September 2010, the document shall be elaborated by the respective ministries, so that the Ministry of the Environment of the Czech Republic shall be able to submit to the Government a comprehensive national strategy on the topic by the end of 2010. The draft strategy is not limited to

simple description of the possible impacts of current and expected climate change on the landscape as a whole and on its individual components, but also proposes a range of the specific measures on how to cope with the consequences of changing climate for nature and the landscape in a reasonable manner in the Czech Republic. The documents summarize the current and projected climate change effects on four main ecosystem types, namely: forest, aquatic, agricultural and urban. It also analyses financial sources, both domestic and the European Community's funds, with proposals for their changes to enabling implementation of adaptation measures in the landscape by various stakeholders. The Strategy also includes a gap analysis of the current legislation according to various sectors.

In July 2009 the Ministry of the Environment of the Czech Republic launched a new subsidiary scheme, the Landscape Natural Function Restoration Programme (LNFRP) and allocated 34.17 million CZK (1.3 million €) for it in 2009. The LNFRP focuses, *inter alia*, on supporting adaptation measures in the landscape related to the existing and projected climate change effects in water, non-forest and forest ecosystems. For the climate change adaptation measures, everybody can apply and the implementation is possible within the whole Czech Republic's territory.

The Ministry of the Environment of the Czech Republic has granted financial support to the following projects:

Czech Terra - adaptation of landscape carbon sinks in the context of global changes.

<http://aplikace.isvav.cvut.cz/projectDetail.do?rowId=SP%2F2D1%2F93%2F07>

The main objective is to track and evaluate possible climate change adaptation mechanisms in the Czech Republic; to elaborate possible climate change adaptation mechanisms and significantly influence health, resistance and resilience of forest ecosystems; to develop various stress scenarios which can pose, in the near future, a risk to ecosystem health in the Czech Republic; with established dynamic information system it will be possible to determine changes in ecosystems and landscape components across the country associated with climate change; such information system will be accessible to experts and decision-makers.

Specification of current estimations of impacts of climate change in the sectors of water management, agriculture and forestry management, and adaptation measures. proposals.

<http://www.isvav.cz/projectDetail.do?rowId=SP%2F1A6%2F108%2F07>

The main objective is to develop and up-date climate change scenarios for the Czech Republic for 2021-2050, 2071-2100 respectively, to specify expected impacts of climate change in hydrology, water management, agriculture and forestry, to propose relevant adaptation measures and to support implementing the National Programme to Abate the Climate Change Impacts in the Czech Republic.

Long-term changes in abundance and distribution of water-birds in the Czech Republic in relation to climate and environmental changes. The main objective is assess possible effects of climate changes and other external drivers on the model ecological/functional group (waterfowl) in the Czech Republic: the outputs of the study can be applied in nature conservation practice.

<http://www.isvav.cz/projectDetail.do?rowId=SP%2F2D3%2F109%2F07>

The impact of forest management type on biodiversity of forest ecosystems in the context of global climate change. The main objective is to evaluate the importance of selected impacts of forest management on the biodiversity of indicator groups of organisms in relation to the stand condition on the basis of gathering already existing and newly collected sets of data.

<http://www.isvav.cz/projectDetail.do?rowId=SP%2F2D1%2F146%2F08>

The dynamics of spreading of invasive plant species in the Czech Republic taking into account different scenarios of global climate change. The objective is to select suitable predictive systems for the Czech Republic; to develop alternative maps of possible invasive alien plant species distribution under the individual global change scenarios; to develop maps (identification possible monitoring sites, sub-national centres of biodiversity threatened by plant invasions, identification of sites for effective early warning and intervention); to summarize possible economic consequences based on invasive plant management; to draft a proposal of plant invasion management strategy/policy.

<http://www.isvav.cz/projectDetail.do?rowId=SP%2F2D1%2F37%2F07>

There have been many interim studies already presented, which can be seen under the same links.

One of the most important national forestry documents is the **National Forests Programme for the 2008- 2013** (approved by the Government of the Czech Republic). It also focuses on climate change issue. Under the Environmental pillar there is the Key Action 6 which reads: “*To alleviate impacts of expected global climate change and extreme meteorological phenomena*”.

Elaboration of the Key action 6 has been in progress. Partial outcomes of the Expert Group for the action indicate huge interest in increasing the proportion of broadleaves and in increasing the number of tree species used in particular stands. Changes in existing recommended guidelines for forest management regarding the tree species composition of future stands can also be one of the solutions. The key idea is to raise stands formed by three tree species in minimum, so that the species dominance would be 3 x 20% at least. This would definitely contribute not only to adapting forests in the Czech Republic to climate change, but also to support forest biological diversity. Proposals for other measures helping to increase biodiversity are expected as well – *e.g.* to support natural regeneration or enhance environmentally friendly afforestation of farmlands.

However, the whole Key action 6 has not yet been approved by the National Forest Programme Coordinative Board so it is necessary to wait for its endorsement, which is expected by the end of 2010.

In 2010, the Czech Geological Survey and the Ministry of the Environment of the Czech Republic launched an annual painting competition for schoolchildren and teenagers between the age of 6 and 18 years called *My Patch of Earth*, held under the auspices of the Ministry of Education, Youth and Sports of the Czech Republic. Children were invited to produce paintings on their visions of the future world, answering the question *How shall the world of humans, animals and plants look like if huge climate changes occur?* (<http://soutez-2010.geology.cz>).

REFERENCES

MACKOVČIN P., PETŘÍČEK V. & PLESNÍK J. (2005): Ecological networks in the Czech Republic.

Commissioner General Office for the Participation of the Czech Republic at the World Exposition EXPO 2005 (Aichi, Japan) Prague, 46 pp.

MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC (2009a): Amendment of the State Nature Conservation and Landscape Protection Programme of the Czech Republic. Prague (in Czech).

MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC (2009b): Climate Protection Policy in the Czech Republic. Preliminary draft. Prague (in Czech).

MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC (2009c): Strategy of the Ministry of the Environment of the Czech Republic on the adaptation measures in the landscape in connection with climate change. Unpublished draft, Prague (in Czech).

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4. EUROPEAN COMMISSION / COMMISSION EUROPEENNE

The European Commission has set up an EU Ad Hoc Expert Working Group on Biodiversity and Climate change in autumn 2008. The Working Group collaborates with the ENCA (European Nature Conservation Agencies) adaptation group, the Group of Experts on Biodiversity and Climate Change under the Bern Convention, the AHTEG (Ad Hoc Technical Expert Group) on Biodiversity and Climate Change established under the CBD (Convention on Biological Diversity) and the Intergroup Climate Change, Biodiversity and Sustainable Development of the European Parliament.

One of the main outputs of the work of this group so far is the Discussion Paper - Towards a Strategy on Biodiversity, Ecosystem services and Climate Change".⁴ This includes consideration of the Natura 2000 network and ecological connectivity, and the role of biodiversity and ecosystem services with regards to combating climate change. More information on the work of the group as well as background documents are accessible via the CIRCA group "Biodiversity and Climate Change": http://circa.europa.eu/Public/irc/env/biodiversity_climate/home.

The White Paper on "Adapting to climate change: Towards a European framework for action" was adopted on 1 April 2009 together with a number of staff working papers, i.e. the Impact Assessment, documents on "Adaptation and Health", "Climate Change and Water, Coasts and Marine Issues" and a report on "Adapting to Climate Change: the challenge for European agriculture and rural areas". All documents are available on the DG CLIMA adaptation website.

Most relevant with regards to biodiversity and ecosystems is the sub item 3.2.3 of the Adaptation White Paper: Increasing the resilience of biodiversity, ecosystems and water and the related action points which include: "Explore the possibilities to improve policies and develop measures which address biodiversity loss and climate change in an integrated manner to fully exploit co-benefits and avoid ecosystem feedbacks that accelerate global warming"; and secondly "draft guidelines by 2010 on dealing with the impact of climate change on the management of Natura 2000 sites".

The White Paper also mentions an Impact and Adaptation Steering Group (IASG) which is supposed to be supported by other technical groups. The Ad Hoc Expert Working Group on Biodiversity and Climate Change is to serve as the technical group on biodiversity, ecosystem services and ecosystem-based approaches to adaptation – short "ecosystem-based adaptation".

The European Commission together with the Swedish Presidency held a side-event on "Ecosystem-based approaches - Convenient solutions ready for use" at UNFCCC COP 15 in Copenhagen in December 2009. The presentations have been webcasted and can be watched under <http://www.se2009.eu/en/1.26298> or downloaded from the CIRCA site of the EU Ad Hoc Expert Working Group on Biodiversity and Climate Change http://circa.europa.eu/Public/irc/env/biodiversity_climate/home.

The **Environment Council Conclusions** adopted on 22 December 2009⁵ include the following paragraphs:

...

RECOGNISES that financing of activities to mitigate and adapt to climate change should contribute to the conservation and sustainable use of biodiversity, ecosystem services and socio-economic co-benefits, based on appropriate criteria;

9. EMPHASIZES the need for targeted and strengthened actions to effectively reverse the loss of forest cover and the loss of forest biodiversity through, inter alia, action at global level within the initiative on Reducing Emissions from Deforestation and Forest Degradation (REDD), and forest conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+), based on an active participation by developing countries, keeping in mind the objectives of the EU to

⁴ See http://ec.europa.eu/environment/nature/pdf/discussion_paper_climate_change.pdf

⁵ See http://www.se2009.eu/polopoly_fs/1.28576!menu/standard/file/112041.pdf

reduce gross tropical deforestation by at least 50% by 2020 compared with current levels and halt global forest cover loss by 2030 at the latest

10. HIGHLIGHTS the mitigation and adaptation potential of resilient wetlands, oceans, forests, peatlands and grasslands and other ecosystems, and that conservation, restoration and sustainable use of these ecosystems result in carbon emission reductions, carbon storage and increased adaptation potential; RECOMMENDS the development and use of ecosystem-based approaches for the mitigation of and adaptation to climate change;...

The **Commission Communication "Options for an EU vision and target for biodiversity beyond 2010"** (COM(2010) 4)⁶ refers to the climate change – biodiversity link:

... As well as having intrinsic value, biodiversity delivers 'value' through ecosystem services, for example through the provision of food and water, by offering natural protection from floods and storms, and by regulating the climate. ...

... Since nature is both the most effective climate regulator and the largest carbon sink, biodiversity loss jeopardises climate objectives. Strong and resilient ecosystems are our life insurance against climate change, providing a 'natural fix' for mitigating and adapting to its consequences. ...

... Also, since biodiversity provides many of the same services as man-made technological solutions, often at significantly lower cost, protecting and restoring biodiversity provide some cost-effective opportunities for climate change mitigation or climate change adaptation. As natural resources are inputs to a wide range of economic activities, restoring their status and enhancing their use may raise productivity or develop new sources of growth, through eco innovation process. ...

... It should be a priority to seize all opportunities to make progress towards biodiversity policy goals while at the same time delivering cost-effective climate change mitigation and adaptation. ...

At the **poster session at CBD SBSTTA 14** in May 2010 a poster "Working with –Nature – Ecosystem-based approaches to climate change adaptation and mitigation"⁷ was presented in the name of the EU Ad Hoc Expert Working Group on Biodiversity and Climate Change and the ENCA adaptation Group referring to the discussion paper and the ENCA workshop report⁸.

ONGOING WORK

The **EU Post 2010 Biodiversity Strategy** is currently being developed. The promotion of working with nature – green infrastructure – ecosystem-based approaches is under discussion as one of the potential sub-targets for the EU Post 2010 Biodiversity Strategy. A dedicated strategy on Green Infrastructure is envisaged for 2011.

The **International Year of Biodiversity** shall also mark the collaboration of the three Rio Conventions (CBD, UNFCCC and UNCCD). A High-level Meeting of the United Nations General Assembly on 22 September 2010 is being prepared as a contribution to the International Year of Biodiversity. It is stressed – *inter alia* - that biodiversity and the climate change crises are inextricably linked and it is demonstrated that determined action to conserve and sustainably use biodiversity and ecosystem services contributes significantly to climate change adaptation and mitigation while providing additional benefits. A Rio Conventions' Ecosystems and Climate Change Pavilion is planned at upcoming CBD, UNFCCC, CCD COPs and Rio + 20 to raise awareness and encourage partnerships. The European Commission is supporting this initiative.

⁶ See http://ec.europa.eu/environment/nature/biodiversity/policy/pdf/communication_2010_0004.pdf

⁷ See http://circa.europa.eu/Public/irc/env/biodiversity_climate/home

⁸ See <http://www.bfn.de/fileadmin/MDB/documents/service/Skript264.pdf>

5. LATVIA / LETTONIE

1. The policy documents:

The Climate Change Mitigation Programme for 2005-2010 was elaborated and approved in 2005; mainly aiming at reduction of emissions and use and development of different types of energy resources;

A new Climate Change Adaptation Policy is under preparation;

The National Environmental Policy Strategy (containing chapters “Climate Change” and “Biodiversity”) was approved in 2009 and aims to minimize the clash between biodiversity conservation and climate change mitigation measures.

The State Program for Environment Monitoring was approved in 2010 (containing chapters “Air monitoring program”, “Water monitoring program”, “Land monitoring program” and “Biodiversity monitoring program”)

2. Projects

The Faculty of Geography and Earth Sciences of the University of Latvia as a partner was involved in the INTERREG III B project "Developing Policies & Adaptation Strategies to Climate Change in the Baltic Sea Region" (ASTRA) (2005-2007).⁹ The main objective of the project was to assess regional impacts of the ongoing global change in climate and to develop strategies and policies for climate change adaptation.

INTERREG IVC Project: FUTURE forest - Woodlands for Climate Change (2008-2011)

Project partner – the Ministry of Agriculture; activities carried out in cooperation with Latvian State Forestry Research Institute “Silava” and Latvian Forest Owners’ Association

The project aims to ensure that future European forests continue to deliver multiple benefits and to leave future generations forests that are well adapted and resilient to natural risks, including effects of climate change.

3. Research

Several researches were and are being done on climate change and its impact, major of them:

National Research Program „Climate Change Impact on Water Environment in Latvia”¹⁰ starting from 2006. Scientists in Latvia have joined forces to investigate how climate change will potentially influence Latvian lakes, rivers and the Baltic Sea coast and coastal waters, and to elaborate scientifically justified proposals to adapt to and mitigate adverse impacts;

“Importance of Genetic Factors on Formation of Forest Stands with High Adaptability and Qualitative Wood Properties” (2009-2012) – funded by ESF, lead by State Forestry Institute “Silava”. The aim of the project is to unit competence in forest research, chemical engineering and biology sectors, attracting young professionals and foreign experts, to analyze the potential impact of the genetic factors of pine, spruce and hybrid aspen to increase the adaptability and improve the wood.

“Adaptation of forestry to climate changes” (2010-2011) – funded by JSC “Latvia’s State Forests”, lead by Latvian State Forestry Research Institute “Silava” in cooperation with University of Latvia. Project aims to improve Latvian-scale predictions of climate variables, important for forestry, considering both tree growth and development (trends) of diseases, insects, possible damages from abiotic factors, and provide recommendations for minimization of possible adverse effects of climate changes on forest sector. During the project also methodology for further in-depth studies of identified most important factors in relation to climate changes and sustainable forest management will be developed.

⁹ www.astra-project.org

¹⁰ <http://kalme.daba.lv>

„Solutions for maintenance and improvement of productivity, resistance, genetic diversity, and propagation ability of coniferous trees in conditions of Global climate changes” (2009-2012) – funded by Latvian Council of Science, lead by State Forestry Institute “Silava” – concentrates on specific aspects of selection and propagation of trees (genotypes), resilient to several possible adverse effects of climate changes.

6. SPAIN / ESPAGNE

CLIMATE CHANGE AND BIODIVERSITY IN SPAIN: IMPACTS, VULNERABILITY AND ADAPTATION

A total of 59 “courses of action” are proposed relating to natural resources (inc. agriculture) and 24 relating to economic sectors (thus, 83 in all). Thirteen measures are listed under biodiversity.

Policy/institutional measures

- Promotion of greatest possible genetic variation in ecosystems as a basis for adaptive capacity in the light of climate change
- Development of guidelines and handbooks for management of agricultural systems with a view to short term climate change, based on simple strategies for changing farming practices such as sowing dates
- Development of the most sensitive climate change indicators for use in implementing WFD.
- Climate change to be incorporated as a variable to be considered in ecosystem restoration projects

Technical/research measures

- Monitoring soil degradation/desertification via erosion and soil carbon loss
- Assessment of carbon balances for different Spanish ecosystems
- Assessment of effects of climate change on alien spp in Spain

Implementation measures

- Consolidation of long term monitoring networks and integration of information to detect effects of climate change
- Identification of biological indicators system for climate change, and devising of protocols to set up a vigilance system for early warning

The UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, in its article 4.1b, states that all Parties to the Convention shall “formulate, implement, publish and regularly update national programmes containing measures to facilitate adequate adaptation to climate change”. Spain signed the Convention in June 1992, the ratification took place on December 1993 and it has entered into force on March 1994.

The ECCE PROJECT (A preliminary assessment of the Impacts in Spain due to the effect of Climate Change, 2005) was the first national evaluation of climate change effects in Spain. It was developed by a group of more than 400 experts in different ecological systems, and economic and social sectors. The ECCE project dealt with the impacts of these projected climate changes on 15 sectors and systems.

The NATIONAL PLAN FOR THE ADAPTATION TO CLIMATE CHANGE (NPACC) is the reference framework for the coordination of all activities related to the evaluation of impacts, vulnerability and adaptation to climate change in Spain.

The NPACC, promoted by the SPANISH CLIMATE CHANGE BUREAU (MINISTRY OF ENVIRONMENT), was presented in February 2006 to the ENVIRONMENTAL SECTORAL CONFERENCE (administrative body that embodies the cooperation between Central Government and Autonomous Communities in environmental policy issues), and has been approved by the relevant national participation and coordination bodies dealing with Climate Change: NATIONAL COMMISSION FOR THE COORDINATION OF CLIMATE CHANGE POLICIES (Administrations) and the NATIONAL CLIMATE COUNCIL (Administrations and stakeholders) in July 2006. Its main objective is the integration of the adaptation to climate change in the planning strategy of, initially, fifteen sectors and systems through a series of Work Programmes. Under the first

Work Program, the priority sectors and activities considered are the generation of regional climate scenarios and the evaluation of the impact of climate change in water resources, coastal areas and biodiversity.

Climate change and biodiversity in Spain: Impacts , vulnerability and adaptation

The MINISTRY OF ENVIRONMENT started in 2006 the preparation of a project to assess the impacts of climate change on biodiversity and to make informed decisions on practical adaptation actions and measures.

The project –started in January 2008 and with a planned duration of two years– involves the participation of the UNIVERSITY OF EXTREMADURA (flora species and habitat types) and the NATIONAL MUSEUM OF NATURAL SCIENCES-CSIC (fauna species).

The main objective of the project is to assess the impacts and vulnerability of biodiversity to climate change, as well as the adaptation measures required to prevent biodiversity loss related to climate change. For this purpose, representative series of habitat types, flora and fauna taxa, are being selected taking into consideration relevant criteria for biodiversity conservation like geographic distribution, conservation status, degree of threat, etc.

In order to evaluate the effect of climate change on biodiversity, the territory has to be analyzed not only in terms of its current natural characteristics (elements, structure and natural processes), but considering also the potentiality of what the territory can house.

Land cover and vegetation maps, as well as biodiversity inventories and other natural resources information, provide us with a general scope of current biological richness. But it is also necessary to estimate the predicted situation in the future, incorporating the projected change(s) provided by different climate scenarios and predicting future species and habitat types distributions. This is considered a very important issue, especially in areas like the Iberian Peninsula where all climate change models predict substantial variations in biodiversity limiting factors, like rainfall regime or maximum temperatures.

The project can be differentiated in two main working lines:

- Development and application of methodologies to assess climate change impacts on biodiversity (APPLIED INVESTIGATION)
- Promotion of participation mechanisms for relevant partners like Public Administrations, researchers/academic institutions, NGOs, etc. and development of information campaigns (COMMUNICATION AND PARTICIPATION)

APPLIED INVESTIGATION

It comprises the application of statistical modelling and spatial analysis techniques aiming to:

- Assess the potentiality of the territory to house flora and fauna taxa and relevant habitat types.
- Assess the expected changes in this potentiality under several climate change scenarios for the XXI Century.
- Evaluate changes in biodiversity distribution patterns along different time horizons of the XXI

Century and identify species turnover rates, including the identification of areas of persistence, disappearance and colonization.

It is important to highlight that the assessment of biodiversity changes in response to climate change is an evolving field of work, and it entails some constraints:

- First, neither biological data nor the simulations required to evaluate the nature and extension of future changes in ecosystems and taxa distribution are still complete, so the predicted effects can only be partially assessed.
- Second, in the current state-of-the-art of predictive habitat and species distribution modelling techniques, the species-climate envelope modelling approach –also known as ecological niche modelling– has been widely used to support estimates of species' extinction risk under climate

change; despite the fact that other important influences related to biological factors (i.e. dispersion, interactions among living organisms, habitat fragmentation) and anthropic factors (i.e. changes in land use, pollution) can not be fully assessed. In this context, the proposed approach has to be seen as a first step to assess the complex response of biodiversity to climate change, but in the light of current scientific knowledge, it is considered appropriate: (1) to evaluate biodiversity vulnerability to climate change, (2) to estimate the expected impacts of climate change on our natural heritage and (3) to identify those biodiversity elements that can be more seriously threatened by climate change. Results of this project are intended to provide decision-makers with tools to facilitate the prioritisation of actions and to assess adequate adaptation measures.

The key activities to be developed under this working line are:

- Selection of biodiversity elements (flora and fauna taxa and habitat types) representative of Spanish biodiversity, taking into consideration conservation status and degree of threat.
- Development and integration of nationwide geographic databases of current taxa and habitat types potential distributions, environmental variables –including bioclimatic variables both for present-day and future climate scenarios–, protected areas, land use and infrastructures, etc.
- Application of statistical modelling methods to project spatial shifts in potential species and habitat types distributions according to different climate change scenarios
- Identification of biodiversity distribution patterns –both at present-day and in the different climate change scenarios– and of species turnover rates, including the identification of areas of persistence, disappearance and colonization
- Assessment of the interaction between the impacts of climate change on biodiversity and land use planning considering –for instance– connectivity, habitat fragmentation, etc.
- Proposal of adaptation measures to reduce the impact of climate change on biodiversity, including the identification of priority fields for further investigation and research.

Communication and participation

It comprehends the development –in parallel to Working Line 1: Applied Investigation– of communication campaigns and participation processes with relevant agents involved in biodiversity management, research, investigation, monitoring and public awareness. Spain is characterised by a highly decentralised administrative system, where Autonomous Communities (Regional Governments) have significant regulatory and management powers, including biodiversity and nature conservation. In this context, the Central Government and Regional Governments are obviously the main agents due to their responsibility in biodiversity management, but the scientific and academic community (researchers and scientists) and the Non-Government Organizations are also relevant ones, taking into consideration their role in investigation, research and monitoring, and public awareness. Besides, specific actions to inform stakeholders will also be implemented.

The objective of this working line is to promote the participation of these agents by means of the development of a communication strategy, the promotion of inter-disciplinary working groups and discussion forums where project development and results can be presented and adaptation measures can be discussed.

The key activities to be developed under this working line are:

- Presentation of the project at its first stages to relevant administrative and scientific bodies, and to the media.
- Establishment of participation mechanisms with the administrative authorities and scientific community, aiming to inform on project development and to promote synergies with related initiatives.
- Dissemination of the results of the project and starting of a wide debate for the assessment and discussion of adaptation measures in the framework of current biodiversity management policies,

priorities for investigation and research and need of reconsideration of environmental and sectoral policies in light of the predicted impact of climate change on biodiversity.

It will report on the findings of the second conference "Bird Migration and Global Change: movement ecology and conservation strategies" held in Algeciras, Spain from 17 to 20 of March, 2010.

7. SWEDEN / SUEDE

Sweden facing climate change – threats and opportunities, SOU 2007:60

The final report¹¹ from the Swedish Commission on Climate and Vulnerability was published in October 2007. The Swedish Government appointed the Commission in June 2005. The Commission has analysed how the climate of Sweden may develop over the next hundred years. Important aspects that have been investigated are vulnerability to floods, landslides and storms.

Terrestrial, marine and freshwater ecosystems will face great upheavals, and the loss of biodiversity may increase. The commission propose various measures to reduce vulnerability and adapt society to long-term climate change and extreme weather events.

Biological diversity and climate changes – What do we know? What do we need to know? What can we do?

The Swedish Biodiversity Centre (CBM) has made a report¹² in 2007 on different aspects of climate change and biodiversity. It includes published knowledge as well as interviews with scientists, officials and people working practical with nature conservation. The report is an enclosure to the final report from the Swedish Commission on Climate and Vulnerability.

CBM points out that effects of climate change on biodiversity must be determined in relation to other effects, above all land use and economization of nature resources. Land use that is negative for biodiversity today will continue to be so even in a changed climate. The conservation work on biodiversity should therefore not be narrowed down to focus on the effects of climate change only.

Instead we need to be aware and prepared for additional problems linked to climate change, for example changes in cultivation. An important conclusion of the report is that changes in cultivation due to climate change could have larger impacts on biodiversity than the climate change itself.

Effects on biodiversity in a changing climate in Stockholm

The local authority in Stockholm has made a report on the effects of climate change on biodiversity in the area of Stockholm. It is based on published knowledge as well as interviews with scientists, officials and consultants. The report¹³ describes the knowledge of today as well as the additional knowledge and analyses that will be needed to adapt the city to the climate change and effect on biodiversity. For example, new requirements and system-boundaries will be necessary in management and administration of natural areas.

Nordic nature management in a changing climate

The Nordic Council of Ministers has made a report¹⁴ in 2005 that describes how the climate and nature may develop in the Nordic Region south of the Arctic Circle in the next 100 years. The report also describes how effects of climate changes can be integrated in nature conservation and management.

Ongoing activities at the Swedish Environmental Protection Agency

Climate change is a priority area at the Swedish Environmental Protection Agency. Potential risks have been mapped to get a general view of potential vulnerabilities to climate changes in the working area of the Nature Department. For example, we need to be more alert on the status of species depending on cold water, how the saltiness in the Baltic Sea develop and how the tree line develop on high mountains.

The climate change bill which gives the Swedish EPA “an assignment to investigate the effect of CC on the loss of biodiversity and ecosystem services and to investigate possible actions to minimize

11 <http://www.sweden.gov.se/content/1/c6/09/60/02/4b04b42e.pdf>

12 <http://www.cbm.slu.se/publ/annat/bmochklimat.pdf>

13 <http://www.stockholm.se/upload/Fackforvaltningar/Miljoforvaltningen/VaxthuseffektenPdf/Anpassning/Biologisk%20mangfald.pdf>

14 <http://www.norden.org/pub/miljo/miljo/sk/TN2005571.pdf>

the negative effects”. However, biodiversity and ecosystem services are not addressed any further than that, as the bill focuses on emission reduction and strengthening the use of renewable energy etc.

Ongoing activities at the Swedish Board of Agriculture

During 2009-2010 the project “Climate change and its effects on biodiversity in the agriculture landscape” has been ongoing. The objective of this study was to explore the effect of climate change on biodiversity in the agricultural landscape. The project was performed by University of Lund and the Swedish University of Agriculture Sciences commissioned by the Swedish Board of Agriculture. The study includes red listed species of vascular plants, butterflies, as well as amphibians and reptiles, and was based on existing regionally adopted climate scenarios (IPCC).

The result of the study shows that many species in the agriculture landscape actually will be positively affected by climate change, but at least in the short term, management practices will still be overarching in effect, positively or negatively. The local species pool might change as the area of distribution of many species will shift northwards. In the future, biodiversity is expected to be effected by a combination of management practices, climate change and other related pressures such as increased nitrogen deposition. However, as the climate scenarios contain some uncertainties, it is not possible to predict what species will be most affected, but meanwhile focusing on management of road verges and other potential dispersal corridors in the landscapes will be a good investment in order to retain viable populations in the future.

8. UNITED KINGDOM / ROYAUME-UNI

UK NATIONAL REPORT ON BIODIVERSITY AND CLIMATE CHANGE

Climate change legislative framework/background

- The **Climate Change Act 2008** (http://www.opsi.gov.uk/acts/acts2008/ukpga_20080027_en_1) and **Climate Change (Scotland) Act** made the UK the first country to introduce a long-term legally binding framework to tackle climate change with targets in legislation and five yearly carbon budgets. The Acts also introduced a framework for adaptation including a UK-wide Climate Change Risk Assessment (CCRA) every five years with an initial report within three years, and a National Adaptation Programme (to cover England) to be laid before Parliament after the first CCRA to address the most pressing impacts.
- Government also requires public authorities and 'statutory undertakers' (companies such as water and energy utilities) to report to Government on how they have assessed and will address climate change risks. Around 90 priority organisations have been instructed to report in 2010-11 and further 60 have been invited to report. The first in a series of **Climate Change Plans** by UK Government Departments emphasising the importance of sustainable adaptation were published in March 2010.
- **Defra's plan** (<http://www.defra.gov.uk/environment/climate/documents/climate-change-plan-2010.pdf>) is supplemented by *Natural Environment: Adapting to Climate Change* (<http://www.defra.gov.uk/environment/climate/documents/natural-environment-adaptation.pdf>) which sets out an approach to sustaining the benefits from the natural environment in the face of a changing climate and highlights the crucial importance of a healthy natural environment in enabling society to adapt.
- For Scotland **The Climate Change (Scotland) Act 2009** received Royal Assent on the 4th August 2009. It created the statutory framework for greenhouse gas emissions reductions in Scotland by setting an interim 42 per cent reduction target for 2020, which can be varied according to expert advice, and an 80 per cent reduction target for 2050. To help ensure the delivery of these targets, the Act requires Scottish Ministers to set annual targets, in secondary legislation, for Scottish emissions from 2010 to 2050. The Act includes other provisions, including adaptation, forestry, energy efficiency and waste reduction. Scottish Natural Heritage (SNH) have produced: "**Climate Change and the Natural Heritage - SNH's Approach and Action Plan**" which sets out their strategic priorities and key actions, for delivering them over the next few years.
- The **UK Climate Change Projections 2009**, published in June 2009 set out the latest scientific evidence base: <http://ukclimateprojections.defra.gov.uk/>

Adaptation Measures taken for Biodiversity in face of Climate Change

- The majority of the **forestry actions** are outlined in Defra's Climate Change Plan in the sections on forestry and green infrastructure. Further actions will flow from the Climate Change Risk Assessment for forests and forestry in England (due end of 2010). This sector level Risk Assessment will feed in to the National Climate Change Risk Assessment (for 2012). Forestry actions on Biodiversity and Climate Change to date include:
 - Public consultation on new **forestry Climate Change Guidelines** – planned for November 2010
 - Drafting of **Practice Guidance for Ancient Native Woodlands** – publication planned for summer 2010
 - Publication of the **Read Report: Combating Climate Change** in November 2009 <http://www.forestry.gov.uk/forestry/infd-7y4gn9>
 - An internal review of grants and regulations in the context of climate change has established where the EU co-financed English Woodland Grant Scheme (eWGS). This will feed into a comprehensive review of eWGS – to be published in 2011.

- **A Climate Change Action Plan for the Public Forest Estate in England** – to be published in summer 2010
- Promotion of tree planting and peri-urban woodland through eWGS to adapt the urban environment to climate change and provide new habitat for wildlife
- The England Biodiversity Strategy (EBS) workstream on climate change adaptation is working with the England Woodland Biodiversity Group to embed adaptation principles for biodiversity delivery.
- In March 2009, Natural England published assessments of the **likely implications of climate change for the natural environment in four English landscapes**: the Norfolk Broads, Cumbria High Fells, Shropshire Hills and Dorset Downs – <http://naturalengland.etraderstores.com/NaturalEnglandShop/Search.aspx>. These aim to improve our understanding of vulnerability to climate change and how to develop adaptation strategies for conservation over large areas. The approach has now been refined and extended to eight new study areas (with reports to be published in 2010).
 - Assessment of the vulnerability of species, habitats and ecosystems and the implications for biodiversity is an important part of all these studies. The potential consequences for wildlife are identified as well as potential adaptation actions.
- As part of the same project, Natural England is **developing and testing practical methods to estimate relative vulnerability** of the terrestrial natural environment, to help inform our conservation efforts in a changing climate. This is being done in three regions in England, covering a wide variety of habitat types:
 - In the South East region using a GIS grid model to undertake a spatial analysis
 - In the North West, the approach evaluates the vulnerability of the 29 individual landscape areas ('National Character Areas') in the region
 - In Warwickshire, West Midlands, vulnerability assessment is part of a larger study to identify areas for potential habitat expansion.
 - Reports on these studies will be published in 2010.
- **Assessment of climate risks to conservation objectives** – Natural England has begun a programme to assess climate threats and opportunities and identify possible actions across all its work. In 2009/10 Natural England identified the risks and possible responses for land management and is now considering how adaptation actions that benefit biodiversity can be implemented through schemes such as Environmental Stewardship (an agri-environment scheme funded under the Rural Development Regulation). Other risk assessments are being undertaken in 2010.

Scientific publications and Research

- The UK statutory conservation agencies (JNCC, CCW, SNH, NE and NIEA) published in May 2010 a booklet: "[Biodiversity and Climate Change - a summary of impacts in the UK](#)"
- **The National Ecosystem Assessment**, covering the terrestrial, freshwater and marine ecosystems across the UK has now released its first chapters, reviewing the past and current status of the services provided by the UK's ecosystems, for extensive scientific peer review. These chapters will be finalised in September 2010 and will include a specific chapter covering biodiversity. The National Ecosystem Assessment is currently assessing how ecosystems and the services they provide may change in future in response to a number of drivers, including climate change, and will consider how society may respond to those possible changes. The final report of the National Ecosystem Assessment will be published in spring 2011.
- **Adaptation research and monitoring of environmental change** – Natural England has a series of research and monitoring projects that address some crucial questions for biodiversity conservation in a changing climate:
 - **Long term monitoring of environmental change** - this project is establishing a series of sites where the impacts of climate change can be monitored and identified through producing long term time series of a range of environmental variables. This is currently being set up and is intended to be a long term project.
 - **Evaluation of adaptation measures in response to climate change** - this aims to collate information about implementation and effectiveness of proposed adaptation measures,

including testing with long term datasets where these are available. It will also develop a framework for assessing the outcome of adaptation schemes. Results will contribute to policy development including new agri environment schemes. Initial work will be completed in March 2011.

- **Resilience to climate change: what is it and what makes ecosystems and landscapes resilient?** This project will summarise current understanding of what makes ecosystems, landscapes and habitats resilient so we they can be managed to achieve resilience to environmental change.
- The Environment Agency has implemented a plan *Freshwater Ecology Climate Change Adaptation Action Plan 2009-2011* based on the England Biodiversity Partnership Climate Change Adaptation Principles <http://www.defra.gov.uk/environment/biodiversity/documents/ebs-ccap.pdf>. The plan is a response to an assessment of the risks and opportunities presented by a changing climate. This plan is currently being updated and extended in scope to cover freshwater and marine biodiversity. Examples of some of the work contributing to this plan can be found at <http://www.environment-agency.gov.uk/research/planning/108363.aspx>
- Defra and the Department for Communities and Local Government commissioned through the Foresight unit in the Office of Science a report on *Land use Futures: Making the most of land in the 21st century*, published in February 2010. It revealed that pressures on land are increasing because of climate change (both mitigation and adaptation), population increase, other demographic change, economic growth, societal preferences for living alone and new technology. Foresight is now engaging in a one-year follow up process. It recommended a more integrated land use framework based on a consistent method of establishing best value working at all levels of Governance. It identified biodiversity as one of the factors that would need to be addressed in a framework, and suggested a flexible approach to designated areas and connecting habitats. <http://www.foresight.gov.uk/OurWork/ActiveProjects/LandUse/lufoutputs.asp>
- **RCEP report on adapting to climate change** - The Royal Commission on Environmental Pollution published its 28th report on *Adapting Institutions to Climate Change* on 30 March 2010. The report explores the challenges of climate change and existing UK institutional arrangements for three exemplar areas: freshwater, biodiversity and nature conservation, and coastal zones.
- Defra has commissioned a number of scientific studies:
 - **Adaptation at a landscape scale** – using landscape permeability models, UKCP09 climate change projections, expert opinion and other research – will produce a series of case studies showing application of England Biodiversity Strategy Adaptation Principles at the end of June 2010.
 - **Bicconet** – the purpose is to detect signals of responses to climate change based on investigating existing species monitoring data sets for relationships with climate variables: www.bicco-net.org . Due to report March 2011
 - **Chainspan** – using UKCP09 climate change projection models to assess the possible impacts of climate change on the ornithological interest of Special Protected Areas (SPAs) in the UK. Due to report March 2011
 - **Developing Tools** – Identifying the potential threat of sea level rise to the English wetland coastal habitats using UKCP09 and National Flood Risk Assessment modelling – and examining the potential to re-create threatened habitats on land. It is developing tools for the assessment and working closely with a parallel Environment Agency project examining impacts below the mean high-water tide mark. Due for completion at the end of June 2010.
 - **Protected sites, Priority Habitats and Climate Change** – an integrated review of possible implications of climate change in three parts
 - ✓ Investigation of whether existing legislation eg designation, is climate change proof;
 - ✓ Common Standards Monitoring, to review the methodology to assess condition and set site objectives;
 - ✓ The contribution of Priority Habitats to mitigation of Climate Change. The outputs (due in March 2011) will produce an integrated analysis across all three elements and inform policy guidance.

- ✓ **Environmental Change Network** – monitoring and data analysis to detect and distinguish signals of Climate Change impacts on Biodiversity www.ecn.ac.uk . Annual Report due in December
- ✓ **Development of an indicator of habitat connectivity** – development of the method and an indicator based on functional connectivity using data from the c 600km squares used in the periodic Countryside Survey across UK. An existing set of biodiversity indicators for the UK is available at JNCC website: www.jncc.gov.uk/biyp, includes an existing connectivity indicator <http://www.jncc.gov.uk/page-4249> . Final Report to be published in summer 2010.
- **UK Overseas Territories – Darwin Initiative BAP for the Cayman Islands** – the project “In Ivan’s Wake” carried out an assessment of the key biodiversity elements of the Cayman Islands; and helped to create the capacity for its future monitoring and conservation, while increasing environmental awareness – which reported in October 2008 <http://darwin.defra.gov.uk/project/14051/>