CONVENTION ON BIOLOGICAL DIVERSITY

5th NATIONAL REPORT of Greece

Executive Summary

Part I - An update on biodiversity status, trends, and threats and implications for human well-being.

Q1: Why is biodiversity important for Greece?

Greece is situated in South-East Europe, at a crossroads between Europe, Asia and Africa. It is noted for its high species diversity, an extensive coverage of natural and semi natural habitats, a lengthy coastline and a broad and well-documented diversity of landscapes with high aesthetic and cultural values.

Extensive semi – natural ecosystems and habitats make up for more than 50 % of the national territory. Forests and wooded areas cover 33% of its terrestrial territory, while grasslands cover 13% and scrublands 21%. Water and wetlands surface take up 2%, and bare land 3% of the land. The most intensively managed and exploited areas are croplands which take up 24%, and built up areas representing 3% of the terrestrial territory.

Greece is characterised by a rich fauna and flora, a high number of fungi species, and a wide array of ecosystems and landscapes. Also, a high proportion of the country's species are unique worldwide, i.e. there is high endemism.

According to the most recent surveys, Greek flora includes 5752 species and 1893 subspecies of vascular plants, which cumulatively represent 6600 taxa that belong to 1072 genera and 185 families. Greece is also one of the world's hotspots for endemic plants, with 1278 endemic species (22.2% of all species present) and 452 endemic subspecies, which cumulatively represent 1461 taxa (22.1% of all taxa present in Greece).

Regarding Greece's fauna, until now 23130 animal species have been recorded in the country's terrestrial and freshwater ecosystems, of which 3956 are characterised as Greek endemics. Furthermore, 3500 animal species have been recorded in the Greek marine environment. Approximately 14% of all vertebrate species are considered endangered.

Several terrestrial and marine areas of Greece are considered as hot spots for biodiversity conservation at a regional and global scale. Conservation of endangered species and the establishment of protected areas both on land and at sea are by far the most recognisable targets of biodiversity related policies and several species such as wetland birds, birds of prey, sea turtles, monk seals have become emblematic for a number of habitats and protected areas.

The contribution of the natural environment to important Greek industries such as tourism, agriculture, fisheries and aquaculture is generally recognised by the public and policy makers. The contribution of forests, wetlands and coasts in regulating ecosystems which are fundamental to human wellbeing such as clean air, water, soil, fisheries is also recognised, however, links between ecosystem services, biodiversity

conservation and sustainable use, still need to be made explicit in several policy areas. A big challenge lies ahead with regard to showcasing the importance of all components of biodiversity in achieving sustainable management of ecosystems and green growth.

Q2: What major changes have taken place in the status and trends of biodiversity in Greece?

Land cover has been relatively stable since the last notable expansion of irrigated agricultural land and the establishment of animal farms in lowlands, which took place mostly during the 1980's. An increasing rate of urbanisation of several coastal areas and an extension of transport networks in the whole of the territory has had its peak during the 1990's and continued up to 2000. Embankments and other changes in river beds, construction of irrigation and hydroelectric dams, a major river diversion and numerous small scale irrigation projects have continued throughout the 1980s and 1990s. Studies have documented the loss of wetlands on Greek mainland during different periods of the 20th century.

While changes in the extent of ecosystems have been assessed by calculating land cover change, there is little information available on the past and on-going changes in the species composition and structure of ecosystems during the last decades. The effects of reduction in crop diversity, abandonment of traditional cultivations in slopes of higher elevations, abandonment of livestock grazing patterns in mountainous areas and forests, intensification of fisheries and aquaculture, biological invasions have not been documented in a systematic way to support relevant biodiversity related policies.

The most comprehensive information on species and habitats of Greece is available for those that are protected by European legislation. Greece is home to 85 habitat types of European importance, including forest, coastal and halophytic habitats, freshwater habitats, coastal sand dunes and natural and semi-natural grassland formations, sclerophyllous scrubs, rocky habitats and caves, raised bogs, mires and fens and lastly, temperate heath and scrub. It hosts a large number of species of European importance: 57 species of mammals, 47 reptile species, 11 species of amphibians, 21 species of fish, 46 species of invertebrates and 58 plant species. The conservation status of these species and habitat types was assessed in 2007 for the period 2000 – 2006[1], where a mixed picture is revealed with several knowledge gaps, which prevented the assessment in a number of habitat types and species. A new assessment of their conservation status is expected to be finalised soon.

The 2009 edition of the red data book for plants includes 258 species of plants as threatened and two are considered extinct, while the 2009 edition of the red data book

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[1] EC, 2009, Article 17 report- National Summary for Greece https://circabc.europa.eu/sd/a/02c960da-c37a-4e56-bf7a-0c79d7e12792/EL_National_Sumary.pdf

for animals includes 468 species (171 vertebrates and 297 invertebrates) of animals as threatened.

Studies on genetic erosion during the last part of the 20th century have shown intense and rapid trends in cultivated cereals, vegetable crops, tree crops and grapevines. Domesticated animal breeds have also been lost at an alarming speed, with very few remaining in recent years.

Q3: What are the main threats to biodiversity?

The direct causes of the loss of biodiversity in Greece

Loss, modification, degradation and fragmentation of natural and semi-natural habitats; Unsustainable practices used in several types of production activities; Climate change; Soil, water and air pollution; Biological Invasions; Forest fires.

The main underlying causes of biodiversity loss that need to be tackled

Lack of knowledge for the state and trends of various biodiversity components; Lack of vision and poor application of sustainability measures in the different economic sectors; Administrative delays in the implementation of physical planning; Poorly enforced existing legal and institutional provisions; Underfinancing of actions related to conservation of genetic resources; Lack of stable management of protected areas.

Q4: What are the impacts of the changes in biodiversity for ecosystem services and the socioeconomic and cultural implications of these impacts?

In the second part of the 20th century, traditional practices for managing habitats throughout millennia for agriculture, hunting, wood extraction, grazing, fishing, salt production have given way to modernisation and intensification.

The **forests** of Greece, as well as of the rest of the Mediterranean region, have been exposed to human activity. As a result, coastal forests and forests located in low altitude have been degraded due to their urbanisation and conversion into agricultural land.

In Greece, the edges of the **mountainous ecosystems** (tree line) have been heavily influenced by human activities, especially through overgrazing and the exploitation of forests. These pressures have dropped a great deal and natural regeneration has reclaimed forest areas.

Within 40 years (1925-1965) approximately 67% of the surface area of Greek **wetlands** has been drained, due to demand for housing and agricultural land. This has resulted mainly in the loss of marshes and a few lakes and rivers. Wetlands are the most threatened ecosystems in the Aegean archipelago and should be treated as such.

Climate change is expected to further intensify the loss and degradation of wetlands and their ability to provide man with goods and services.

The expansion of intensive farming in the lowlands and certain semi-mountainous/mountainous areas; the abandonment of traditional, extensive mountain agriculture and livestock farming; and the substitution of lush traditional agricultural landscapes by monocultures have spoiled the traditional agricultural landscapes, degraded **agricultural ecosystems**, and, lastly, have reduced biodiversity. Varieties of agricultural crops and species of bred animals that were perfectly adapted to local conditions no longer exist due to the above factors.

Part II - The national biodiversity strategy and action plan (NBSAP), its implementation, and the mainstreaming of biodiversity.

Q5: What are the biodiversity targets set by Greece?

The "Operational Program for the Environment and Sustainable Development 2007 – 2015" was adopted in 2007 as component of the overall "National Strategic Reference Framework 2007 – 2013". The Action Plan identified the following objectives:

A1.   Protection and conservation of endangered species of flora, fauna and habitats

A2.   Ensure monitoring of conservation status of species and habitat types of European Community interest.

A3.   Sustainable use of agricultural and forest land and fishing areas selected for biodiversity conservation.

A4.   Maintaining the diversity of landscape.

A5.   Integration of environmental considerations into development policies.

B1.   Full establishment of the Natura 2000 network.

B2.   Measures for protection and management of Natura 2000 sites

C1.   Strengthening of environmental awareness and participatory process of social partners and the public regarding the importance of biodiversity and ecosystems for the quality of life.

Q6: How has Greece's national biodiversity strategy and action plan been updated to incorporate these targets and to serve as an effective instrument to mainstream biodiversity?

In early 2014, an updated draft of the National Strategy for Biodiversity was put to public consultation by the Ministry of Environment, Energy and Climate Change. The

update was a necessary adaptation of the previously proposed strategy to the Aichi targets and the EU Biodiversity Strategy for 2020. The general targets have been set and work for establishing the relevant indicators for monitoring and evaluation of its implementation has been planned for. The NBSAP for Greece was adopted as a Ministerial Decision and published in the Official Journal of the Government (FEK 2383 B / 08 September 2014).

The National Biodiversity Strategy takes into consideration the following:

1. Scientific knowledge about the wealth, value-of, and pressures-to the biodiversity in Greece
2. Legal framework – national, European and international – including International Treaties and European Directives
3. Strategic framework, as defined by various national, European and international documents that Greece has adopted
4. General principles that are considered a priori acceptable, since they originate from moral values, national needs and capabilities, as well as from corresponding scientific approaches
5. Integration of conservation and sustainable development into a national policy framework
6. Preservation and strengthening of actions aiming to conserve biodiversity throughout the national territory
7. Long-term conservation of biodiversity and its function, as well as the fair and equitable sharing of its benefits.

The NBSAP for Greece was adopted as a Ministerial Decision and published in the Official Journal of the Government (FEK 2383 B / 08 September 2014).

Q7: What actions has Greece taken to implement the Convention since the fourth report and what have been the outcomes of these actions?

Around 12% of the terrestrial area is protected, as reported to the European Common Database of Designated Areas. Moreover, 163 Special Protection Areas (SPAs) according to the Birds Directive and 239 Sites of Community Importance (SCIs) according to the Habitats Directive have been included in the pan-European network Natura 2000, covering more than 21% of the terrestrial part of the country and 6% of the national territory of sea. Twenty seven Management Bodies have been established in number of protected sites and/or SPAs and SCIs around the country.

Important protected species (e.g. Monachus monachus, Caretta caretta) have been the focus of action plans and LIFE-Nature projects with good outcomes.

Recording of genetic resources has continued with endemic plant varieties, herbal and medicinal plant species, and a considerable number of domestic and farm animal species. Established in 1981, the Greek Gene Bank maintains in its facilities or

plantations more than 14.000 samples of seeds or clonal reproductive material belonging to 169 species of agricultural crops or their wild-growing relatives. Additionally, the need to implement the Nagoya Protocol has revitalized the effort to establish a comprehensive national framework that will regulate access and sharing of genetic resources.

Q8: How effectively has biodiversity been mainstreamed into relevant sectoral and crosssectoral strategies, plans and programmes?

A number of strategic documents at the national level incorporate the biodiversity dimension, including the 2002 National Strategy for Sustainable Development, the National Strategic Reference Framework 2007–2013, the National Strategic Rural Development Plan 2007-2013, the National Strategic Plan for Fisheries Development 2007-2013 and the General Framework for Land use Planning and Sustainable Development. Moreover, procedures for the integration of biodiversity concerns in environmental impact assessment and strategic environmental assessment are in place and measures are being taken in this regard.

The EU Good Agricultural Practice Codes is implemented together with regulations and standards of cross-compliance that promote environmentally friendly production together with specific actions for the conservation of biodiversity. Explicit biodiversity considerations are embedded in the National Strategic Rural Development Plan 2007-2013, related to the objective of enhancing the environment and the countryside.

Sustainable management practices of forests in Greece have been introduced gradually since 1920, especially in terms of logging and grazing, and there is strong legal protection for forests and woodlands. Management plans are implemented for 10 years for forest complexes, by the pertinent Forest Services. These plans ensure that the principles of sustainable forest management are applied, together with the protection of forests from fires. Moreover, the implementation of the EU Action Plan on Forests and the optimal use of available measures under the reformed Common Agricultural Policy among other things, support the implementation of the above.

Greek legislation imposes certain restrictions to fisheries and measures for the sustainable management of fisheries resources in the Mediterranean are applied as required by relevant EU regulations. Fishing with towed gear is prohibited in areas with Posidonia meadows, which is a priority habitat type protected in the EU and in the Mediterranean Sea. The National Operational Program 2007-2013 for Fisheries and aquaculture includes measures for the reduction of fishing capacity of the fleet and promotion of environmentally-friendly methods in aquaculture.

The National Research Policy for the upcoming years (2007-2013) is reflected in the recently published Strategic Development Plan for Research, Technology and

Innovation and several projects are funded in the field of environment, including biodiversity.

Several biodiversity related programs and projects have been implemented in the framework of the Bilateral Program of Development Assistance and Cooperation by the Ministry of Foreign Affairs (Hellenic Aid).

Q9. How fully has the Greek national biodiversity strategy and action plan been implemented?

The duration of the National Biodiversity Strategy is set to last for 15 years. Within this time framework, the foundations should be set for future actions beyond this time point. The successful implementation of the National Strategy requires the continuous monitoring and evaluating the implementation process. The Ministry of Environment, Energy and Climate Change is the main administrative institute responsible for implementing this strategy and for coordinating the other Ministries and Agencies involved in the process.

The National Biodiversity Strategy will be reviewed and amended every five years. To this end, the Ministry will establish a competent service that will prepare reports on the implementation process every five years. The first review is planned for 2020, so as to be combined with the corresponding review for the European Biodiversity Strategy, and the United Nations Strategic Action Plan for Biodiversity 2011–2020, which includes the Aichi targets for biodiversity.

The implementation of the National Biodiversity Strategy relies on the Action Plans, which will be prepared with a five- year horizon. There is a need to establish a monitoring system that quantifies the successful implementation of the strategy based on a set of indicators. The monitoring system will be completed with the preparation of a report to be included in the Action Plan for the first five-year period (2014–2019) under the General Target 1: "Increase of knowledge about the assessment of biodiversity status", Specific Target 1.1: "Facilitate access to scientific knowledge (regarding Greek flora and fauna) and fill the gaps in scientific data". Some preliminary indicators of the successful implementation of each target are with the NBSAP document.

Part III - Progress towards the 2015 and 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 Targets of the Millennium Development Goals.

Q10: What progress has been made by Greece towards the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets?

See main report

Q11: What has been the contribution of actions to implement the Convention towards the achievement of the relevant 2015 targets of the Millennium Development Goals in your country?

The first *National Sustainable Development Strategy* (NSDS) was adopted by the Council of Ministers in 2002. The second NSDS was prepared in 2007 and had been partially implemented by 2009. Since 2009 when the "Ministry of Environment, Energy and Climate Change" (MEECC), was established, the political priorities for Greece, throughout the whole Government structure, have been set under the overarching objective of "*Green Growth*". Since 2010 when the economic difficulties have been increased due to the financial crisis, until today Greece's overarching political strategic objective, remains that of "*Green Growth*", taking into account the constraints and obligations arising from the structural reform.

Q12: What lessons have been learned from the implementation of the Convention in Greece?

Recent years have highlighted the difficulties in pushing for tighter environmental legislation during periods of economic crisis and austerity. The measures that are often necessary to safeguard the valuable biodiversity of the country are increasingly more difficult to be accepted by the local populace when they restrict economic activity, and as a consequence they limit the employment options of people who reside near protected areas especially. The balancing of adequate environmental protection and economic development is a difficult feat, both in the field of legislation but also of implementation. Periods of economic austerity make this already difficult balancing act even more challenging.

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Greece is characterised by a rich fauna and flora, a high number of fungi species, and a wide array of ecosystems and landscapes. Also, a high proportion of the country's species are unique worldwide, i.e. there is high endemism.

According to the most recent surveys, Greek flora includes 5752 species and 1893 subspecies of vascular plants, which cumulatively represent 6600 taxa that belong to 1072 genera and 185 families. Greece is also one of the world's hotspots for endemic plants, with 1278 endemic species (22.2% of all species present) and 452 endemic subspecies, which cumulatively represent 1461 taxa (22.1% of all taxa present in Greece).

Regarding Greece's fauna, until now 23130 animal species have been recorded in the country's terrestrial and freshwater ecosystems, of which 3956 are characterised as Greek endemics. Furthermore, 3500 animal species have been recorded in the Greek marine environment. Approximately 14% of all vertebrate species are considered endangered.

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[1] EUROSTAT, http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/5-04102010-BP/EN/5-04102010-BP-EN.PDF

Several terrestrial and marine areas of Greece are considered as hot spots for biodiversity conservation at a regional and global scale[2]. Conservation of endangered species and the establishment of protected areas both on land and at sea are by far the most recognisable targets of biodiversity related policies and several species such as wetland birds, birds of prey, sea turtles, monk seals have become emblematic for a number of habitats and protected areas.

The contribution of the natural environment to important Greek industries such as tourism, agriculture, fisheries and aquaculture is generally recognised by the public and policy makers. The contribution of forests, wetlands and coasts in regulating ecosystems which are fundamental to human wellbeing such as clean air, water, soil, fisheries is also recognised, however, links between ecosystem services, biodiversity conservation and sustainable use, still need to be made explicit in several policy areas. A big challenge lies ahead with regard to showcasing the importance of all components of biodiversity in achieving sustainable management of ecosystems and green growth.

1.2 Sources

This chapter comprises a succinct synthesis of the available data on various issues of biodiversity in Greece, rather than an exhaustive assessment of these issues.

The drafting of this chapter was based on:

- Information reported to the European Commission in the framework of implementation of the European Environmental Policy (e.g. Chrysopolitou and Hadjicharalambous 2008. Second National Report on the Implementation of the Habitats Directive in Greece (reporting period 2001-2006)

- Information included in biodiversity related National Reports to other organization and authorities (e.g. Stavropoulos et al.2006. *Greece: Second Country Report concerning the state on plant genetic resources for food and agriculture*. Hellenic Democracy, Ministry of Rural Development and Food, Athens),

- Information included in biodiversity related National Strategies (e.g. draft National Biodiversity Strategy, Greek Strategy for a Sustainable Management of Farm Animal Genetic Resources)

- Information included in National Operational Program 2007-20013 "Environment and Sustainable Development"

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[2] Myers et al, 2000, Nature Vol 403, http://www.equalisambiental.com.br/wp-content/uploads/2013/02/My042.pdf

-   Information included in National Catalogs and/or in Red Data Books

1.3 General features of Greece

Location: Greece, covering an expanse of 132,000 km^2 and having a population of 10,500,000, lies in the southernmost part of the Balkan peninsula, on the boundaries of three continents (Europe, Asia and Africa), and it belongs to the Mediterranean zone of the Palaearctic biogeographic region.

Climate: Mediterranean with mild winters and dry summers, with 29 distinct climate zones described according to the Thornthwaite climate classification system, which the sea.

Topography/Geology: It is primarily a mountainous country, with 2/3 of its land being covered by medium-height mountains presenting strong relief features. It is also defined by its extensive coastline (approximately 15,000 km) and the many island clusters in the Aegean and Ionian seas. It has a noted topographic diversity, with large number of islands, abrupt change from sea landscape to alpine landscape within a stretch of a few kilometres, extensive natural fragmentation of the land by numerous rivers, streams, gorges, valleys, peninsulas. It has complex geological history with volcanic activity and a wide variety of geological formations, large number of caves and other underground environments and rocks (pre-alpine, alpine and post-alpine).

Endemism/Species richness: The above factors have contributed to the great biological wealth of the country, which consists of a particularly abundant flora and fauna that includes a large number of endemic plant and animal species, and a wide variety of ecosystems and landscapes. Many endemic species have a very limited spread (e.g. on a single island). Due to its high level of endemism and seeing as it is one of the last refuges for many endangered and rare – to the rest of Europe – species, Greece is of great importance to European and Mediterranean flora and fauna. This is also confirmed by the large number of habitat types and species of European interest (EU Habitats Directive).

Diversity of ecosystems: It is similarly mirrored in the diversity of the landscape, which changes in several parts of Greece from a marine to an alpine landscape within a stretch of only a few kilometres. The semi-arid landscapes of eastern Crete, the northern parts of Rhodope, and the alpine regions of Olympus, Smolikas, Tymphe, Voras and other mountain ranges in Northern Greece are only a few of the uniquely beautiful landscapes in the country.

1.4 Genetic resources

Genetic resources are in the process of being recorded, and we are already familiar with endemic plant varieties, herbal and medicinal plant species, and a considerable

number of domestic and farm animal species. The Greek Gene Bank that was established in 1981 and belongs to the National Agricultural Research Foundation (NAGREF) was organised in collaboration with the Ministry of Agriculture and the Food and Agriculture Organization of the United Nations. The Greek Gene Bank maintains in its facilities or plantations (at the NAGREF institutes) 7,220 samples of seeds or clonal reproductive material belonging to 169 species of agricultural crops or their wild-growing relatives.

1.5 Species

1.5.1 Fungi

The diversity of fungi, as well as their distribution and status in Greece are less known in comparison with other groups of organisms. The first Fungus-Host Index for Greece was published in 1973 and included 1950 fungus species that were known up until that time (Pantidou 1973)[3]. There have since been a considerable number of publications on fungi, and in recent years new species for Greece have been added. By way of example, the database of the NAGREF Forest Research Institute in Thessaloniki has over 11,000 entries. The *List of Threatened Macrofungi in Greece*, which includes 150 taxa[4], was published in 2000 in the newsletter of the European Council for the Conservation of Fungi (Diamandis S. 2000)[5].

1.5.2 Algae

A complete list of algae species found in freshwater and marine ecosystems has not yet been drawn up for Greece; however, there are records on many regions in the country. Marine macro-algae have been recorded on a list including 515 taxa.

1.5.3 Flora

5,500 higher-plant species have been reported in Greece, which cumulatively represent 6600 taxa that belong to 1072 genera and 185 families. There is high level of endemism in plants with 1278 endemic species (22.2% of all species present) and 452 endemic subspecies which cumulatively represent 1461 taxa (22.1% of all taxa present in Greece). Approximately 4% of the species are considered endangered and

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3 Pantidou, M., 1973. Fungi-Host Index for Greece. Benaki Phytopathological Institute. Kifissia, Athens.

4 Taxonomic group (e.g. species, subspecies)

5 Diamandis, S. 2000. List of threatened Macrofungi in Greece. ECCF Newsletter 10: 12.

an equal percentage is protected by the legislation in force[6]. The *Red Data Book of Rare and Threatened Plants of Greece* (1995)[7] has been updated in 2009.

<u>Assessment of conservation status of plants of European interest</u>

58 plant species of European interest exist in Greece, namely species that are included in the annexes of EU Habitats Directive. Of these, 42 are species of European interest whose conservation requires the designation of Special Areas of Conservation, and 25 are priority species, i.e. species that are in danger of becoming extinct and for whose conservation Greece and the EU has particular responsibility in view of the proportion of their natural range which falls within the country and the Union.

Based on the results of the 2nd national report on the implementation of EU Habitats Directive for the period 2000-2006 (Figure 1), out of the 58 plant species of Community interest, 5 have a favourable status, 19 have an inadequate status and 2 have a bad status. Furthermore, the conservation status of 32 species or 55 % of the species of Community interest is unknown. The next assessment of conservation status of plants of European interest is under development and scheduled to be finalized in 2015.

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[6] Information based on the following references:

Strid A, Tan K. 1997. Flora hellenica 1.Königstein: Koeltz Scientific Books.

Tan K, Iatrou G. 2001. Endemic plants of Greece, the Peloponnese. Copenhagen: Gads Publishers.

Strid A, Tan K. 2002. Flora hellenica 2. Ruggell: Koeltz Scientific Books.

Georgiou K. & Delipetrou P. 2010. Patterns and traits of the endemic plants of Greece. Botanical Journal of the Linnean Society 162:130–422.

Dimopoulos P., Raus Th., Bergmeier E., Constantinidis Th., Iatrou G., Kokkini S., Strid A. Tzanoudakis D. 2013. Vascular plants of Greece: An annotated checklist. – Englera 31: 1-372.

7 Phitos, D., A. Strid, S. Snogerup, and W. Greuter. (eds). 1995. The Red Data Book of Rare and Threatened Plants of Greece, WWF Hellas Athens. 528 p.
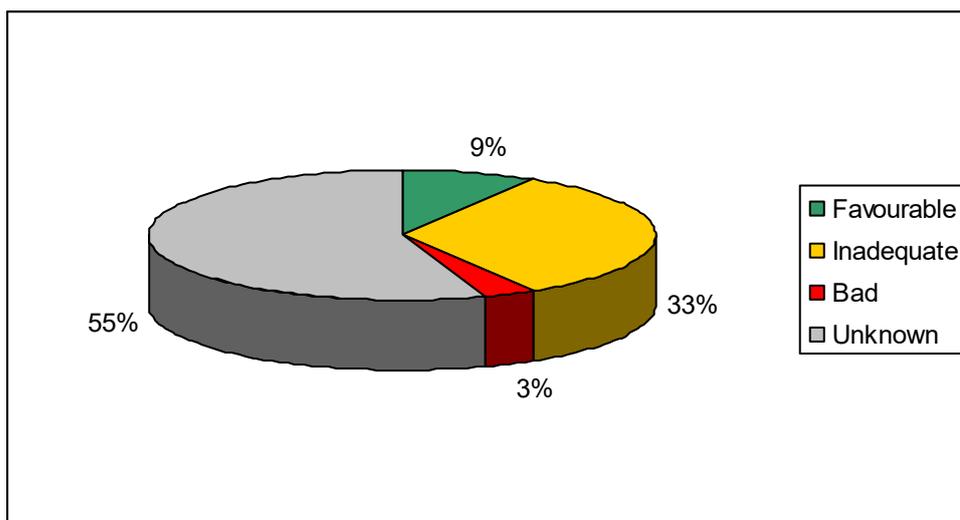
Figure 1. 2000-2006 Assessment of the conversation status of plant species of European interest (EU Habitats Directive)

1.5.4 Fauna

According to Legakis (2004)[8], 23,130 land and freshwater animal species, and another 3,500 marine species have been recorded to date. Included among them are 436 bird species, 116 mammal species, 79 reptile and amphibian species, 110 freshwater fish species, 447 marine fish species and approximately 4,000 invertebrate species.

The primary feature is the increased endemism and geographic diversification of most animal groups. Specifically, 3,956 endemic land and freshwater species have been recorded (Fauna Europaea 2004)[9], whereas in specific animal groups the percentage of endemism amounts to 64% (Legakis et al 2006)[10]. The most important endemic regions include Crete (for almost all taxa), the Cyclades islands and the mountains in mainland Greece. Individual taxa may possibly also be endemic to other regions such as Peloponnesus, the Ionian Islands, etc. Also of utmost importance to endemism are the numerous caves in Greece (approximately 8,000), of which only a few hundreds have been studied in terms of their fauna. However, the comprehensiveness of the available data is only satisfactory as regards the vertebrates and certain groups of invertebrates. Coastal and marine ecosystems comprise a large part of the country's natural wealth, with 3500 animal species recorded in the marine environment.

Approximately 14% of all vertebrate species present are considered to be endangered, whereas about half of the species in Greece are protected by the national legislation and are included under the annexes of international conventions that have been

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8 Legakis, A. 2004. How many animal species are there in Greece? Pan-Hellenic Conference of the Association of Greek Ecologists & the Hellenic Zoological Society, Mytilene, November 2004.

9 Fauna Europaea Web Service 2004. Fauna Europaea version 1.1, Available online at http://www.faunaeur.org

10 Legakis, A., R. Tzannetatou-Polymeni, S., Giokas, K. Sotiropoulos (ed.). 2006. Animal Diversity. University of Athens, p. 217.

ratified by Greece. These species are included in the **List of Threatened, Protected and Endemic Animal Species of Greece of the Zoological Museum** (Ed.: A. Legakis, March 2007). The Red Book on threatened animal species of Greece was published in 2009[11].

Assessment of conservation status of animals of European interest

Greece has 182 animal species of European interest, in accordance with the EU Habitats Directive, as can be seen in Table 1. Their conservation status according to the 2nd national report on the implementation of EU Habitats Directive for the period 2000-2006 is presented in Figure 2. Based on the results of the report, there is a great lack of data regarding the geographic distribution, range and population size of these species.

The conservation status of 65% of these animal species has been rated as unknown (118 out of 182 species). Favourable conservation status was attributed to 14% (25 out of 182 species), inadequate conservation status to 14% (26 out of 182 species), bad conservation status to the remaining 7% (13 out of 182 species).

The knowledge gaps are greater when it comes to invertebrates, as the conservation status of 45 out of 46 invertebrate species is unknown. Mammals have up to 75% unknown status, 14% has an inadequate status and the remaining 11% has a bad status) and reptiles (57% has an unknown status, 23% has an inadequate status, 11% has a favourable status and the remaining 9% has a bad status). 62% of the fish have a satisfactory conservation status. It should be noted that the majority of the fish of Community interest mainly concerns freshwater fish species.

The next assessment of conservation status of animals of European interest is under development and scheduled to be finalized in 2014.

Group species	
Mammals	57
Reptiles	47
Amphibians	11
Fish	21
Invertebrates	46
TOTAL	182

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[11] Legakis A., Maragou P. 2009. Greek red data book of threatened fauna. Hellenic Zoological Society.

Table 1. Numbers of animal species of European Importance protected under the EU Habitats Directive, which are present in Greece (Annexes II, IV & V)

As regards the wealth of avifauna in Greece, out of the 436 species, 348 are a regular presence in our country. Of these, 286 species are protected by the EU Birds Directive (118 species under Annex I of the EU Birds Directive and 168 migratory species). Overall, 23 globally endangered species appear in Greece (BirdLife International 2000)[12], of which 7 appear randomly or occasionally, or as a result of unpredictable dispersion in Greece.

According to a relevant publication by the Hellenic Ornithological Society[13], the most threatened groups are wetland birds and birds of prey. The first group is threatened due to the extensive damages caused to wetlands mainly in the past, but also due to the degradation suffered by wetlands even today (change of the hydrological regime, pollution, desiccation, human disturbance). Predator populations suffer due to the degradation of their habitats, the intake of poisoned bait, the intake of pesticide residues that accumulate in their tissues, as well as due to their reduced prey populations.

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[12] BirdLife International. 2000. Threatened Birds of the World. Barcelona and Cambridge, UK: Lynx Editions and BirdLife International και Bourdakis, S. & Vareltzidou S. 2000. Greece. P.p. 261–333 in Heath, M.F. & M.I. Evans, eds. Important Bird Areas in Europe: Priority sites for conservation. 2: Southern Europe. Cambridge, UK: BirdLife International (Birdlife Conservation Series No. 8.

[13] Hatzilakou, Dionysia. 1999. Ornithological value of Greece: protection system and threats to birds. pp. 5-7. *In*: Hatzilakou Dionysia (ed.). 1999. Concise guide: impact of works and activities on birds and their biotopes, management of bird-fauna wetlands. Hellenic Ornithological Society. Athens. p. 346.
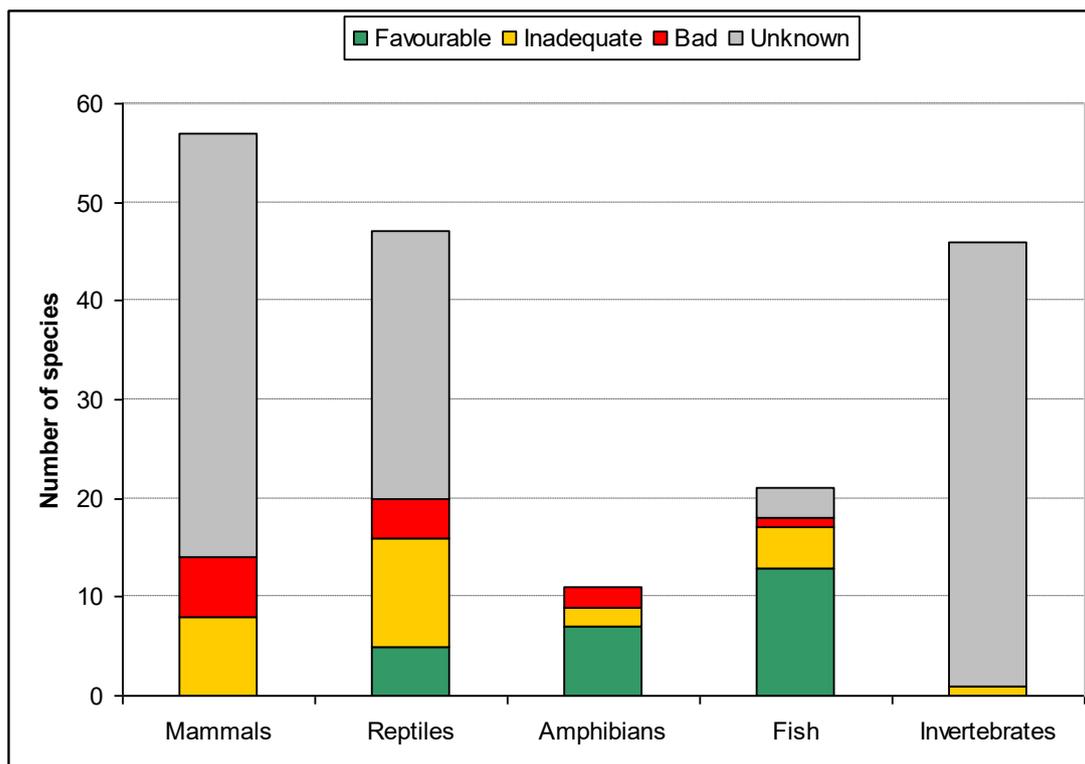
Figure 2. 2000-2006 Assessment of conservation status of animal species of European interest (EU Habitats Directive) present in Greece, 2007

For example, the substitution of lush traditional agricultural landscapes by monocultures has led to a reduction in species populations that constitute prey for predatory birds, such as the suslik, and has contributed to the removal of many mature trees that are used by these species for nesting. The abandonment of free mountain livestock farming and the turn to livestock farming in enclosures have drastically reduced the prey of vultures and have led to the reduction of clearings, which are necessary to many predatory birds in their search of food. The protection of many seabirds relies on the isolation of the islands where they nest. The growth of tourism and multitude of private boats cause a disturbance to birds during the crucial period of their reproduction (Hellenic Ornithological Society 2000).

1.6 Habitat types

Habitat is a term used across diverse contexts with different meanings. In EU nature policy a habitat type is an area with a defined species composition (both fauna and flora) and associated physical factors (e.g. climate and soil type). Existing habitat classifications in Europe are the Corine biotopes, the EUNIS and the Palaearctic classifications. In implementing the EU Habitats Directive, one uses the relevant

Interpretation manual.[14] An extensive habitat mapping project based on terrestrial and marine vegetation sampling and phytosociological analysis was carried out in areas of interest for Nature conservation in Greece, in 1999-2000.

<u>Assessment of conservation status of habitat types of European importance</u>

Greece is home to of 85 habitat types of European importance of which almost a third comes within the forest category (27 habitat types or 32%). Coastal and halophytic habitats represent approximately 16.4% of all habitat types of Community interest found in Greece (14 out of 85 types), and following in a descending order are freshwater habitats (9 or 10.6%), coastal sand dunes and natural and semi-natural grassland formations (8 types or 9.4% per category), sclerophyllous scrubs (7 types or 8.2%), rocky habitats and caves (6 types or 7%), raised bogs, mires and fens (4 types or 4.7%), and lastly, temperate heath and scrub (2 types or 2.3%).

According to the 2nd national report on the implementation of the said Directive for the period 2000-2006, 49 habitat types, i.e. 58% of the habitat types found in Greece, have a favourable conservation status, 26 habitat types (30%) have an inadequate conservation status and 7 habitat types have been found to have a bad conservation status. These last 7 habitat types all fall within the category of "coastal and halophytic habitats", which indicates that half of the habitats in this category (7 out of 14) are in bad condition. The conservation status of three habitat types under Annex I is unknown; two of these fall under the category of raised bogs, mires and fens, and one is a coastal habitat (sandbanks which are slightly covered by sea water all the time). The next assessment of conservation status of habitat types of European interest is under development and scheduled to be finalized in 2015.

The following figure presents the conservation status of habitat types of Community interest by group.

[14] EEA, 2014, http://www.eea.europa.eu/publications/terrestrial-habitat-mapping-in-europe
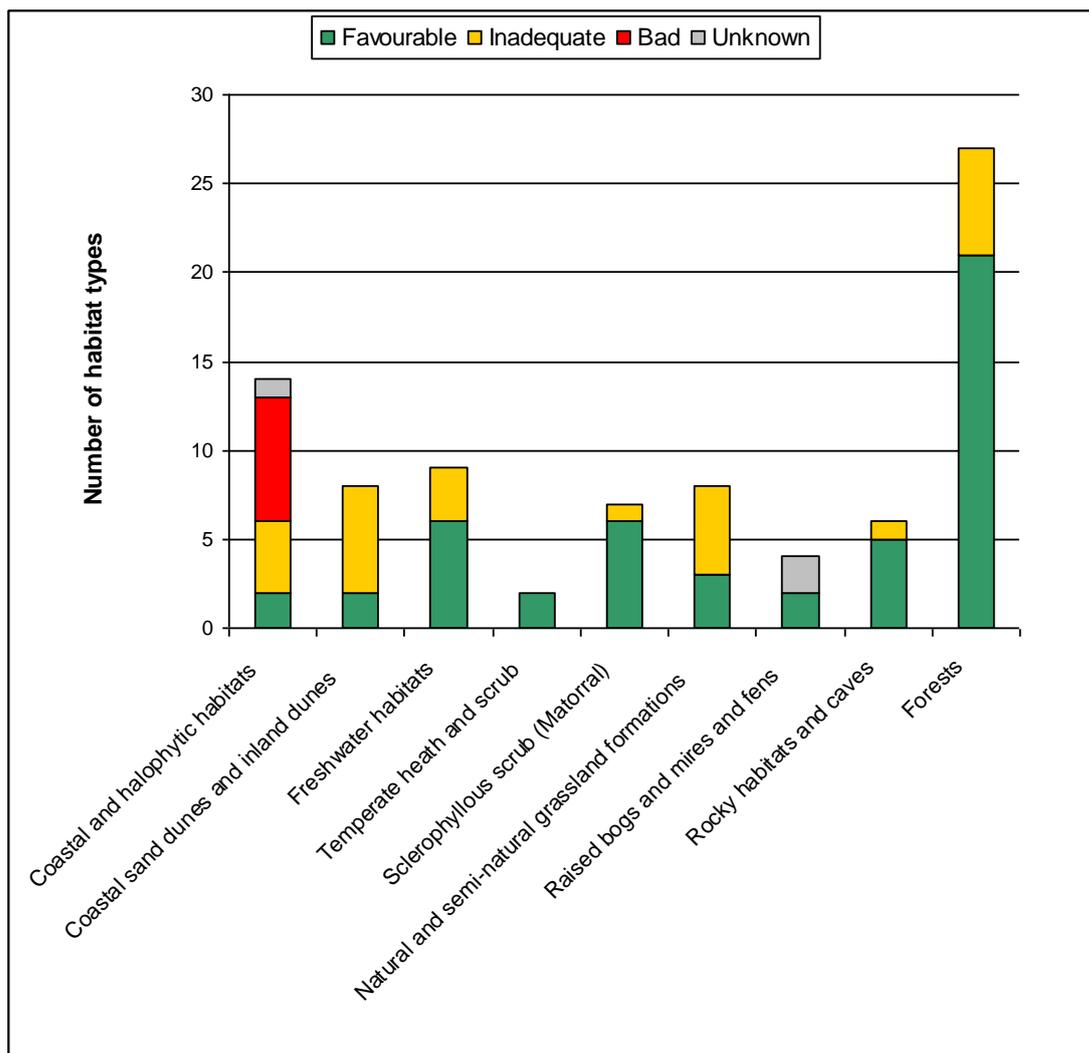
Figure 3. 2000-2006 assessment of conservation status of habitat types of European interest (EU Habitats Directive), present in Greece (2007)

1.7 Ecosystems

There exists a large variety of ecosystems in the country : terrestrial (e.g. forests and other wooded land, maquis, phrygana, mountainous, agricultural), freshwater (wetlands, estuaries, lakes and rivers) and marine (coastal, open sea). Their main characteristics include high diversity, naturalness of their composition, degradation of their productive capacity, but also great ability of physical restoration. Further information on Greece's ecosystems are provided in chapter 1.3.

Q2: What major changes have taken place in the status and trends of biodiversity in Greece?

Land cover has been relatively stable since the last notable expansion of irrigated agricultural land and the establishment of animal farms in lowlands, which took place mostly during the 1980's. An increasing rate of urbanisation of several coastal areas and an extension of transport networks in the whole of the territory has had its peak during the 1990's and continued up to 2000. Embankments and other changes in river beds, construction of irrigation and hydroelectric dams, a major river diversion and numerous small scale irrigation projects have continued throughout the 1980s and 1990s. Studies have documented the loss of wetlands on Greek mainland during different periods of the 20th century.

While changes in the extent of ecosystems have been assessed by calculating land cover change, there is little information available on the past and on-going changes in the species composition and structure of ecosystems during the last decades. The effects of reduction in crop diversity, abandonment of traditional cultivations in slopes of higher elevations, abandonment of livestock grazing patterns in mountainous areas and forests, intensification of fisheries and aquaculture, biological invasions have not been documented in a systematic way to support relevant biodiversity related policies.

The most comprehensive information on species and habitats of Greece is available for those that are protected by European legislation. Greece is home to 85 habitat types of European importance, including forest, coastal and halophytic habitats, freshwater habitats, coastal sand dunes and natural and semi-natural grassland formations, sclerophyllous scrubs, rocky habitats and caves, raised bogs, mires and fens and lastly, temperate heath and scrub. It hosts a large number of species of European importance: 57 species of mammals, 47 reptile species, 11 species of amphibians, 21 species of fish, 46 species of invertebrates and 58 plant species. The conservation status of these species and habitat types was assessed in 2007 for the period 2000 – 2006[15], where a mixed picture is revealed with several knowledge gaps, which prevented the assessment in a number of habitat types and species. A new assessment of their conservation status is expected to be finalised soon.

The 2009 edition of the red data book for plants includes 258 species of plants as threatened and two are considered extinct, while the 2009 edition of the red data book for animals includes 468 species (171 vertebrates and 297 invertebrates) of animals as threatened.

Studies on genetic erosion during the last part of the 20th century have shown intense and rapid trends in cultivated cereals, vegetable crops, tree crops and grapevines.

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[15] EC, 2009, Article 17 report- National Summary for Greece https://circabc.europa.eu/sd/a/02c960da-c37a-4e56-bf7a-0c79d7e12792/EL_National_Sumary.pdf

Domesticated animal breeds have also been lost at an alarming speed, with very few remaining in recent years.

Q3: What are the main threats to biodiversity?

The direct causes of the loss of biodiversity in Greece

Loss, modification, degradation and fragmentation of natural and semi-natural habitats; Unsustainable practices used in several types of production activities; Climate change; Soil, water and air pollution; Biological Invasions; Forest fires.

The main underlying causes of biodiversity loss that need to be tackled

Lack of knowledge for the state and trends of various biodiversity components; Lack of vision and poor application of sustainability measures in the different economic sectors; Administrative delays in the implementation of physical planning; Poorly enforced existing legal and institutional provisions; Underfinancing of actions related to conservation of genetic resources; Lack of stable management of protected areas.

3.1 Direct and indirect pressures on Greece's biodiversity

3.1.1 Loss, degradation and fragmentation of habitats

Between 1990 and 2000 the north eastern and central regions of the country showed a notably high trend of loss of pastures to agricultural land, compared to the average of the EU territory. Similarly three regions showed high trends in loss of land from agricultural to artificial surfaces (see maps below). About 40,000 ha of agricultural land were converted to urban areas during the same period.[16][17]

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[16] EEA, 2009 http://www.eea.europa.eu/data-and-maps/figures/the-transfers-of-land-between-pasture-and-arable-cover-types-across-europe-net-conversion-from-pasture-to-arable-land-and-permanent-crops-24-countries-1990-2000-ha-per-year

[17] EEA, 2006 *http://www.eea.europa.eu/data-and-maps/figures/losses-of-agricultural-areas-to-urbanisation/so108-fig2.1-soer2010-eps-file/image_original*
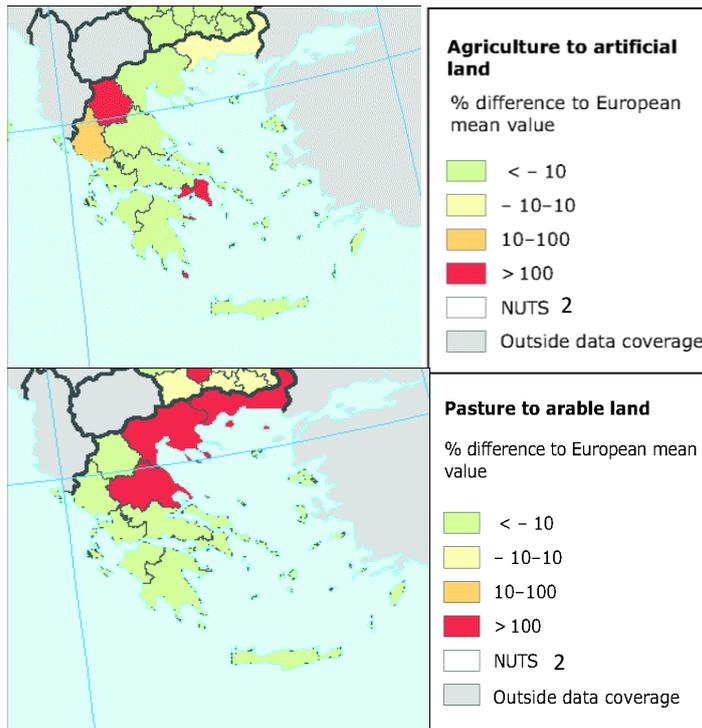
Figure 4. Agriculture to Artificial Land, Pasture to Arable Land (1990-2000)

Fragmentation: Until 2000, the average non fragmented parcel size in Greece was between 200 - 250 km2, one of the highest in the European Union[18]. A sporadic pattern of urban sprawl, near existing cities but also in rural areas following the expansion of roads and highways has been observed in Greece between 1990- 2000[19]. A new version of the CORINE Land Cover Data set is expected by the end of 2014 and will support updated assessments.

Degradation: It is estimated that approximately 30% of the soil in the sensitive climate zones of Greece has been subjected to various stages of desertification, a percentage that is presenting a rising tendency[20].

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[18]   EEA,   2000   http://www.eea.europa.eu/data-and-maps/figures/average-size-of-non-fragmented-land-parcels

[19]   EEA,   2006   http://www.eea.europa.eu/data-and-maps/figures/patterns-of-urban-sprawl-across-europe-24-countries-1990-2000-1-km-x-1-km-grid

[20]   National   Plan   of   Greece   to   combat   Desertification, http://www.unccd.int/ActionProgrammes/greece-eng2001.pdf

Greece, 5th National Communication to the United Nations Framework Convention on Climate Change, http://www.climateadaptation.eu/greece/desertification/

3.1.2 Unsustainable productive practices

Water abstractions for irrigation, manufacturing industry, energy cooling and Public Water Supply (million m3/year) in early 1990s and the period 1997-2007 have an increasing trend and the water exploitation index (WEI) of Greece[21] has increased.

During 2000-2008, the emissions of nitrogen from agriculture (expressed as nitrogen balance, N-balance) in Greece were decreased. At the same time the economic output of agriculture and related services and activities expressed as the gross value added (GVA) has also decreased. The rate of emission decrease was greater than the rate of the decrease of GVA, showing that there has been some progress in decoupling the two[22] .

The state of marine fish stocks in the Mediterranean is alarming[23]. European aquaculture production has continued to rapidly increase during the past 15 years due to the expansion of marine production. Greece is one of the countries with the highest production. In marine farms, antibiotics are used for disease control but the amounts used have been reduced drastically in recent years following the introduction of vaccines and improved husbandry practices. In general, significant improvements in the efficiency of feed and nutrient utilisation as well as environmental management have served to partially mitigate the associated increase in environmental pressure[24].

3.1.3 Climate change

Work in several European research projects has predicted changes in biodiversity due to climate change. Scientists estimate that even a slight temperature increase may have a noticeable effect on the ability of species to survive and reproduce in the areas in which they have been living to date. Also, in a period of only a few decades the change of climate could negate all efforts that have been made for the conservation and sustainable management of biodiversity[25]. The effects of climate change on biodiversity are already becoming visible (such as changing patterns of distribution, migration and reproduction of various species).

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[21] EEA, 2010 http://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources/use-of-freshwater-resources-assessment-2

[22] EEA, 2014, **http://www.eea.europa.eu/data-and-maps/indicators/untitled-indemission-intensity-of-agriculture/assessment**

[23] EEA, 2010, http://www.eea.europa.eu/data-and-maps/indicators/status-of-marine-fish-stocks/status-of-marine-fish-stocks-8

[24] EEA, 2011, http://www.eea.europa.eu/data-and-maps/indicators/aquaculture-production-1/aquaculture-production-assessment-published-feb

[25] Greece, 5th National Communication to the United Nations Framework Convention on Climate Change, http://www.climateadaptation.eu/greece/desertification/

Some examples also relevant for Greece are shown in presenting the rate of change of flowering[26] , rate of change of meteorological balance[27], Projected changes in mammalian species richness.[28]

3.1.4 Soil, water and air pollution

Industrialisation, the intensification of agriculture, the disposal of large quantities of untreated or toxic waste and sewage, marine accidents, and the extensive use of non-renewable energy sources pollute the abiotic resources on which biodiversity depends. Atmospheric pollution is one of the threats of biodiversity, causing degradation of habitats. Greece and the whole of the Mediterranean show high concentrations of ground level ozone, a 'secondary pollutant', which means it is formed in chemical reactions between other pollutants in the air. High ozone concentrations can cause serious health problems to humans and damage to vegetation such as forests and crops[29].

3.1.5 Invasive alien species

Invasive alien species compete with native species for the same survival resources, or they interbreed with them. Thus, native species are in danger of suffering population and genetic degradation, or even of becoming completely extinct.

Data currently available in Greece has been the outcome of various research initiatives. As regards the marine invasive alien species of flora and fauna, research is primarily carried out by the Hellenic Centre for Marine Research (HCMR), who also maintain a database and provide relevant information to national authorities. Over 34 marine researchers from 9 research institutes/universities have formed the ELNAIS network (Ellenic Network on Aquatic Invasive Species). Members of the network are actively contributing to European processes such as Streamlining European Biodiversity Indicators (SEBI 2010). As regards the terrestrial invasive alien species, 21 individual researchers have contributed to the Expertise Registry of the European research project known as DAISIE (Delivering Alien Invasive Species Inventories for

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[26] EEA, 2012 http://www.eea.europa.eu/data-and-maps/indicators/timing-of-the-cycle-of-1/assessment

[27] EEA, 2012 http://www.eea.europa.eu/data-and-maps/indicators/water-requirement-1/assessment

[28] EEA, 2012

[29] EEA, 2013 Rural concentration map of the ozone indicator AOT40 for forest in 2010. http://www.eea.europa.eu/data-and-maps/figures/ozone-aot40-for-forest-4

Europe). In the framework of the above project, initial research was conducted into alien species of flora in Greece. However, the alien flora of Greece has not yet been studied in its entirety, nor have the relationships to climate change been explored. An example of combined work at European level, expected to affect Greece, is the projected spatial mismatches of the Portuguese Dappled White butterfly and its host plants[30].

The threat of alien invasive species has in the recent years been the focus of an initiative on the EU level, which led to the enactment of Regulation No 1143/2014 "*on the prevention and management of the introduction and spread of invasive alien species*". As a matter of compliance with this regulation, the Greek Ministry for the Environment is taking the opportunity to approach current research on alien invasive species on a more systematic fashion which will facilitate the formulation of relevant policies.

3.1.6. Fires

Fires directly influence the biodiversity of a region, and their effects on ecosystems are linked to changes in the hydrological and geomorphological features of the drainage basins, soil erosion, etc. Specifically with regard to fauna, species that lack good escape mechanisms are inflicted beyond recovery, resulting even in the extinction of local populations. Furthermore, due to the dependence of animal species on the type and density of the vegetation in a region, even the temporary loss of that vegetation following a fire can have a dramatic effect on the fauna populations[31].

The forest fires of the summer of 2007 have been recorded as the most destructive fires in the last decades, not only at the national, but also more widely at the European level. In all, over 250,000 hectares were destroyed, of which at least half were areas of natural cover including mainly forests and other wooded land. Among them, over ten institutionally protected natural areas were struck, including Parnitha, Taygetos, Parnonas, Pelion and Grammos, as were important habitats of threatened species such as the deer, the jackal, the bear and the wolf.

3.1.7 Other factors

Other factors that threaten the biodiversity of Greece are: the incorrect application of the law and impunity regarding environmental crimes, the small degree of completion of the National Cadastre, and the division of competences between various Ministries. As regards the latter, it should be noted that although a substantial part of the country

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[30] **http://www.eea.europa.eu/data-and-maps/figures/projected-spatial-mismatches-of-the**

[31] WWF Hellas. 2007. Ecological review of August 2007 Peloponnesus destructive fires. Athens, September 2007.

falls under Community protection and a considerable part of the country is in the process of receiving national protection, nevertheless:

a) the integration of measures for the protection of nature into the sectoral policy of the competent ministries is limited and does not form part of an integrated plan,

b) the declaration of protected areas pursuant to national legislation has not been completed, nor has the preparation of the required Special Environmental Studies and relevant management plans,

c) the current situation regarding the coordination of Protected Area Management Agencies is not yet satisfactory, and

d) the framework of thematic strategies aiming at halting the loss of biodiversity has not been completed[32].

3.2 Forests and other wooded land

Greece's forests vary from the semidesert Vai palm forest of Crete to the alpine forests of birch, Scots Pine and spruce in the Rhodope Mountains.

Forest extent of coverage: The forest land including forests and other wooded land, as referred to in the European report on forests of 2007[33], covers more than half of Greece's land (2005 data), with 29.1% being covered by forests and 21.6% being covered by other wooded land. Out of the total number of forests in Greece, 57.5% are predominantly broadleaved forests, whereas 42.5% are predominantly coniferous forests. The other wooded land belongs exclusively to the category of predominantly broadleaved woodland (Figure 4). Based on the data of the same report, it arises that the total surface area of forest land in Greece had remained more or less stable between 1990 and 2005 (6,511,000, 6,525,000 and 6,532,000 ha in 1990, 2000 and 2005 respectively). During this period, the surface area of forests presented an increase (3,750,000 ha in 2005 compared to 3,299,000 ha in 1990), however, the surface area of other wooded land presented a similar decrease (2,780,000 ha in 2005 compared to 3,212,000 ha in 1990).

Forest genetic resources : With regard to genetic resources, the very same report states that in Greece the area managed for in *situ* gene conservation remained stable for the whole reference period (30797 ha), while the area managed for *ex situ* gene conservation increased from 2.7 ha in 1990 to 6.7 ha in 2005. The area managed for seed production was 7532.9 ha in 2005 but there are no comparative data for the whole reference period. Finally, the area of forest protected to conserve biodiversity

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[32] From the SWOT analysis included in the Operational Programme Environment and Sustainable Development 2007 – 2013.

[33] MCPFE Liaison Unit Warsaw, United Nations Economic Commission for Europe and Food and Agriculture Organization of the United Nations. 2007. STATE OF EUROPE'S FORESTS 2007: The MCPFE report on sustainable forest management in Europe. Ministerial Conference on the Protection of Forests in Europe. 247 p.

according to MCPFE Assessment Guidelines 2000-2005, increased from 152,000 ha in 2000 to 159,000 ha in 2005 regarding the MCPFE Class 1.1: Main Management Objective Biodiversity "No Active Intervention".
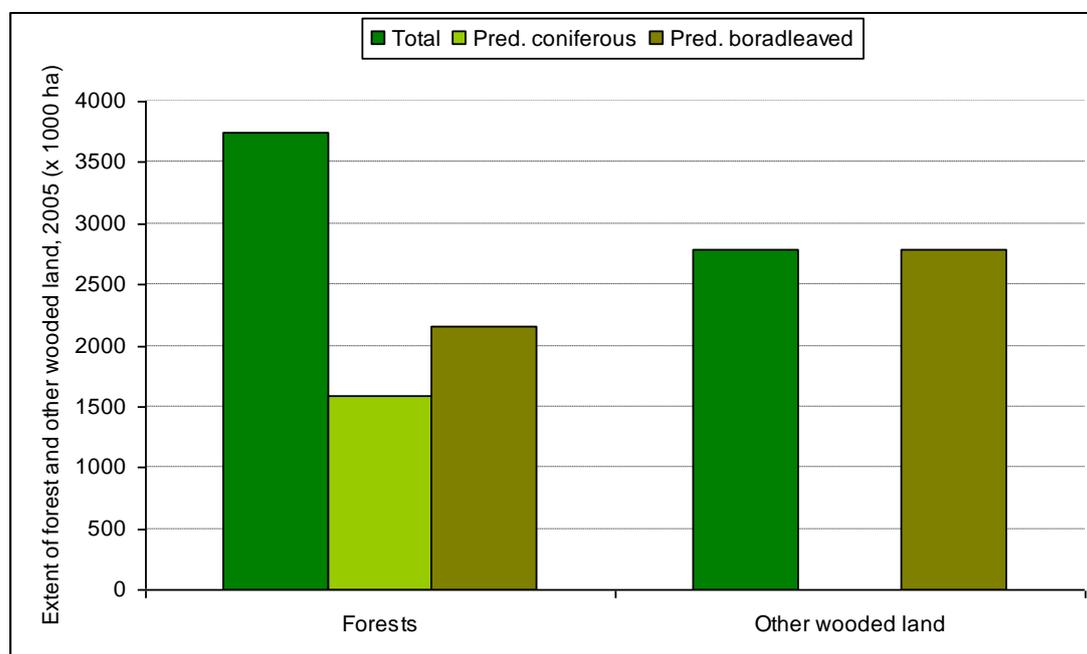
Figure 5. Comparative data on forest and other wooded land extent by forest type (2005)

The forest cover of the country by forest type[34], according to the data of the Directorate of Forest Resources Development for the year 2005, is presented in the following figure.

Biodiversity in forests: The forests and other wooded land in Greece are home to a wide variety of species and habitat types. Plant species such as the *Quercus euboica*, *Juniperus drupacea* and *Zelkova abelicea*; mammals such as the bear, wolf, jackal, bobcat, chamois and the deer; reptiles such as the *Vipera ursinii*, spur-thigh or Greek tortoise (*Testudo graeca*); Hermann's tortoise (*Testudo hermanni*); marginated tortoise (*Testudo marginata*) are only a few of the protected species found in Greek forests. It is not accidental that the two biodiversity hotspots identified in Greece[35] (southern and central Greece and Crete), namely areas where plant richness exceeds 2000 species per 15,000 km^2 and where at least 10% narrow endemism occurred, include large forest lands of the country such as those of the Pindus mountain range and the mountains of Peloponnesus and Crete. In addition, a substantial part of the

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[34] Vakalis Dimitris (ed.). 2006. Review of forestry service activities in the year 2005. Ministry of Rural

Development and Food, General Directorate for the Development and Protection of Forests, Directorate of Forest Resources Development. Athens, p. 78.

[35] Médail, F and Pierre Quézel. 1999. Biodiversity Hotspots in the Mediterranean Basin : Setting Global Conservation Priorities. Conservation Biology, vol. 13, No 6, 1510-1513.

forests and other wooded land in the country is included in the areas of High Nature Value of Greece . With regard to the habitat types of Community interest found in Greece, as has already been stated, 32% fall in the category of forests and 8.2% fall in the category of sclerophyllous scrubs.
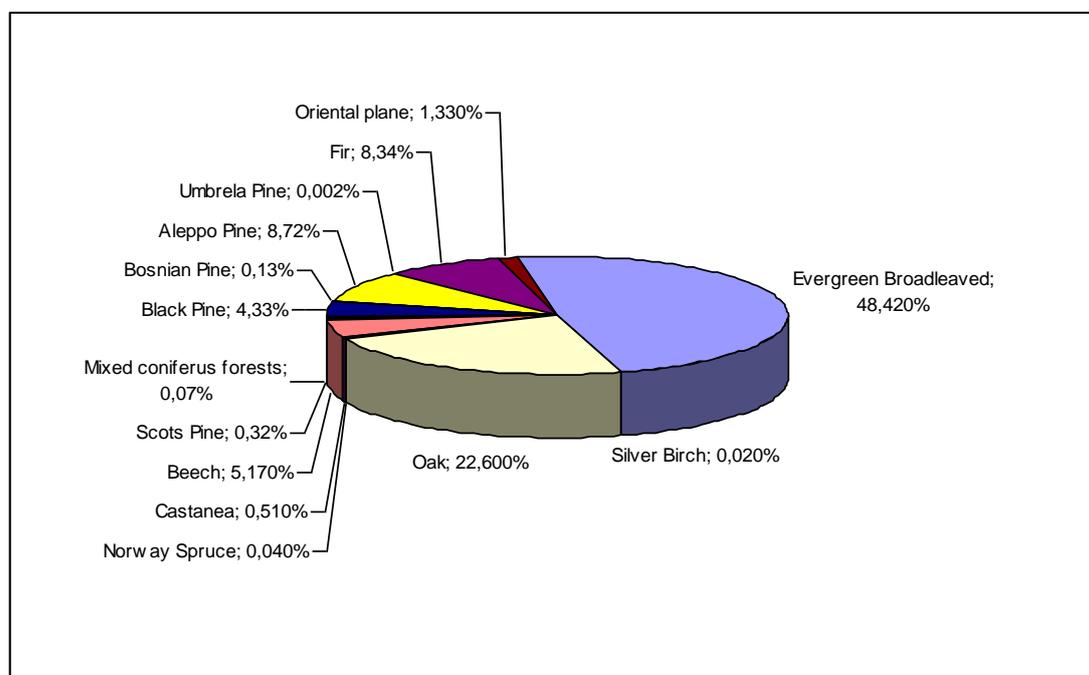
Figure 6. Forest cover of the country by forest type [by Vakalis D. (ed.) 2006]

Sustainable forest management practices in Greece have been introduced gradually since 1920, and strong legal protection is accorded to forests and other wooded land. Forest management plans are being prepared for a large number of forest complexes in the country, including – *inter alia* – the ten (10) National Parks of Greece, which shall be managed in accordance with these five-year plans. It is worth mentioning that in Greece, approximately 40% of the areas in the Natura 2000 Network (i.e. over a third of the Sites of Community Importance and approximately half of the Special Protection Areas) are primarily characterised as forest land.

It is evident that conservation objectives for the habitat types and species included in the Annexes of Directive 92/43/EEC should be integrated in forest management. National authorities is moving in this direction through the preparation of the first management plans for 27 protected areas, which are expected to reach completion in 2009. Sixteen of these plans also concern areas that are primarily characterised as forest land.

Direct threats to forests and forest biodiversity are:

- Illegal trespassing and clearing of forests and wooded land in order to obtain building land.

- Forest fires recurring at short intervals. It should be noted that climate change is expected to further intensify the risk of fires breaking out in the country.
- The use of wood harvesting methods which are unfriendly to forests (use of heavy machinery).
- Organic diseases such as chestnut blight, Dutch elm disease (U*lmus campestris*), cypress canker and the infestation of fir forests by bark beetles, especially Greek fir (*Abies cephalonica*) forests.

3.3 Mountainous ecosystems

Ecosystems that lie at a high altitude and beyond forest edges are considered to be mountainous. These include the ecosystems in the outer-forest or upper-forest zone of high mountains (sub-alpine or pseudo-alpine ecosystems). Mountainous regions constitute biodiversity reservoirs, since they include a wealth of species, genotypes and ecosystems.

Greece is primarily a mountainous country, with approximately 2/3 of its land being covered by medium-height mountains. Forty-one peaks have a height of over 2,000 m. In this way, conditions of isolation and consequently endemism are created. Beyond the forest edges, τhe area is covered by shrub and herbaceous vegetation that has been degraded by overgrazing, which has been reported as a serious threat in southern Europe.

The mountainous ecosystems of Greece spread across almost all of the country's massifs, from the Rhodope mountain range to the high mountain elevations on Crete, and almost all of them contribute to the Sites of the Natura 2000 Network (SCIs and SPAs). The results of the project titled "*Inventory, Identification, Evaluation and Mapping of the Habitat Types and Flora and Fauna Species in Greece*" in accordance with Directive 92/43/EEC show that 9 habitat types of European importance are found in the mountainous ecosystems of Greece, of which three are priority types.

CODE	NAME OF HABITAT TYPE
4060	Alpine and Boreal heaths
4090	Endemic oro-Mediterranean heaths with gorse
* 6110	Rupicolous calcareous or basophilic grasslands of the *Alysso-Sedion albi*
6170	Alpine and subalpine calcareous grasslands
* 6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)
* 6230	Species-rich *Nardus* grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)
7110	Active raised bogs
8140	Eastern Mediterranean screes
8210	Calcareous rocky slopes with chasmophytic vegetation

Table 2. Habitat types under Directive 92/43/EEC that belong to mountainous ecosystems and are present in Greece.(*Priority habitat types)

The main threat faced by mountainous ecosystems in Greece is overgrazing, but in recent years the pressure of tourism (ski resorts, higher number of visitors) and the collection of species pose a further threat. It is thus necessary to conserve these areas and to promote actions that are compatible with the conservation of their biodiversity and the general aspect of the mountainous landscape.

3.4 Mediterranean terrestrial ecosystems (maquis and phrygana)

Phrygana and maquis, two typical Mediterranean ecosystems, cover a large part of the vegetation in Greece and are distinguished for their high biodiversity and high rates of endemism. The maquis type is usually included in the country's other wooded land.

Maquis ecosystems occur throughout our country's coastal zone, especially in western Greece and the Ionian islands, as well as in the eastern and northern part of Greece, the islands of the Northeast Aegean, in western Crete and the Dodecanese. They contain dense shrubs such as the holm oak, strawberry tree, mastic tree, phillyrea media, tree heath, alder, kermes oak, Judas tree, ash tree, bay tree and others.

Phrygana constitute a basic element of the landscape of the Cyclades islands, the eastern Aegean, Crete and the Dodecanese islands. They consist of spiny, semicircular shrubs (phrygana) that result from the combination of frequent fires and overgrazing. The following species prevail in this type: the thorny burnet, spiny broom, spiny spurge, genista acanthoclada, thyme as well as woody shrub species such as the carob tree, the wild olive tree, the mastic tree and the alder.

In areas with a semidry climate, the conservation of phrygana may be due to the effects of fire or grazing, or phrygana may occupy abandoned crops or burnt land. In these cases, however, the same high diversity levels of the phrygana ecosystem are maintained.

The main threats faced by these ecosystems are:

- Changes in land use.
- The frequent occurrence of fires and the burning of natural vegetation for purposes of converting land into pastures.
- Excessive and uncontrolled grazing.

3.5 Wetlands

The general categories into which wetlands are divided in Greece are deltas, marshes, lakes, lagoons, springs, estuaries, rivers and reservoirs. In the updated inventory of

Greek wetlands of the Greek Biotope/Wetland Centre (EKBY) (Fytoka et al 2000)[36], 411 wetlands have been inventoried in Greece, most of which (2/3) are in northern Greece and 109 of which are on the islands of the Aegean Sea, Ionian Sea and Crete. The 10 most important wetlands of Greece have been designated as Wetlands of International Importance under the Ramsar Convention and are included in the areas of responsibility of the management bodies established under Law 3044/2002.

Due to their importance, lagoons constitute priority habitats of European interest (Directive 92/43/EEC). Their conservation status in Greece, according to the 2nd national report on the implementation of Directive 92/43/EEC, is bad. In order to ensure their effective protection, Greece shall have to designate Special Areas of Conservation. Furthermore, the country's obligations under Directive 2000/60/EC mandated that by 2015 the quality of the water in the lagoons had to be in "good" status.

Wetland type	Number of sites
Deltas	12
Marshes	75
Lakes	56
Lagoons*	60
Springs	17
Estuaries	42
Rivers	91
Reservoirs	25

Table 3. Total number of Greek wetlands by each wetland type

* The lagoons located in wetland complexes are not counted as separate wetlands.

A recent inventory of wetlands on the islands of the Aegean from WWF-Greece[37] identified a total of 352 wetlands in 51 islands and islets in the Aegean (except Crete). The inventory of the wetlands of Crete was launched in spring 2008 and during the first phase identified 228 wetlands.

Out of the 352 island wetlands, 257 are natural and 65 artificial, while 21 are smaller than 0.1 ha and 9 are totally destroyed. The natural wetlands of the Aegean islands add up to a total area of ca 40 km^2 of which ca 30 km^2 are found on 3 islands (Lesvos, Lemnos and Evia). The majority are coastal, groundwater-fed and of fluctuating salinity. They mainly include small estuaries of seasonal streams/rivers with or without coastal marshes and open water areas. More than half of them are smaller than 1 ha while only 5 are bigger than 3 km^2. Despite their very small size, compared

36 Fytoka, Eleni, T. Partozis, D. Houvardas, P. A. Gerakis and M. Karteris. 2000. Wetland inventory in the framework of the project titled "Updating and Enriching the National Wetland Database". Database. Greek Biotope/Wetland Centre (EKBY) and Aristotle University of Thessaloniki.

[37] Katsadorakis and Paragkamian. 2007. Inventory of the wetlands on the islands of the Aegean: identity, ecological status and threats. WWF-Hellas.

to the large continental wetlands, the Aegean island wetlands are of invaluable importance for the conservation of biodiversity: they host a variety of endemic taxa [e.g. fishes: *Ladigesocypris ghigii* (endemic to Rhodes), *Oxynoemacheilus theophilii* (endemic to Lesvos); amphibians: *Rana cerigensis* (endemic to Karpathos)], rare habitat types of utmost importance for the animal life in the archipelago and they form indispensable stepping-stones for migrating birds as well as refuge in cases of heavy cold spells.

Human activities carried out in wetlands and their drainage basins do have an effect on the wetlands. Today, wetlands in Greece are mainly threatened by point and non-point source pollution (from agriculture, industry, housing facilities, etc.), the expansion of agricultural crops and housing facilities at the expense of wetlands, overpumping and clearing of natural vegetation. Over the last few decades new causes of degradation have occurred, such as mass tourism, holiday houses, seaside airports, etc. According to the above inventory of the Greek Biotope/Wetland Centre, 42% of all wetlands are exposed to non-point source pollution from farming activities, whereas 20% are threatened by the establishment or expansion of agricultural holdings. Irrigation works threaten 14% of wetlands, whereas overpumping threatens 15%. A percentage of 36% of wetlands receives waste from housing facilities and 28% receives waste from craft industries and various processing enterprises. Lastly, the establishment and/or expansion of housing and tourism facilities cause degradation to 26 and 13% of wetlands respectively.
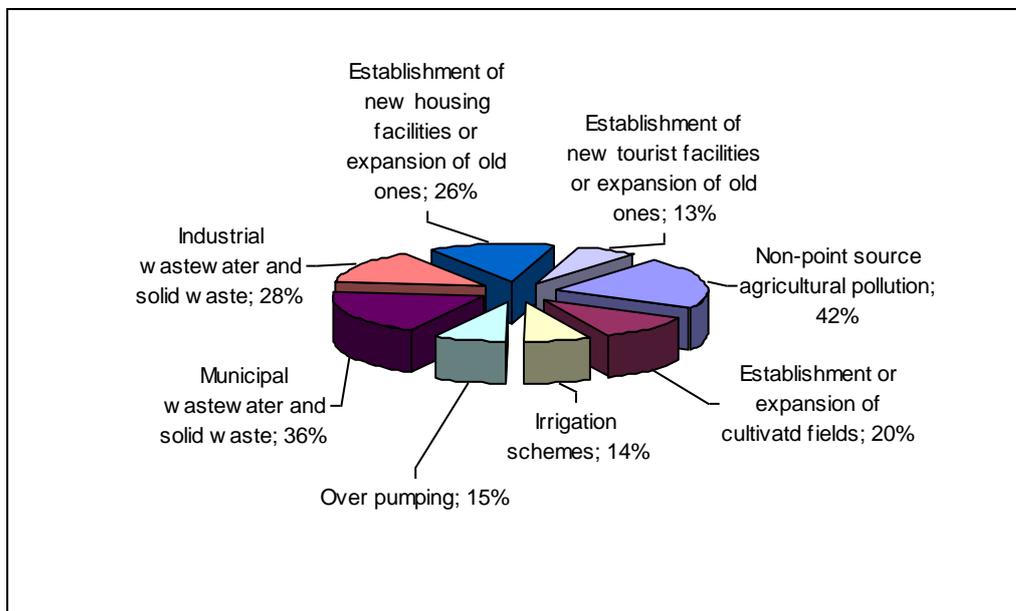
*Figure 7. Factors changing the wetlands' ecological character*

Regarding the wetlands on the islands of the Aegean (except Crete), with the exception of the few wetlands that are found in inaccessible sites, the remainder are increasingly deteriorating and shrinking in size over the last decades. In order of importance, clearing, filling with rubble, building and road construction, pollution,

draining, over-pumping, deprivation of fresh-water inputs and over-grazing are the main problems they face. The building of hotels and holiday houses in particular, in combination with the right to building in areas outside town planning, is the most serious factor of degradation which exerts incredible pressure on the integrity and quality of wetland habitats on the islands.

To summarise, there is no accurate and overall picture of the current condition of Greek wetlands. Several years after the first approach to inventorying, and taking into account the changes that have occurred due to human activity and the current climatic and hydrological conditions, it is necessary to improve, supplement and update the geographic data on wetlands in the country and their other features. It would be particularly useful to identify their edges, which receive the greatest pressure due to trespassing, clearing, etc.

3.6 Agricultural ecosystems

According to data of 2005[38] the agricultural (total) area of Greece is 3.8 million Ha of which 16% is arable land and 5% permanents crops. Beside cultivated land, animal husbandry relies, to different degrees, on natural grasslands and scrublands and cultivations by-products for the coverage of the feeding requirements of ruminants. This land is allocated to those crop categories that are illustrated below, concerning the years between 1995 and 2004. The average set aside land for the same period is about 45.000 Ha. The average family lot size in Greece is only 4.2 Ha. The highest average of agricultural areas per holding is located in northern Greece (west Macedonia) and the lowest in west Greece. On the other hand, the highest average of Ha per agricultural area is located in Thessaly region and the lowest in Attica.

[38] Stavropoulos, N., Gogkas, D. Chatziathanassiou, A., Zagilis, E., Drakopoulos, G., Paitaridou, D., Trigas P., Thanopoulos, R., Koutsomitros, S., Perdikaris, A., Lourida, B. and Alesta, A. (2006) *Greece: Second Country Report concerning the state on plant genetic resources for food and agriculture*. Hellenic Democracy, Ministry of Rural Development and Food, Athens.
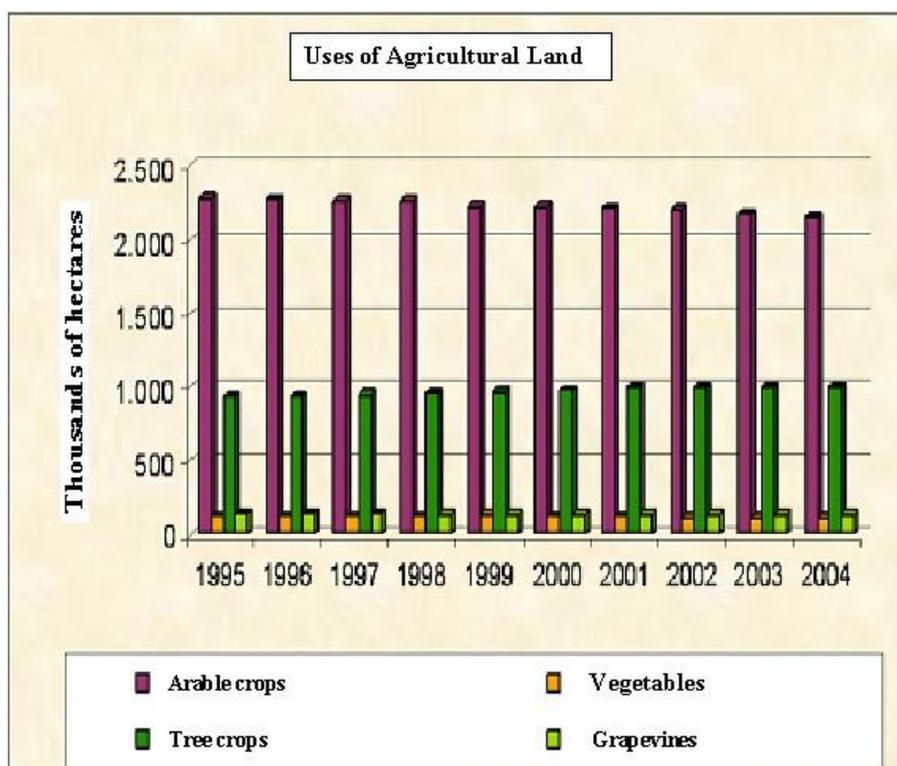
Figure 8. Allocation of agricultural land uses (from Stavropoulos et al, 2006)

According to Stavropoulos et al. (2006) plant genetic resources in Greece are analogous to its rich natural environment and its long agricultural history. Taking into account its limited size, Greece is considered among the richest countries in natural vegetation and crop wild relatives (CWRs) in Europe. If a more modern concept of wild relatives is used (i.e. those species related to any cultivated plants, including aromatic, medicinal and ornamental plants), then it is thought that more than 50% of the total Greek flora can be considered as crop wild relatives and certain areas rich in indigenous wild relatives of crop plants have identified which merit particular care and protection. Greece has also identified and proposed for protection certain areas where traditional agricultural systems and a limited number of associated landraces still survive, resisting the pressure of modern times.

With the advent of the modern market oriented agriculture, Greece has suffered dramatic losses in its cultivated germplasm, which was displaced by superior modern varieties produced by the local breeding institutes or was imported from abroad. The erosion was particularly intense and rapid in cultivated cereals, where the local populations and varieties cultivated today hardly account for 1% of the total allocated acreage. An analogues trend, but with a 15-20 years' delay compare to this of cereals, is now becoming apparent for the vegetable crops, where in the last years local landraces are rapidly displaced even from backyard gardens. Traditional varieties are still used in many tree crops (olive, apples, cherry, apricots, pears, nuts) and in the grapevine. However the number of varieties used at a large scale has been substantially reduced.

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Even though most wild species of wide distribution are not facing immediate threat of genetic erosion or extinction (cereals, forages, pulses, aromatic-medicinal plants), the danger for certain categories is great and the threat of extinction is a reality. Such species are for example the wild Tulips of Crete and Beta nana on the mountains of the Greek mainland. Among the threatened species are also certain unique aromatic and medicinal plants of the country (Sideritis ssp. or 'Greek mountain Tea', Origanum dictamnus, the famous "Dictamon" of Crete etc.) due to their excessive overexploitation, putting at risk the limited natural populations.

Significant progress was made since 1995, the time of compilation of the first national report. The number of germplasm accessions of the Greek Gene Bank was raised from 7,220 in 1995 (belonging to 66 genera and 169 species of crop plants and relatives) to 10,650 in 2005 through a series of collecting expeditions within the country (Stavropoulos et al., 2006). A significant part of the accessions (Wheat, Barley, Maize, Rice, Oats, Gabbage, Sugar Beet, Carrot, Onion, Eggplant, Grapevine, Minor Fruits), maintained in the Greek Gene Bank or in the gene banks of certain crop breeding institutes of NAGREF (i.e. Cereal Institute, Agricultural Research Centre of Macedonia and Thraki, Grapevine Institute), were regenerated, characterised and evaluated for a number of important agronomic properties through a number of EU co-funded Programmes such as those of the Regulation 1467/94/EC, other EU initiatives and national funding initiatives. Many Institutions of NAGREF have also participated in relevant crop breeding networks of European Cooperative Programme for Crop Genetic Resources (ECP/GR) which is the major scientific platform for PGR activities for Europe.

On farm and *in situ* conservation as well as *ex situ* management of landraces and crop wild relatives should be a priority for Greece. The main conclusion is that monitoring programmes and protection policies should be developed for certain species, biodiversity hotspots and landraces through either national or European programmes, similarly to adopted regulation 870/04/EC.

Concerning the farm animal genetic resources[39], in Greece there are 8 cattle breeds, the 5 being widely used, and a buffalo breed, numbering 1000 animals. From the 23 sheep breeds, 21 are native and the 9 are threatened by extinction, while from the 6 goat breeds, one is in the state of extinction. Moreover, there are 6 horse breeds, five of which have a limited number of animals, and 2 widely used donkey breeds. From the 6 pig breeds, the indigenous is in danger of extinction, while the rest are adapted to the local environment and widely used. The 4 locally adapted rabbit breeds are widely used, too.

There are also feral flocks of goats and horses in mountainous and semi-mountainous regions of the country, which are used for meat production. However, the financial

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[39] Greek Strategy for a Sustainable Management of Farm Animal Genetic Resources. Country Report for the State of the World's Animal Genetic Resources (SoW-AnGR) 2003.

profit that derives from the exploitation of these populations is offset by the damage to the pastures and fields and the transmission of infectious diseases. Furthermore, there is a population of feral donkeys. The horse populations located at 5-6 regions are protected by governmental institutions and/or non-governmental organizations. This protection effort includes mainly feeding, especially in the winter months, constructing shelters, water tanks etc. These regions where the feral horses live, combined with other works, like roads etc. act as tourist attraction. The Pindos feral horses' populations have been included in the national program for the conservation of domestic breeds.

The overburdening and overgrazing of the pastures by goat flocks might cause serious damages to the forest. The rational handling of the semi-mountainous and mountainous pastures depends on the various local agents but also on the breeders themselves, who, in order to have an important economic benefit from the production of goat milk and meat, as well as from other traditional cheese-dairy products employ practices that are damaging to the natural environment. In general, goat breeding should not be considered as a damaging activity for the forests but as a contributing factor to the conservation of a traditionally productive sector with important financial profits.

The high biodiversity of Greek agricultural ecosystems is also validated by the High Nature Value (HNV) Farmlands and Forests. The High Nature Value (HNV) Farmlands and Forests of the country were identified and designated for the purpose of implementing certain measures under the 2007-2013 Rural Development Programme (RDP)

The total surface area of HNV farmlands and forests in Greece amounts to 6,893,865 ha and occupies (Figure 8) [40]:

- **2,044,902 ha of grazing forest land** (semi-natural forest / forage land). Out of the above surface area, 503,032 ha are included among the Sites of Community Importance of the NATURA 2000 Network and contain mainly forest land that is used by livestock farmers, without however having a permanent management system as a whole. This land cannot simply be classified as HNV farmland. Out of the 2,044,902 ha of HNV semi-natural forest land, we could say that only 11.8% of this land can be considered as HNV farmland, namely 241,298.43 ha. The remaining 1,803,603.6 ha of HNV are considered as HNV forest land.
- **2,423,186 ha of agricultural land**. The land defined as pure HNV farmland covers a total surface area of 2,423,186 ha, and out if this land, 190,117 ha are included among the Sites of Community Importance of the Natura 2000 Network. These expanses constitute approximately 67.6% of the Usable

[40] Hellenic Ornithological Society. 2008. Designation of High Nature Value Farmland and Forests.

Agricultural Area (UAA) (3,583,185.27) that was measured in the framework of the agricultural inventory of 2000.

- **2,422,577 ha of HNV forests**, of which **964,427 ha** are included among Sites of Community Importance of the NATURA 2000 Network.

Below is illustrated the distribution of HNV areas in every region, overall and by category. One notices that the largest HNV expanses are found in the Peloponnesus region.
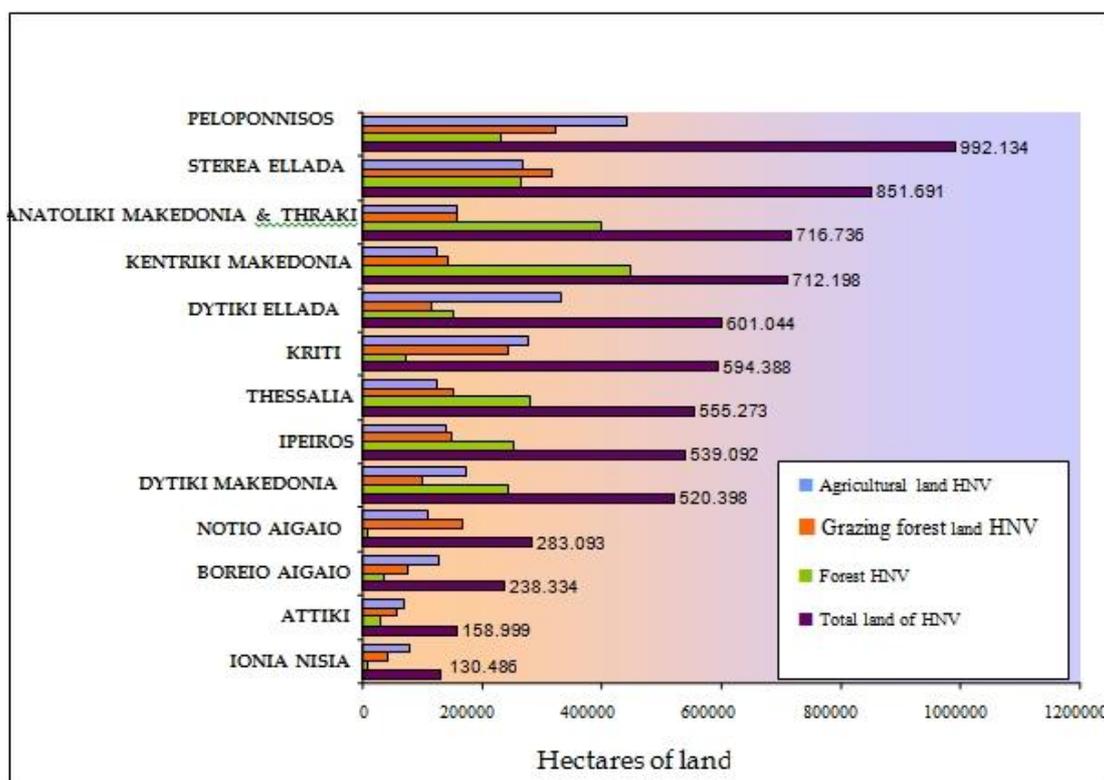
Figure 9. Extent of areas of High Nature Value by type and region in Greece, 2009

It appears that the largest surface area of HNV farmland is in Peloponnesus, and this is due to the large distribution of olive groves existing in the region. The region of Western Greece comes second in terms of the distribution of HNV farmland, with the region of Crete following in third place. In Central Greece we see an almost equal distribution of HNV types with the total surface area of HNV areas being the second largest in the country, as is the surface area of HNV grazing forest land. Coming next is the Region of East Macedonia, which comes third in terms of the total HNV surface area (mainly due to the large expanse of HNV forests), whereas the Region of Central Macedonia has the fourth largest expanse, which however includes the largest surface area of HNV forests in the country.

3.7 Coastal and marine ecosystems

Coastal and marine ecosystems have a high biological, geophysical, aesthetic, cultural and economic value. They constitute a natural resource and are the common heritage of the Mediterranean and Europe, often being of international importance. Over half of the full extent of the coastline runs along the islands of the Aegean and the Ionian Seas, which include approximately 3,000 islands (over 9,800 if the islets are included), several hundreds of which are uninhabited according to the national report on the management of the coastal zone.

The Greek coastal and marine ecosystems, and especially the lagoons, river mouths and underwater *Posidonia* meadows, are defined by high productivity and are habitats to many species. The above ecosystems are included in Annex I of Directive 92/43/EEC as habitats of Community interest. The protected marine areas of the country cover a surface area of 256,426 ha. Box 1 provides information on the Posidonia meadows in Greece.

With regard to the species found in Greece's coastal and marine ecosystems, the following have been referred to in the National Report on the Strategic Action Plan for Biodiversity (2002):

- Macrophytes (in the sea and brackish water): 515 taxa of marine macro-algae and 7 taxa of angiosperms in the sea and brackish water.
- Coastal flora (land): more than 1,500 taxa of land plants.
- Marine mammals: 12 taxa of cetaceans and the Mediterranean monk seal.
- Marine reptiles: 3 taxa of sea turtles, of which only one, namely the *Caretta caretta*, reproduces on the Greek shores.
- Fish: Approximately 450 marine fish species.
- Zoobenthos: more than 2,650 taxa of benthic macrofauna, not including the fauna on the hard substrate of the coast and bathyal zone.

The coastal zone is a complex and strong system, which is affected by sea currents, storms and the flow of alluvial matter. It is particularly sensitive to extreme climate changes and especially to rising sea levels, changes in the frequency and intensity of storms, erosion and flooding. In the national report on the coastal zone, four types of problems have been identified, which arise from human activities in coastal ecosystems:

a) concentration of population and activities in a relatively limited and sensitive space,
b) frequent clashes due to incompatible uses in the same or neighbouring spaces,
c) overexploitation of natural resources, and
d) failure to make decisions, implement policies and coordinate the competent authorities.

According to the above report, three types of coasts found throughout Greece are considered as being the most sensitive: beaches, rocky coasts and coastal wetlands.

Greek seas are oligotrophic. However, they experience problems of pollution coming from industries, urban areas or shipping, which are of a rather local nature, although in certain cases they can be substantial. Furthermore, they suffer from the loss of habitats and the occurrence of invasive alien species. As regards the latter, in the framework of a relevant research project (Streftaris and Zenetos 2006)[41], a preliminary list of the 100 worst invasive alien plant (phytobenthos and phytoplankton) and animal (vertebrates and invertebrates) species in the Mediterranean was drawn up. Climate change is expected to degrade the marine ecosystems. Moreover, the fish reserves in Greece have in the last 20 years presented a tendency to drop. Overfishing tendencies are clear in the largest fishing grounds in the country.

Box 1.

The underwater meadows of the marine angiosperm *Posidonia oceanica* L. in Greece

Posidonia oceanica is a higher plant that grows in the Mediterranean in sandy sea beds at depths from 1-40 metres. The extensive meadows that it forms produce 10 litres of oxygen per square metre a day and 20 tonnes of dry organic matter (biomass) per hectare per year. Its roots penetrate deep into the sea bottom and form a complex mesh. This mesh is capable of holding together the sea bottom, thus contributing to its stability.

The Posidonia meadows are of the most abundant and valuable ecosystems in the Mediterranean. The dense foliage of the meadows provides food, refuge and a place to lay eggs to many animal organisms (more than 500 invertebrate and vertebrate species live exclusively in the meadows). Many types of seaweed attach themselves to its large leaves. They constitute the wealthiest fishing grounds, since fish with high commercial value spend a great part of their lives in the meadows or they find abundant food therein.

The Posidonia meadows are commonly found along the Greek coastline. They are found in most island regions, whereas along the coasts of mainland Greece, they are found in places that are far from urban centres or large tourist resorts.

The main threats to the Posidonia meadows in Greece are related to tourism and residential development (disposal of raw waste, recreational boats, construction of ports/marinas), agriculture (wasteful use of fertilizers and pesticides), fishing (use of trawl fishing gear, amateur fishing, aquaculture facilities) and the occurrence of invasive alien species. For the purpose of dealing with problems arising from trawl fishing gear, Ministerial Decision 167378/2007 (Government Gazette 241/Δ/2007) was issued, which prohibits fishing with the use of trawl gear in areas where Posidonia meadows are located. The said decision is accompanied by a detailed map indicating the prohibited sites.

The Posidonia meadows constitute priority habitats of Community interest. Furthermore, in the Barcelona Convention for the protection of the Mediterranean Sea against pollution, *Posidonia oceanica* has been designated as a protected species. The conservation status of the Posidonia meadows, according to the 2nd national six-year report on the implementation of

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[41] Streftaris N. and A. Zenetos 2006. Alien Marine Species in the Mediterranean - the 100 'Worst Invasives' and their Impact. Mediterranean Marine Science. Volume 7/1 pp. 87-118

Directive 92/43/EEC, is inadequate. In order to ensure their effective protection, Greece shall have to designate Special Areas of Conservation by 2013. Furthermore, by 2015 the quality of all coastal waters in the country, including those that are home to Posidonia meadows, shall have to be good at least, in accordance with the country's obligations under Directive 2000/60/EC.

Q4: What are the impacts of the changes in biodiversity for ecosystem services and the socioeconomic and cultural implications of these impacts?

In the second part of the 20th century, traditional practices for managing habitats throughout millennia for agriculture, hunting, wood extraction, grazing, fishing, salt production have given way to modernisation and intensification.

Existing assessments of the impacts of the changes in biodiversity for ecosystem services and the relevant socio – economic and cultural implications are mostly referring to wetlands. One example is lake Karla, (the ancient lake Voivis) which was drained in 1962, with the construction of a tunnel that channeled water to the sea. The adverse effects of draining began several years later with a degradation of the exposed soils which became unsuitable for cultivation. In the meantime, the once wealthy local communities had lost valuable grazing and fishing grounds.

4.1 Forests and other wooded land

The forests of Greece, as well as of the rest of the Mediterranean region, have been exposed to human activity. As a result, coastal forests and forests located in low altitude have been degraded due to their urbanisation and conversion into agricultural land. Tourism, too, has had a serious impact on semi-natural areas in Greece, among several other countries, particularly as concerns islands such as the Crete[42]. The country's forest land has also been struck by fires. The catastrophic 2007 fires in central Greece caused the destruction of 147,000 ha of forests and other wooded land, of which 20,700 ha were part of the Natura 2000 sites[43].

The contribution of the forestry sector to Greece's GDP is generally low and is around 1.32%. This is due to the fact that on the one hand the country's forests have low productivity since they are protected as a whole, and on the other hand the gains that result from this function are not valued in money, nor are they recorded in national accounts[44].

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[42] Médail Frédéric and Norman Myers. 2004. Mediterranean Basin. *In*: R.A. Mittermeier, P.R. Gil, M. Hoffmann, J. Pilgrim, Th. Brooks, Cristina Goettsch Mittermeier, J. Lamoreux and G. A.B. Da Fonseca. 2004. Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions. Series Producer Cemex Books on Nature, 2004, Agrupación Sierra Madre, S.C.

[43] Ministry of Rural Development and Food. 2007. "Study for the Restoration and Development of the Agricultural Sector and Forests, and for the Protection of the Environment in Areas that were Struck by Fires".

[44] "Alexandros Baltatzis" Rural Development Programme of Greece 2007-2013.

4.2 Mountainous ecosystems

In Greece, the edges of the mountainous ecosystems (tree line) have been heavily influenced by human activities, especially through overgrazing and the exploitation of forests.

These pressures have dropped a great deal and natural regeneration has reclaimed forest areas. Nevertheless, the main activity in several of these areas is grazing, which continues almost uncontrollably. There are very few delineated pastures and the plans that have been prepared for their improvement are even fewer.

Another activity that has been recorded and is presenting a rising tendency, yet with a slow development rate to date, is that of mountain tourism or otherwise the recreational activity that involves the establishment of ski resorts and activities such as rock climbing, mountaineering, short stays in mountain resorts, hang gliding, hiking, etc.

4.3 Wetlands

Wetlands constitute one of the most valuable resources on our planet: they come second to tropical rainforests in terms of biodiversity and productivity, and they provide man with valuable goods and services. They provide, *inter alia*, water for water supply and irrigation, catches of fish, forage for livestock, as well as opportunities for recreation and tourism. They regulate the climate, provide protection against floods, and enrich underground aquifers. They contribute to man's financial and social well-being.

The wetlands in Greece are numerous; they consist of various types and are wealthy in terms of biodiversity. They are home to many endemic taxa and rare habitat types, and they function as crucial points of reproduction and nutrition for hundreds of species of resident and migratory birds that cross the Mediterranean when moving between Europe, Asia and Africa.

Within 40 years (1925-1965) approximately 67% of the surface area of Greek wetlands has been drained, due to demand for housing and agricultural land. This has resulted mainly in the loss of marshes and a few lakes and rivers. Total drainage, especially of the marshes, was deemed necessary at the time in order to deal with the great problems of malaria, flooding, ensuring irrigation water and acquiring more land for cultivation. In addition to drainage, other strong interventions were also made (e.g. river-bed lining, clearing of natural vegetation, construction of dams). Today, local populations have expressed their wish to restore some of the wetlands that were drained, and measures have been taken to this end by investing national and Community funds. Typical examples of this are the works carried out for the restoration of the three drained lakes of Karla, Kallipefki and Xyniada.

The available quantities of water in the country are constantly decreasing and its quality is deteriorating. The saving and general rational use of water in agriculture,

industry and the water supply sector are necessary. The sound use and management of water is now a matter of survival, as well as of social and financial well-being. The agricultural sector uses over 80% of the freshwater that is consumed today in Greece. In order to produce one kilogram of cotton, we consume more than one tonne of water. Agricultural activities are a significant cause for water pollution. The agricultural development model of previous decades has in many regions led to a shortage of water of suitable quality, the exhaustion of groundwater, groundwater salinisation, soil degradation, water pollution and reduction of biodiversity. Wasteful irrigation practices are still applied in water-intensive crops and networks resulting in huge losses. This model should be reviewed: there must be a restructuring of crops; a promotion of the implementation of sound farming practices that protect the soil, save water and respect biodiversity; as well as a spreading of organic farming practices.

The country's water quality status presents problems in specific regions, and especially in the coastal zones. The distribution and development of the population and its activities along the drainage basins of Greece's rivers, as well as the runoff of farmland soil have caused pollution in many outlets. The situation has improved in recent years through the construction of wastewater treatment facilities in the country's large agglomerations. However, the level of pollution caused by the industry, agricultural activities and the wastewater of smaller agglomerations remains high.

Wetlands are the most threatened ecosystems in the Aegean archipelago and should be treated as such. So far, only 2 of them are adequately protected and have some form of sound environmental management. The disappearance of the small wetlands will be the first visible result of mismanagement of the islands' water resources and coastal areas. The consequences will be immediate as the islands' human communities will have less available water, less cultivable land, less recreation areas and less tourist resources, while the biodiversity of Greece will suffer a major strike as undoubtedly the populations of several hundreds of wetland dependent species will be driven to extinction.

Climate change is expected to further intensify the loss and degradation of wetlands and their ability to provide man with goods and services. The elimination of the causes of degradation and the improvement of the resilience of wetlands constitute the most effective ways to help them cope with the effects of climate change. The conservation, recovery and restoration of wetlands may form the elements of an overall strategy for dealing with climate change.

4.4 Agricultural ecosystems

Farming supports a diverse rural community that is not only a fundamental asset of Greek culture, but also plays an essential role in maintaining the environment in a healthy state. The link between the environment and the farming practices is very complex. While many valuable habitats in Greece are maintained by extensive

farming, and a wide range of wild species rely on this for their survival, agricultural practices can also have an adverse impact on natural resources.

The diversity of the abiotic environment of Greece combined with traditional agricultural and livestock farming practices up until recent decades has contributed to a high diversity of agricultural ecosystems, both as regards agricultural crops and their relative plant species, and farm animals. However, the expansion of intensive farming in the lowlands and certain semi-mountainous/mountainous areas; the abandonment of traditional, extensive mountain agriculture and livestock farming; and the substitution of lush traditional agricultural landscapes by monocultures have spoiled the traditional agricultural landscapes, degraded agricultural and neighbouring ecosystems, and, lastly, have reduced biodiversity. Varieties of agricultural crops and species of bred animals that were perfectly adapted to local conditions no longer exist due to the above factors.

The landscapes shaped by farming activities, such as the dry stone walls and terraced landscape (mainly on the islands of the Aegean), the plant boundary fences, the traditional olive groves (in Amfissa, Corfu, Mytilene, etc.), the vineyards (e.g. on Santorini) and the pastures, are in need of special protection and conservation given that they are the homes of almost all wild fauna and flora in the agricultural ecosystems in Greece. In the mountainous and island areas, large expanses of farmland have been abandoned, which – under the effect of erosion or due to their conversion into pastures – now present strong signs of desertification (e.g. the islands of the Aegean). The existence of the abandoned agricultural cultural environment (trails, cabins, other constructions) provides opportunities for the development of special forms of tourism, forming a cultural reserve and agricultural landscape that must be protected. The protection of the environment is directly linked to the problem of the reduction of farmland, especially that which has high productivity, in island, peri-urban and coastal regions. There is also great pressure to change the land use of these areas, mainly due to the expansion of residential and tourism uses. A Methodological approach for the optimal address of the interdependence between biodiversity-agricultural ecosystems and water resources is presented in Box 2.

Box 2

BIODIVERSITY - AGRICULTURE - WATER RESOURCES

KERKINI LAKE: AN EXAMPLE OF INTERDEPENDENCE

The most important and obvious value of freshwater wetlands for humans, with the exception of water supply value, particularly in arid and semi-arid regions, is to provide water for irrigation (irrigation value).

The Kerkini artificial lake was constructed in 1932 for the protection of rural areas against flood events caused by the river Strymon. The lake has high irrigation value. The water of the river is stored in the dam and used for irrigation of the plain of Serres.

During recent decades, Lake Kerkini has evolved into a unique wetland ecosystem with high biodiversity and therefore is protected at international, European and national level.

THE PROBLEM:

Threats: Water level fluctuations (high growth rate in the spring, a wide range of levels between autumn-spring), unwise use of agrochemicals, overgrazing.

Impacts: Habitat degradation, changes in species composition, indications of eutrophication.

FACING THE PROBLEM:

Assessment of water needs for agriculture	Consultation with stakeholders
Simulation of the existing management of irrigation water using state-of-the-art modeling tools and satellite image analysis in the catchment area	Farm management survey at catchment scale
Wetland functional assessment	Evaluation of alternative crop projects
⇓	⇓
Assessment of water needs for the wetland	Assessment of the needs of farmers
Quantification of the impact of agriculture on the quantity of water of the lake	Estimated cost of irrigation water use

⇓

Optimization through modeling

Deliberation with stakeholders

⇓

THE BENEFITS:

Optimum management of water resources for biodiversity and agriculture

Source: Project LIFE-ENVIRONMENT STRYMON

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Part II - The national biodiversity strategy and action plan (NBSAP), its implementation, and the mainstreaming of biodiversity.

Q5: What are the biodiversity targets set by Greece?

The National Biodiversity Strategy with its 15 year of duration has 13 general targets to be achieved over a period of 15 years. The 13 general targets correspond to a number of different sub-targets as illustrated in the table below.

General Target 1: Increasing knowledge about the assessment of biodiversity status	1.1 Facilitate access to scientific knowledge (regarding Greek flora and fauna) and fill the gaps in scientific data.
	1.2 Facilitate access to information on actions for biodiversity conservation and monitoring, as well as the implementation of the National Strategy.
General Target 2: Conservation of national natural capital and ecosystem restoration	2.1 Conservation of species and habitat types in Greek terrestrial and marine ecosystems, to promote the goal of sustainability.
	2.2 Restoration of important species and habitat types.
General Target 3: Organisation and operation of a National System of Protected Areas and enhancement of benefits from their management	3.1 Effective organisation of the administration and management of protected areas and implementing preventive measures in protected areas.
	3.2 Application of exemplary and innovative practices in the productive sectors and tourism based on the areas management plans for biodiversity conservation and management.
	3.3 Design, and possible integration, of ecological corridors of special designation status and their effective management.
General Target 4: Conservation of the genetic resources of Greece – Facilitating access to genetic resources – Fair and equitable sharing of the benefits arising from their utilisation	4.1 Ensuring access to scientific records of genetic resources and filling gaps in scientific data.
	4.2 *In situ* and / or *ex situ* conservation of Greek genetic resources.

	4.3 Facilitating access to genetic resources and the fair and equitable sharing of benefits arising from the utilisation of genetic resources.
	4.4 Study, prevention and reduction of the impact of Genetically Modified Organisms on biodiversity.
General Target 5: Enhancing the synergies among the main sectoral policies for the conservation of biodiversity. Establishing incentives.	5.1 Effective integration of biodiversity conservation at all levels of spatial planning.
	5.2 Minimise impacts of large infrastructure projects.
	5.3 Ensure the compatibility of residential and industrial development activities (including conventional energy production) with biodiversity conservation.
	5.4 Ensure the compatibility of tourist activities with biodiversity conservation.
	5.5 Ensure the compatibility of agricultural, fisheries, and forestry activities with biodiversity conservation.
	5.6 Ensure the compatibility of energy production activities and infrastructure (including renewable energy) with biodiversity conservation.
	5.7 Ensure the compatibility of mining activities with biodiversity conservation.
	5.8 Ensure the compatibility of other activities (like hunting, collection of plants or animals) with biodiversity conservation.
General Target 6: Conservation of landscape diversity	6.1 Completion of integration of conservation landscape diversity policy into all sectoral policies.
	6.2 Maintaining the diversity of the landscape both inside and outside of protected areas.
	6.3 Conservation of unique landscapes.
General Target 7: Prevention and minimisation of the impacts of climate change on biodiversity	7.1 Study the effects of climate change on biodiversity and ecosystem functions.
	7.2 Take action so that the components of biodiversity will be able to adapt to climate

	change.
	7.3 Reduce the impacts of actions established to address climate change on biodiversity.
	7.4 Enhance the role of forests in mitigating the effects of climate change.
General Target 8: Protection of biodiversity from invasive alien species	8.1 Prevention, early detection, and controlling the introduction and spread of invasive species.
	8.2 Taking action to restore the impacts of invasive alien species on biodiversity.
General Target 9: Enhancing international cooperation for biodiversity conservation	9.1 Substantially enhancing the effectiveness of international, regional and transnational cooperation for the conservation of biodiversity and ecosystem services.
	9.2 Enhancing transboundary cooperation for biodiversity conservation.
General Target 10: Upgrade the quality and efficiency of public administration on biodiversity conservation	10.1 Improving public administration in organisational issues, scientific issues and decision-making processes for the effective implementation of policies, measures and legislation on biodiversity.
	10.2 Ensuring adequate funding for biodiversity conservation.
General Target 11: Integration of biodiversity conservation in the value system of societies	11.1 Integrating biodiversity issues in formal and non-formal education and the promotion of the value of biodiversity.
	11.2 Promoting environmental awareness in biodiversity conservation.
General Target 12: Citizen participation in biodiversity conservation	12.1 Establishment of cooperation among citizens, scientists and public administration in the decision making process and monitoring of its implementation.
	12.2 Promoting the accountability of companies in the context of biodiversity conservation.
General Target 13: Appreciation of ecosystem services and the promotion of the value of Greek biodiversity	13.1 Valuation of ecosystem functions and services in social and economic terms.
	13.2 Promotion of the value of biodiversity and the services provided by biodiversity and ecosystems.

	13.3 Promotion, establishment and maintenance of natural green infrastructure.

Table 4. National Biodiversity Strategy targets

Q6: How has Greece's national biodiversity strategy and action plan been updated to incorporate these targets and to serve as an effective instrument to mainstream biodiversity?

6.1 National Strategy for Biodiversity

In early 2014, an updated draft of the National Strategy for Biodiversity was put to public consultation by the Ministry of Environment, Energy and Climate Change. The update was a necessary adaptation of the previously proposed strategy to the Aichi targets and the EU Biodiversity Strategy for 2020. The general targets have been set and work for establishing the relevant indicators for monitoring and evaluation of its implementation has been planned for. The NBSAP for Greece was adopted as a Ministerial Decision and published in the Official Journal of the Government (FEK 2383 B / 08 September 2014).

The National Biodiversity Strategy takes into consideration the following:

1. Scientific knowledge about the wealth, value-of, and pressures-to the biodiversity in Greece
2. Legal framework – national, European and international – including International Treaties and European Directives
3. Strategic framework, as defined by various national, European and international documents that Greece has adopted
4. General principles that are considered a priori acceptable, since they originate from moral values, national needs and capabilities, as well as from corresponding scientific approaches
5. Integration of conservation and sustainable development into a national policy framework
6. Preservation and strengthening of actions aiming to conserve biodiversity throughout the national territory
7. Long-term conservation of biodiversity and its function, as well as the fair and equitable sharing of its benefits.

6.2 Action Plan

The "*Action Plan for Biodiversity and the National Environment 2007 – 2015*" was adopted as a component of the National Strategic Reference Framework for Environment and Sustainable development 2007 – 2013.

The operational objectives for the period 2007-2015 included:

A1. Protection and conservation of endangered species of flora, fauna and habitats in the country.

A2. Monitoring of conservation status of species and habitat types of Community interest.

A3. Sustainable use of agricultural and forest land and fishing areas selected for biodiversity conservation.

A4. Maintaining the diversity of landscape.

A5. Integration of environmental considerations into development policies.

B1. Completion of the Natura 2000 network.

B2. Appropriate measures for a coherent, comprehensive and practical system of protection for the Natura 2000 sites (regulatory, administrative or contractual measures)

C1. Strengthening of environmental awareness and participatory process of social partners and the public regarding the importance of biodiversity and ecosystems for the quality of life.

Q7: What actions has Greece taken to implement the Convention since the fourth report and what have been the outcomes of these actions?

7.1 Protected Areas

Around 12% of the terrestrial area is protected, as reported to the European Common Database of Designated Areas. Moreover, 163 Special Protection Areas (SPAs) according to the Birds Directive and 239 Sites of Community Importance (SCIs) according to the Habitats Directive have been included in the pan-European network Natura 2000, covering more than 21% of the terrestrial part of the country and 6% of the national territory of sea. Twenty seven Management Bodies have been established in number of protected sites and/or SPAs and SCIs around the country.

With the National Operational Program "*Environment 2000 – 2009*", which included a specific section on the "*Protection and management of biotopes - habitats, species protection, areas of natural beauty* was set up and financed a system of protection, administration and management for protected areas, mainly sites of the EU Natura 2000 network. Through it, Greece established the operation of 27 Management Bodies for designated protected sites..

Other objectives included the national scale habitat mapping and site monitoring actions as well as measures to restore areas affected by natural disasters, including fires and oil pollution. The implementation of the program generated significant knowledge and valuable experience for the Ministry of Environment and allowed the establishment of the first Management Bodies in protected areas.

With the National Operational Program "*Environmentand Sustainable Development 2007 – 2013*" the support of the functioning of the Management Bodies was continued and surveillance projects for the evaluation of the conservation status of species and habitats were implemented.,

Restoration and/rehabilitation of degraded habitats and species was carried out within several protected areas. Examples are the rehabilitation of coppice oak forests of Mount Athos, and the restoration of functions of lakes Zazari.

In addition, a large – scale venture, the restoration of the former lake Karla was undertaken within the context of the Operational Program Environment 2000 – 2009. The project aimed at addressing the acute environmental problems and threats, which altered the character of the wider area of the former lake Karla and at the partial restoration of the ecosystem, with specific objectives in terms of nature conservation and sustainable management, to create conditions for sustainable development and development of new activities and employment.

A big restoration project, funded by the Operational Program Environemnt and Sustainable Development (2007-2013) concerned also Lake Koronia.

7.2 Protected species

7.2.1 Monachus monachus

Research and data collection for the Mediterranean Monk Seal (Monachus monachus) is carried out through a number of projects almost all over Greece, in collaboration mainly with *MOm-the Hellenic Society for the Study and Protection of the Monk Seal*. In the wider area of the National Marine Park of Alonnissos - Northern Sporades, the Mediterranean Monk Seal has been monitored since 1990. Specifically in sites with *Monachus monachus*, the implementation of the National Programme for the Protection of the Mediterranean Monk Seal (Archipelagos and MOm, 1996) has been continued. The main target area has been the National Marine Park of Alonissos. In Kimolos – Polyaigos and North Karpathos – Saria implementation took place with the support of a Life – Nature project.

Another Life-Nature project is addressing mitigation of the conflict between monk seals and fisheries. An ongoing LIFE project is examining the presence of large populations of the seal around the vicinity of isle Gyaros with the view of establishing a new protected area.

7.2.2 Caretta caretta

Through a number of projects, NGOs (mainly ARCHELON, the Sea Turtle Protection Society of Greece), are monitoring the most important populations of the Loggerhead sea turtle *Caretta caretta* all over Greece. In sites important for nesting of *Caretta caretta*, actions for the reduction of the intentional and accidental injuries /deaths among loggerhead sea turtles arising from capture in fishermen's nets were implemented through a Life-Nature project. Through this project the existing rehabilitation system (rescue centre and rescue network) was improved and complemented with the opening of two first aid centres in areas where most captures are recorded. Moreover, protection of nests and hatchlings were conducted in southern Kyparissia bay by a Life- Nature project. Similar actions were carried out in Zakynthos National Marine Park (prevention of sound and light pollution, control of activities on the beaches). Incidents of dead, wounded or live marine turtles that have been stranded are also recorded by the Port Police Service of the Ministry of Merchant Marine.

7.2.3 Cetaceans

As regards cetaceans, incidents of dead, wounded or live species that have been stranded are recorded by local Port Police and are kept in an electronic file by the Port Police Service of the Ministry of Merchant Marine. Environmental NGOS are informed on the incidents respectively. Wounded or dead cetaceans are examined, where possible, by veterinaries of the Prefectures or the Veterinary School of Universities. Further on, Universities, research institutes and NGOs (like the Veterinary School of the University of Thessaloniki, National Centre for Marine Research, Fisheries Research Institute, Rhodes Aquarium of HCMR, Pelagos Cetacean Research Institute, ARION, Tethys) are collecting data on their own databases. All of the above mentioned bodies, where possible, do biometric measurements, external examination and take photos. Some of them do also tissue examinati

Greece, as a party to the *Barcelona Convention for the Mediterranean Sea*, is bound to implement the regionally adopted Action Plans for marine turtles, monk seals, cetaceans (especially bottlenose dolphin), seabirds such as Audouin's gull, cartilaginous fishes like the great white shark and the saw-shark and marine plants (such as macrophytes and plant assemblages) seen as natural monuments, like *Posidonia* barrier reefs.

7.2.4 Other species

Action Plans are being implemented for the protection of specific endangered species. For example, there are currently nation-wide action plans being drafted for the protection of *Anser erythropus* and of *Neophron percnopterus*.

7.3 Invasive Alien Species

As regards Invasive Alien Species, the country prohibits the import of all alien species to be farmed/used as baits, and regulates trade in some alien species through CITES regulations. Furthermore, the Sanitary Committee may decide to control introduced animal species. As regards IAS research, a lot has been done by the Hellenic Centre for Marine Research (HCMR) on marine IAS, including the publication of an updated list of marine alien species in Hellenic waters. A network of marine researchers working on marine IAS has been set up under the name ELNAIS including nine research Institutes / Universities and more than 34 Greek scientists currently carrying out relevant research. As regards terrestrial invasive alien species, research has been carried out by individual researchers, with 21 listed as experts under the project "Delivering Alien Invasive Species for Europe (DAISIE)"

The threat of alien invasive species has in the recent years been the focus of an initiative on the EU level, which led to the enactment of Regulation No 1143/2014

"*on the prevention and management of the introduction and spread of invasive alien species*". As a matter of compliance with this regulation, the Greek Ministry for the Environment is taking the opportunity to approach current research on alien invasive species on a more systematic fashion which will facilitate the formulation of relevant policies.

7.4 Genetic resources

Recording of genetic resources has continued with endemic plant varieties, herbal and medicinal plant species, and a considerable number of domestic and farm animal species. Established in 1981, the Greek Gene Bank maintains in its facilities or plantations more than 14.000 samples of seeds or clonal reproductive material belonging to 169 species of agricultural crops or their wild-growing relatives. Additionally, the need to implement the Nagoya Protocol has revitalized the effort to establish a comprehensive national framework that will regulate access and sharing of genetic resources.

With regard to agricultural genetic diversity, the country has set targets for the coming decade regarding plant genetic resources. These include the establishment of a national committee on plant genetic resources, the founding of national research projects on plant genetic resources, the updating and enforcement of the legal framework and the collaboration of plant genetic resources bodies at regional and international levels. Furthermore, the implementation of the Council Regulation (EC 870/2004) on the conservation, characterisation, collection and utilisation of genetic resources in agriculture should be underlined, as well as the active network of farmers that collect, use and exchange old crop varieties called "Peliti".

7.5 The first transboundary protected area in the Balkan peninsula

THE TRANSBOUNDARY PARK OF PRESPA

The Prespa Park was established with the joint Declaration of the Prime Ministers of Albania, Greece, and the FYROM, on the occasion of the World Wetlands Day, on 2nd February 2000, in Aghios Germanos, Greece. The Park, which includes the lakes Mikri Prespa and Megali Prespa Lakes and the surrounding mountains, constitutes the first transboundary protected area in the Balkans.

The main purpose of the establishment of the Prespa Park is the environmental protection and sustainable development of the wider area for the benefit of nature conservation and for the prosperity of its inhabitants and future generations. As mentioned in the joint Prime Ministers' Declaration, **"the conservation and protection of an ecosystem of such importance not only renders a service to Nature but it also creates opportunities for the economic development of the adjacent areas that belong to the three countries.**

Furthermore, the long history of the human presence in the area proves the compatibility of traditional activities and knowledge with the conservation of nature."

The Declaration further defines the objectives of the Prespa Park as follows: a) to maintain and protect the unique ecological values of the area, b) to prevent and/or reverse the causes of its habitat degradation, c) to explore appropriate management methods for the sustainable use of the Prespa Lakes water, and d) to spare no efforts so that the Prespa Park becomes and remains a model of its kind, as well as an additional reference to the peaceful collaboration among the three countries.

In order to promote the co-operation among the three countries, so that to achieve the environmental protection and sustainable development of the Prespa Lakes and their surroundings, a trilateral Prespa Park Co-ordination Committee (PPCC) has been established, with government, local society and non-governmental representation of all three countries. The PPCC has also appointed a Secretariat consisting of three persons from the collaborating non-governmental organisations. These two bodies have already undertaken a series of activities and joint programmes, in order to translate the political commitment into a tangible reality for the environment and the people of Prespa.

On the tenth anniversary of the Prespa Park, 2 February 2010, the three states and the European Union signed an international agreement, which strengthens the institutional operation of the park, ushering in a new era for the Prespa Transboundary Park.

Source: www.medwet.org, www.spp.gr

Q8: How effectively has biodiversity been mainstreamed into relevant sectoral and crosssectoral strategies, plans and programmes?

8.1 Integration into sectors

8.1.1 Agriculture

Greece, with its rich biodiversity in genetic level, has a high responsibility for conserving genetic resources and has taken relevant actions. The current framework includes PD 80 (OJ 40/A/1990) on the protection of plant genetic material of the country, PD 434 (OJ 248/A1995), which provides measures for the conservation and protection of indigenous breeds of livestock. Moreover, Greece has ratified the International Treaty on Plant Genetic Resources for Food and Agriculture Organization (Law 3165/2003) and implements its provisions.

There are also action plans and commitments of the Food and Agriculture Organization (e.g. the *Global Plan of Action for the conservation and sustainable use of plant genetic resources for food and agriculture*, the *Global Plan of Action on Genetic Resources of Farm Animals*) and national reports and strategies to FAO that set out priorities for action (e.g. the *Greek strategy for the sustainable management of genetic resources of domestic animals 2003*, *2nd national report on the status of plant genetic resources for food and Agriculture 2006*). Furthermore, Greece implements the Community Regulation 870/2004, laying down a Community program for the conservation, characterization, collection and utilization of genetic resources in agriculture and repealing Regulation (EC) No 1467/94. The regulation applies to plant, animal and microbial genetic resources that are or could be used in agriculture.

Finally, the Bank of genetic material that the National Agricultural Research Institute holds since 1981 should be mentioned. The Ministry of Agriculture, through the National Agricultural Research Foundation, in collaboration with research institutions and commitments under the Food and Agriculture Organization, is implementing inventory, characterization, documentation and evaluation of plant genetic resources and genetic resources of livestock. The country is committed to continue the effort with a view to setting up a database with lists of genetic resources held today a) in situ, including for conservation of genetic resources in situ / on farm b) collections of ex situ (gene banks) and the average in situ (resources).

With regards to mainstreaming biodiversity concerns into agricultural policy, it should be noted that Greece implements the *Operational Programme for Rural Development*. As part of its contribution to achieving the objectives of policy related to agriculture and the environment, the axis 3 of the Operational Programme includes a number of agri-environmental measures with the broader following aims:

- The application of farming practices compatible with the protection and improvement of environment, natural resources, soil and genetic diversity.
- The reduction of negative impacts of farming on the environment and particularly on water quality, soil and biodiversity.
- The introduction of sustainable practices, beyond the normal for soil protection and control of physical, chemical and biological degradation.

There are a number of measures included in this line based on the principles of protection, prevention and rehabilitation of the environment by presenting a high degree of consistency to achieve the objectives of EU policy on agriculture and the environment.

Morever, Good Agricultural Practice codes and regulations and standards of cross-compliance are applied, that promote environmentally friendly production together with specific actions for the conservation of biodiversity. Regarding agriculture, Greece implements the Regulation (EC) No 1782/2003 that considers, inter alia, to avoid the abandonment of agricultural land and to ensure that the land will be maintained in good agricultural and environmental condition. The regulation includes the establishment of common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers and amending previous regulations. Article 5 thereof, is inserted in the reference framework for the implementation of good agricultural and environmental practices by Member States (Annex IV). According to this, Member States shall ensure that all agricultural land, especially land no longer used for production purposes, is maintained in good agricultural and environmental condition.

Member States determine the minimum requirements for good agricultural and environmental conditions, thereby affecting the rules on good agricultural practices under Regulation (EC) No 1257/1999 and to agri-environment measures implemented beyond the level of good agricultural practices. The JMD 568/2004 came to implement the «*Codes of Good Agricultural Practice*», which are aimed at sustainable management of agricultural land and natural resources, protecting the rural landscape and protecting the health of farmers and consumers. These involved a whole range of agricultural and livestock activities, and in areas that are in special protection schemes. In addition, the JMD No 324032/24.12.04 on the «*Application of cross-compliance and Other Measures on implementation of Regulation (EC) No 1782/03 of Council*» defines the practices of agriculture and livestock produced by the European legislation, with specific references to parts of the network Natura 2000.

With regards to agricultural cross-compliance measures, Greece has included a number of *GAEC Minimum Level of Maintenance measures* (as referred to in article 5 of. Council Regulation (EC) No 1782/2003), that may help to protect biodiversity within farmland habitats. These include minimum stocking density levels for pasture land (which are set at 0.2 LU/hectare for all categories of animal, unless more specific rules exist at regional level). The ploughing of permanent pastures is also prohibited

(except in cases where an environmental or archaeological need is demonstrated) and farmers must not destroy terraces, walls, dykes and natural banks bordering parcels. As regards the Rural Development Programmes (RDP), the Axis 2 budget of the RDP accounts for about 33.8 % of public RDP expenditure (i.e. EAFRD allocations plus cofinancing). The majority of Axis 2 funds are focused on agri-environment payments.

Moreover, Greece adopted the *National Strategic Rural Development Plan (NSRDP) 2007-2013*, which determines the national priorities for the period 2007-2013, in accordance with Article 11 of Regulation (EC) 1698/2005 on the support of rural development by the European Agricultural Fund for Rural Development (EAFRD).

The rural development policy 2007-2013 for Greece focused on three basic axes:
• Improving competitiveness in the agricultural and forestry sectors.

• Enhancing the environment and the countryside.

• Ameliorating quality of life in rural areas and differentiation of the rural economy.

It was assisted by LEADER, a fourth horizontal axis, which is based on the experience gained from the Leader Community Initiatives of past programming periods. It should be noted that biodiversity considerations are taken into account in the second axis.

Agriculture, water and ecosystems

The agricultural sector is the biggest consumer of water in Greece. The water consumption by agriculture is more than 80%. The management of irrigation water is examined by the Ministry of Development for the development and application of management tools for water management in the water districts of the country. These tools are designed to meet the requirements of ecosystems in water. The Ministry, under this program, has also funded in 2007 a synthesis work undertaken by the Greek Biotope / Wetland Centre. This publication looked into the interdependence between the water regime and biota and discussed the issue of water levels and discharges in Macedonia and Thrace, Greece.

8.1.2 Forestry

Sustainable management practices of forests in Greece have been introduced gradually since 1920, especially in terms of logging and grazing, and there is strong legal protection for forests and woodlands. Management plans are implemented for 10 years for forest complexes, by the pertinent Forest Services. These plans ensure that the principles of sustainable forest management are applied, together with the protection of forests from fires. Moreover, the implementation of the EU Action Plan

on Forests and the optimal use of available measures under the reformed Common Agricultural Policy, among other things, support the implementation of the above.

The overall aim of the *Community Forest Action Plan* (Commission Communication to the Council and the European Parliament [COM (2006) 302 final]) is to support and enhance sustainable management of forests and their multifunctional role. One of the objectives of the Action Plan, directly related to biodiversity is «*To maintain and appropriately enhance biodiversity, carbon sequestration, integrity, health and resilience of forest ecosystems at multiple geographical scales*».

Moreover, Greece implements the *EU Action Plan for Forest Law Enforcement, Governance and Trade (FLEGT)*, as a first step towards addressing the urgent issue of illegal logging and associated trade. The Action Plan covers Central Africa, Russia, Southeast Asia and tropical regions of South America. These regions and countries host nearly 60% of forests in the world and supply a large proportion of timber.

In addition, Greece participates in the *Ministerial Conference on the Protection of Forests in Europe (MCPFE)* which is a high-level political initiative (www.mcpfe.org) for the protection and sustainable management of forests in Europe. It is worth mentioning in particular the 4th Ministerial Conference, held in Vienna (2003) and its fourth decision, entitled «*Conserving and enhancing forest biological diversity in Europe*».

Finally, it should be noted that there is also a small allocation of funding for Natura 2000 forest measures. A significant amount of funding is allocated for first afforestation measures on agricultural land or non-agricultural land.

FOREST FIRES

The natural environment and biodiversity in Greece have been severely hit by fires, those of July and August 2007 being of dramatic proportions. Fires in the Peloponnese, Attica and Euboea burnt a total of around 275,000 hectares, of which more than 150,000 hectares were forest land and more than 30,000 ha Natura 2000 sites. Species, such as *Abies cephalonica* the Greek fir, and important habitat types and protected species populations were heavily affected. The forest fires did not only affect the burnt areas themselves. They affected the situation of the Natura 2000 network and the conservation status of habitat types and species in Greece and maybe across Europe, to the extent that these areas host important, unique and rare species and habitats.

Greece has assessed the situation and has started its efforts to restore the burnt forests. Natural regeneration is foreseen in many areas with mediterranean pine forests such as those with *Pinus halepensis*, *Pinus brutia* and in evergreen – broadleved forests. In other cases restoration is underway. It should be mentioned that on Mount Parnonas, in the Peloponnese, the mediterranean pine forests with black pine (priority habitat according to the EC Habitats Directive) will be restored through a structured approach, taking into account biodiversity concerns with EC cofinancing (LIFE +). This approach will then be demonstrated in other areas as well.

8.1.3 Fisheries and Aquaculture – Marine Environment

In fisheries, Regulation (EC) No 1967/2006 for the sustainable management of fisheries resources in the Mediterranean is applied. In Greece legal restrictions are imposed regarding the use of fishing gear and methods, years of fishing, types of fishing vessels, and restrictions on the size of various species of fish, molluscs, gastropods, crustaceans, and stricter measures are applied for tuna, swordfish, shells and corals.

Also, according to the Decision 167378/07, (OJ 241/D/2007), fishing with towed gear is prohibited in areas with *Posidonia* meadows (priority habitat type according to the Habitats Directive, among others). The Greek Operational Programme 2007-2013 for Fisheries and aquaculture included environmentally friendly measures, including reduction of fishing capacity of the fleet and promotion of environmentally-friendly methods in aquaculture.

The majority of the EFF contribution for Greece (37 %) went to Axis 1 '*Measures for Adaptation of the Fishing Fleet'*. Axis 2 '*Aquaculture, inland fishing, processing and marketing of fishery and aquaculture products*' received 29 % of the EFF funds and Axis 3 '*Measures of Common Interest*' received 16 % of the EFF funds. The plans for Aquaculture (Axis 2) include the implementation of methods for improvement of positive impacts of aquaculture on the environment; the support of traditional, biological and sustainable aquaculture methods; and the modernization of the fisheries methods in internal waters. The plans for '*Measures for Common interest*' (Axis 3) also include management measures for fisheries resources as well as environmental and biodiversity protection.

Finally, the newly adopted *EU Marine Strategy Framework Directive (MSFD)* requires the progressive development of certain marine strategies in order to achieve "*Good Environmental Status*" in all European seas by 2020. Greece is in the process of establishing the appropriate National Plans in order to follow the strict time schedule of MSFD implementation plan.

With regard to bathing water quality, according to recent Bathing Water Reports, general bathing water quality in coastal areas remained excellent, though there are fluctuations from season to season. All the coastal bathing areas complied with the mandatory standards (100 %).

8.1.4 Tourism

The national policy for tourism published by the Ministry of Development in 2000 includes the aim of protection of natural environment through the promotion of ecotourism. The sustainability principle is integrated in the tourism policy through "*the development of alternative tourism activities (ecotourism, cultural tourism, sport tourism)*". Within the *Operational Programme Competitiveness and Entrepreneurship 2007 – 2013*, it was assumed that the quality and the use of natural and cultural

heritage may enhance the tourism product through the development of specific forms of tourism, including marine tourism, nature tourism, ecotourism and rural tourism. These in turn may create the conditions for the promotion and protection of national natural resources and enhance environmental public awareness.

8.1.5 Research

The General Secretariat for Research and Technology funds several projects in the field of environment, including biodiversity. Within the context of Environmental and Physical Environment thematic areas of 3 national research programmes, related to human potential in research support, attraction of Greek researchers to be re-established in Greece, and Transnational Cooperation, 20 research projects on the field have been funded within a period of 5 years. The National Research Policy for the years 2007-2013 has been reflected in the Strategic Development Plan for Research, Technology and Innovation under the 2007-2013 NSR Framework.

Biodiversity research has been allocated in two out of 11 National Thematic priorities of the Strategic Development Plan for RT&I, namely

    i)   Agriculture, Fishery, Foodstuffs and Biotechnology, and

    ii)   Environment.

In particular,

a) utilization of Biotechnology for the study, assessment and conservation of Biodiversity, and

b) Protection of Biodiversity for the Sustainable use of Natural Environment, protection and considerable use of Ecosystems (especially forestry and marine ones)

are explicitly mentioned in the explanatory discussion of the above mentioned thematic priorities, and will be included in future Calls and Initiatives. Moreover, within the new framework, several funding and decision making tools are also foreseen to support policies, especially in Strategic and Sustainable Development thematic fields.

8.1.6 Communication, Education and Public awareness

Greece does not have a national *Clearing House Mechanism* supporting the *Convention on Biological Diversity (CBD)* in place to improve communication and public awareness of biodiversity issues and to encourage public participation in support of the Convention and in environmental issues in general. In addition, Biodiversity is being promoted through the press, including the bimonthly newsletter *AMPHIVION* of the Greek Biotope / Wetland Centre. Public relations and media oriented activities are carried out during significant anniversaries, such as International Biodiversity Day.

Greece has established 54 *Environmental Education Centres* in various regions of Greece to provide advice and assistance to teachers on environmental education and the development of relevant projects. The Greek Ministry of Environment, Physical Planning and Public Works (named subsequently as Ministry of Environment and Energy) supported the Management Bodies of protected areas in the production of educational material. Moreover, projects by NGOs with public awareness goals have been supported.

During 2013-2014 the Greek school system underwent reforms. Some new curricula for compulsory and post compulsory education included an interdisciplinary approach based on the support of sustainable development and the transition to a green economy. Educational material was developed; seminars were programmed for the training of School Counselors, Principals and teachers, in over 200 schools. 9,784 environmental education projects were developed, with 19,024 teachers and 235,368 students. Additionally 439 seminars were organized for teachers as well as the local community.

The Directorate of International Relations in Education, of the Ministry of Education, coordinates the so called "UNESCO Associated Schools Project" (ASPnet). The majority of the Greek ASP net schools develop projects related to environmental/sustainability thematic guidelines through a whole school approach.

The majority of the Greek Universities have introduced sustainability-related themes in their curricula.

An interesting ESD related activity run by the Ministry of Culture and Tourism, which could be considered as a Good Practice is the implementation of educational projects in archaeological sites, museums and monuments. The Directorate of Museums, Exhibitions and Educational Programs, in the framework of youth awareness regarding issues on the protection of cultural heritage and the natural environment.

Based on the above, the Directorate General of Antiquities and Cultural Heritage of the Hellenic Ministry of Culture, along with its regional offices, initiated a communication action throughout the country entitled "Environment and Culture". In this framework, a number of events are being organized, aiming at the awareness of the citizens towards the protection of the cultural and natural heritage, the youth awareness of the bonds between the cultural heritage and the natural environment, the promotion of the environment as a means of inspiration and creativity and at the reinforcement of the belief that cultural issues go hand in hand with the sustainable management of natural resources. This campaign aims also at raising awareness at the local level.

Comparing the results from two surveys of the Flash Eurobarometer, conducted in 2013 and 2007, we would note that people in Greece got more information and became more familiar with biodiversity and Natura 2000 terms. In particular, the term "biodiversity" was more known to people in 2013 (36% had heard the term and knew

the meaning, contrasted with 16.7% in 2007). However, they had been equally concerned about biodiversity loss (96-98%).

8.1.7 Hellenic Aid

With regard to supporting developing countries, several programmes and projects have been implemented in the framework of the *Bilateral Programme of Development Assistance and Cooperation* by the Ministry of Foreign Affairs. Greece has developed a system with an Inter-ministerial Committee (*EOSDOS*), chaired by the Minister of Foreign Affairs, providing strategic guidance on its aid programme, and Hellenic Aid (in the Ministry of Foreign Affairs) coordinating its implementation. Its bilateral aid programme is focused on 21 priority countries, with a high concentration in the Balkan and the Black Sea region. The country is already considering possibilities for increasing its development aid activity in the Middle East and Sub-Saharan Africa. Greece's bilateral programme is focused on a limited number of sector priorities, which are in line with its overall objective of poverty reduction. Annual spending on biodiversity-related bilateral aid in 2006 was EUR 380 000, which amounted to 0.33 % of the total bilateral aid budget.

8.2 Cross sectoral integration

8.2.1 National Strategies and Plans

Greece published in 2002 its *National Strategy for Sustainable Development*, one of the main axes of which is the integration of biodiversity into sectors of decision-making.

In addition, the *National Strategic Reference Framework (NSRF) 2014–2020* has been adopted. The NSRF constitutes the reference document for the programming of European Union Funds at national level for the 2014–2020 period. Its 7 Sectoral Operational Programmes and 13 Regional Operational Programmes provide ample opportunities for cross sectoral integration of the CBD objectives. An obvious direct first approach may be sought in the Sectoral Programme "*Transport Infrastructure, Environment and Sustainable Development*" and in particular as part of the third objective to "*Preserve and protect the environment and promote resource efficiency*". But other NSRF Programmes may also internalise important biodiversity strategies, for example the *Rural Development Programme* (Axis 2: Improvement of the Environment and the Countryside), or the Operational Programme *Fisheries and Maritime* (Strategic Objective 1: To achieve a long term balance between the fisheries resources and the respective fisheries activities).

The *National Strategic Rural Development Plan (NSRDP) 2007-2013* determined the priorities of Greece for the period 2007-2013, in accordance with Article 11 of Regulation (EC) 1698/2005 on the support of rural development by the European Agricultural Fund for Rural Development (EAFRD), in which it is stipulated that the national strategy for rural development will be applied via the Rural Development Programme (RDP) 2007-2013. The rural development policy 2007-2013 for Greece focused on three basic axes, the second of which aimed to "*enhance the environment and the countryside*". The *Programme for Rural Development of Greece 2014-2020* explicitly states as an objective the "*protection of biodiversity and showcasing the natural importance of rural areas*".

The *National Strategic Plan for Fisheries Development (NSPFD) 2007-2013* period covered the country's fishery sector and was drafted according to the provisions of Article 15 of the Regulation regarding the European Fisheries Fund (EFF), describing all aspects of the common fishing policy and determining priorities and objectives principally in relation to (among other things):

• Sustainable development of fishing activities.

• Sustainable development of the aquaculture sector.

Moreover, the *regional land use and sustainable development plans* that are typically issued through Ministerial Decisions, integrate nature protection concerns into the land use and sustainable development decision-making process.

In July 2008, after lengthy consultations, the Greek Parliament approved the *General Framework for Land use Planning and Sustainable Development* (No 6876/4871, OJ 128/A/3.7.2008), for the next fifteen years. In its Article 10, entitled "*Conservation, protection, enhancement of the national natural and cultural wealth, conservation and enhancement of the rural diversity and sustainable management of natural resources*", related policies and other measures are foreseen. These provisions are structured in five axes: 1. Priority areas of natural wealth; 2. Management of natural and cultural wealth; 3. Land-use guidelines for the protection of the landscape and rural areas from uncontrolled urban sprawl; 4. Guidelines for the sustainable management of natural resources in regional and local planning; 5. Prevention – control of natural and technological risks-restoration of affected areas.

8.2.2 Environmental Impact Assessment, Strategic Assessment

Regarding the environmental impact assessment, the framework is set by a) Law 3010/2002 that harmonised national law with the EU directives 97/11/EC for the assessment of public and private projects on the environment and 96/61/EC on

integrated pollution prevention and control which have contributed in a positive way to protecting nature and biodiversity and b) the Council Directive 2001/42/EC «on environmental impact assessment of certain plans and programs», which introduces the important dimension of the strategic environmental assessment.

The Directive is transposed in the Ministerial Decision no 107017 (OJ 1225/V/5.9.2006). This Decision further strengthens the regulatory regime by specifically mentioning biodiversity as one issue that has to be reported on. Moreover, article 6 of the Habitats Directive (92/43/EEC) requires Member States to assess the likely impact of any plan or project likely to affect sites designated or intended to be protected as special areas of conservation under the Directive or as special protection areas under the Birds Directive (79/409/EEC), so as to ensure that any development will not adversely affect the integrity of the site. Strict criteria apply for any exceptions to this requirement.

In 2014, Law 4014/2011 set new provisions for Environmental Impact Assessment, with the aim to simplify and streamline the procedures and reduction of the requisite time for the issuing of the relevant decisions. By this Law, obligatory ordinary and extraordinary inspections are enacted. As regards assessments within Natura 2000 sites, the application of a "Specific Environmental Assessment" is foreseen.

Strategic Environmental Assessment is covered by the Joint Ministerial Decision 107017/28.8.2006, which is in accordance with the EU Directive 2001/42/EK for the assessment of plans and projects.

Q9. How fully has the Greek national biodiversity strategy and action plan been implemented?

The duration of the National Biodiversity Strategy is set to last for 15 years. Within this time framework, the foundations should be set for future actions beyond this time point. The successful implementation of the National Strategy requires the continuous monitoring and evaluating the implementation process. The Ministry of Environment, Energy and Climate Change is the main administrative institute responsible for implementing this strategy and for coordinating the other Ministries and Agencies involved in the process.

The National Biodiversity Strategy will be reviewed and amended every five years. To this end, the Ministry will establish a competent service that will prepare reports on the implementation process every five years. The first review is planned for 2020, so as to be combined with the corresponding review for the European Biodiversity Strategy, and the United Nations Strategic Action Plan for Biodiversity 2011–2020, which includes the Aichi targets for biodiversity.

The implementation of the National Biodiversity Strategy relies on the Action Plans, which will be prepared with a five- year horizon. There is a need to establish a monitoring system that quantifies the successful implementation of the strategy based on a set of indicators. The monitoring system will be completed with the preparation of a report to be included in the Action Plan for the first five-year period (2014–2019) under the General Target 1: "Increase of knowledge about the assessment of biodiversity status", Specific Target 1.1: "Facilitate access to scientific knowledge (regarding Greek flora and fauna) and fill the gaps in scientific data". Some preliminary indicators of the successful implementation of each target are with the NBSAP document.

Part III - Progress towards the 2015 and 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 Targets of the Millennium Development Goals.

Q10: What progress has been made by Greece towards the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets?

Target 1 By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	See 8.1.6 '
Target 2 By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	Though there is a progress in integration of biodiversity in relevant policies there is no measurement of the achievement of the target
Target 3 By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	Subsidies are determined on the European Union level as part of the Common Agricultural Policy
Target 4 By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have	Though there is a progress in integration of biodiversity in relevant policies there is no measurement of the achievement of the target

implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	
Target 5 By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	Though there is a progress in integration of biodiversity in relevant policies there is no measurement of the achievement of the target However, forest loss has been reduced, with cases of re-forestation taking place where grazing pastures have been abandoned. Wetland protection remains crucial.
Target 6 By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	Though there is a progress in integration of biodiversity in relevant policies there is no measurement of the achievement of the target
Target 7 By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	-
Target 8 By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	Observable progress according to Eurostat[45]
Target 9 By 2020, invasive alien species and pathways are identified and prioritized,	Ongoing work under the framework of EU Regulation No 1143/2014 working groups. National listing project in

[45]http://ec.europa.eu/eurostat/statistics-explained/index.php/Agriculture_and_environment_-_pollution_risks

priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	preparation to be submitted for funding.
Target 10 By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	See 3.7
Target 11 By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	Ongoing process to expand the network of protected marine areas by adding more Natura 2000 sites, for which the current coverage rises up to 6%. Management of protected sites is under way from Management Bodies and some measures of "horizontal type" are implemented in Natura 2000 sites. See 7.2
Target 12 By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	Red Data Books were issued in 2009 and assessment of conservation status of habitat types and species has been made. However, there is no measurement of the progress towards the target. See also 1 and 7.3
Target 13 By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	See 7.5
Target 14 By 2020, ecosystems that provide essential services, including services	See 7.2.

related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	
Target 15 By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	See 7.2
Target 16 By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	National legislation expected to be in place sometime in 2016.
Target 17 By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	Achieved.
Target 18 By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	Local communities are represented at the Management Bodies for protected areas. Additionally issuing of all national legislation is required to go through a process of public deliberation through an electronic platform.

Target 19 By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	Programmes of data gathering are being implemented but mainly at a non systematic way. Further on, see also 1, 7.2, 7.3, 7.5
Target 20 By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	Allocation of resources has been increased during the period of reporting

Q11: What has been the contribution of actions to implement the Convention towards the achievement of the relevant 2015 targets of the Millennium Development Goals in your country?

The first *National Sustainable Development Strategy* (NSDS) was adopted by the Council of Ministers in 2002. The second NSDS was prepared in 2007 and had been partially implemented by 2009. Since 2009 when the "Ministry of Environment, Energy and Climate Change" (MEECC), was established, the political priorities for Greece, throughout the whole Government structure, have been set under the overarching objective of "*Green Growth*". Since 2010 when the economic difficulties have been increased due to the financial crisis, until today Greece's overarching political strategic objective, remains that of "*Green Growth*", taking into account the constraints and obligations arising from the structural reform.

The difficult financial situation has required the promotion of a new model of development that will serve citizens' needs while in parallel respecting the environment as a reserve for development. To this end the new model, in the form of a green economy in the context of sustainable development, provides the ability to address the multifaceted current challenges in the financial, energy, biodiversity, food and environmental sectors, while fostering sustainable livelihoods and social cohesion. To name an example, the promotion of renewable energy sources, such as photovoltaic and wind turbines have been driven. This new model additionally serves the fulfillment of requirements of the aquis communautaire in the environmental sector.

The implementation of the new Strategy of the Ministry for the Environment on "*Green Growth*" that reflects the overall government orientation and focus requires a close cooperation between all relevant Ministry and Government Agencies as well as a reach out to the private sector and other social stakeholders. The Strategy itself aims at economic growth, increase of investment opportunities, creation of jobs, reduction of unemployment, revitalising degraded urban and rural areas, social cohesion, education on sustainable development and increased democracy, through an integrated and sustainable use of natural resources. These goals extend beyond the tasks and responsibilities of the Ministry for the Environment and focus on the real economy.

For example, in the context of the new Strategy, the government has set the goal of reaching a 'resource efficient and low carbon economy'. Thus all related Services throughout competent Ministries are coordinating their work to achieve this target. Two indicative programmes that will contribute to the implementation of the Strategy and require horizontal integration include:

- "*In-house saving*" is a public-private venture with the active participation of the banking sector and aluminum frame producers, for providing no-interest or low-interest loans to house and shop owners for replacing door and window frames with special new ones that ensure best heating and cooling performance and insulation, thus, resulting in a considerable decrease in energy requirements.
- "*Building the future*" is a larger scale programme that entails the pilot application of the principles of "*green growth*" in selected indicative geographic and sectoral areas like an island, 3 urban neighborhoods, a rural village, selected military camps and selected industrial sectors that will be linked to academic research in order to invest in development of new materials for energy saving.

Another example of effective horizontal integration is the establishment of an Inter-Ministerial Committee on "Green Public Procurement and Integrated Product Policy". More than 5 Ministries actively participate in the works of this Committee that will lead to policy recommendations for changing the related legal framework in the country.

Greece is also participating in the Bureau of the ESD Steering Committee, supporting, inter alia, the strengthening of the cooperation and synergies with other bodies starting to be involved in ESD issues, like the Union for the Mediterranean.

In this respect, Greece has been working in depth in promoting activities implementing the three priority areas as decided at the 7th Meeting of the Steering Committee on ESD, namely (a) to ensure that there is an education for sustainable development school plan in every school by 2015; (b) to promote the introduction of ESD into teacher education; and (c) to reorient technical and vocational education and training in support of sustainable development and the transition to a green economy; through decisions and circulars, in line with the endorsed work plan for the 3rd phase of the implementation of the Strategy.

Moreover, regarding the preparation of national goals in the framework of the post 2015 Development agenda discussions in the OWG on SDGs, Greece under the leadership of the Ministry of Foreign Affairs, has prepared the national priority areas through interministerial collaboration during the Hellenic Presidency of the Council of the EU (A semester 2014).

Additionally, inter-Ministerial coordination was strengthened for the drafting of the National Strategic Reference Framework in which the principles of the NSDS were embedded. Moreover, a new Service for the Coordination of all Environmental Activities that are being carried out by all government entities (central Ministries and Regional Authorities) has been established aiming to effectively coordinate planned and implemented interventions related to environment, as a cross-cutting issue, in the context of all sectoral and Regional Operational Programmes under the NSRF (2007-2013).

The Special Service for Coordination of Environmental Projects is the competent authority for monitoring and assessing the integration of the horizontal environmental

issues derived by the European Environmental Acquis into the Greek Cohesion Policy.

<u>Indicators</u>

In 2003, a preliminary set of 70 SD indicators was presented in the report 'Environmental signals' produced by the National Centre for the Environment and Sustainable Development (NCESD), supervised by the Ministry for the Environment. However, as the indicators were a proposal and not all of them measurable, the implementation of the NSDS was not monitored across all of them and the indicators were not used nor expanded to cover all the NSDS's objectives.

A new set of indicators has been developed by the NCESD, in close co-operation with the National Statistics Service, which take into account the SD indicator set by Eurostat and the needs of reporting for the renewed NSDS. This set was developed and established in 2008-2009 within a "State of the Environment" Report produced by NCESD in 2010. The new indicator set was developed after the EU SDS Implementation Report (2007) has been adopted: it is not integrated in the old report (2007). The indicators will be utilized from the government and administrative departments to keep on track.

Indicators are also used in the Operational Programmes for period 2007-2013 to evaluate the results and impacts of the Operational Programmes funded by Structural Funds and also EC Life + Programme. Those include green and employment growth indicators.

Q12: What lessons have been learned from the implementation of the Convention in Greece?

The public perception of the importance of biodiversity and its components -genes, species, habitats, ecosystems-, is varied within the Greek society. The historical and cultural importance of landscapes and habitats has been gaining recognition in recent years. There is widespread appreciation of the quality of the natural environment, characterised by intense relief, extensive coastline, numerous islands and high variety of landscapes, along with the interrelationship between nature and human well-being, while making use of the services provided. An appreciation of the benefits of nature has resulted in the involvement of all stakeholders to preserve ecosystem services in all levels of planning and implementation, as their decisions and acts will in turn affect nature, the economy, society and people.

The maintenance of genetic diversity, especially in terms of wild crop relatives and local breeds of domestic animals, has a direct resonance to people because of its high importance for future generations. Other aspects of genetic and species diversity related to human wellbeing, including traditionally used edible and medicinal wild plants are also perceived positively by large parts of society.

At the same time, the recent years have highlighted the difficulties in pushing for tighter environmental legislation during periods of economic crisis and austerity. The measures that are often necessary to safeguard the valuable biodiversity of the country are increasingly more difficult to be accepted by the local populace when they restrict economic activity, and as a consequence they limit the employment options of people who reside near protected areas especially. The balancing of adequate environmental protection and economic development is a difficult feat, both in the field of legislation but also of implementation. Periods of economic austerity make this already difficult balancing act even more challenging.