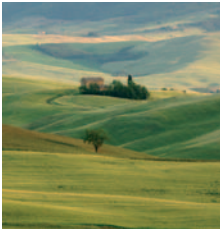




BIODIVERSITY AND NATURAL, AGRICULTURAL AND FOREST AREAS



Biodiversity is the richness of life on the Earth and a source of goods, resources and services indispensable to the survival of man.

Introduction

Biodiversity can be defined as the richness of life on the Earth: the millions of plants, animals and micro-organisms, the genes that they contain and the complex ecosystems of which they are the component parts in the biosphere. The *Convention on Biological Diversity* (CBD), whose provisions were set during the world summit held in Rio de Janeiro in 1992, defines biodiversity as the variety and variability of living organisms and of the ecological systems in which they live, stressing that the diversity in question involves genes, individuals and ecosystems as a whole.

Biodiversity consists not only of the range of different forms and structures of living beings, but also of their diversity in terms of abundance, distribution and interactions among the different components of biodiversity itself. Biodiversity also includes variety in human culture, though this is another area subject to the same negative repercussions that affect, as we shall see, the biodiversity of the gene pool, of species and of the ecosystem as a whole. Biodiversity, apart from its intrinsic value, is a source of goods, resources and services (ecosystems services) that are indispensable to man's survival. These services (classified by specialists under the categories of *provisioning, regulating, cultural and supporting*) provide both direct and indirect benefits to all the planet's human, animal and plant communities, in addition to playing a key role in constructing the economies of the world's nations.

For example, plant biodiversity, in the form of both cultivated and wild plants, provides the underpinnings of agriculture, making possible the production of food while contributing to the health and nourishment of the global population. In the past, genetic resources have been used to improve species of cultivated plants and bred animals, and they shall continue to serve this function in the future. Genetic variety can also be drawn on to respond to ongoing developments on markets for agricultural products and to adapt to climate change and changing environmental conditions. The priority objectives of the CBD are the preservation of biodiversity and the sustainable and durable use of its components, in addition to a just and equitable distribution of the benefits it provides. In 2003, on the occasion of the sixth session of the Conference of the Parties to the CBD, 123 nations committed



themselves to reduce significantly loss in biodiversity at local, national and regional level by 2010. Unfortunately, as even the international conservation agencies admit, there is no hope of achieving this objective. The decline of biodiversity moves forward with unprecedented speed: species are becoming extinct at a rate 100 greater than that registered in the pre-human era.

The variety of bio-geographic, geo-morphological and climatic conditions that characterise continental Europe and the Mediterranean basin make Italy a nation with an extraordinary concentration of species, habitats and areas with bountiful natural resources. Major centres of biodiversity have been identified in Italy, such as the Tyrrhenian islands and the Maritime and Ligurian Alps, to say nothing of the high rate of endemic species that characterises many areas, such as, to name just one, the Apennine chain. On the global level, Italy is considered one of the “hot spots” of biodiversity¹, being recognised as a priority eco region².

This massive natural heritage is threatened by a series of critical problems traceable to the general course of economic development, both global and national, such as the destruction and fragmentation of habitats due to urban development and agricultural practices, the deterioration of habitats on account of unsustainable management, plus the serious threat to diversity posed by the introduction of alien species and the unsustainable use of resources and species, as well as the effects of climate change. In addition to these general critical threats, there are other factors that place more direct pressure on natural systems, such as water, air and soil pollution, the increasing transformation of watersheds into artificial systems, the intensification of the grid of infrastructures, the spread of genetically modified organisms whose effects on natural dynamics are not always clearly identified and the growing presence of natural risks.

The loss of biodiversity is countered, on the national and international levels, through the use of both indirect and direct instruments. The first category includes all the initiatives taken to reduce the sources of pressure, such as controls on the levels of emissions of polluting substances and defence of the quality of waters. The second category consists of direct efforts to preserve species and ecosys-

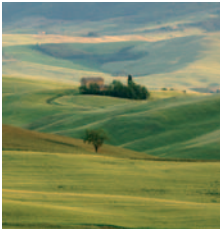
Italy is considered one of the planet's key “hot spots” of biodiversity.

Many critical problems pose either indirect or direct threats to Italy's national heritage.

National and international instruments, both indirect and direct, are meant to fight the loss of biodiversity.

¹ <http://www.biodiversityhotspots.org/xp/Hotspots/hotspotsScience>

² <http://www.worldwildlife.org/science/ecoregions/ecoregion-conservation.html>



Italy is one of Europe's richest countries in terms of biodiversity, possessing half of the European plant species and a third of the animal species.

Italy has the highest number of animal species in Europe (more than 58,000), with a high incidence of endemic species, including more than 9% of the terrestrial fauna.

tems. A noteworthy regulatory framework supports policies of conservation, making it possible both to take increasingly effective measures at the various levels of territorial jurisdiction and to establish forms of coordination between increasingly focussed and effective initiatives involving safeguards, territorial planning and general programming. Still, the regulatory sphere needs further reinforcement, in particular through increased and more widespread application of controls, higher levels of funding and adjustment of the regulations to address newly emerging problems, such as the spread of alien species and global climate change.

Starting from the information provided by the indicators found in the ISPRA Yearbook of Environmental Data, this chapter provides an overview of biodiversity in Italy, briefly outlining the state of the country's natural environments, the most important threats to biodiversity and, finally, the primary actions of defence undertaken.

The state of the natural and semi-natural environments

Italy is one of Europe's richest countries in terms of biodiversity, essentially on account of its favourable geographic position, as well as its extensive geo-morphological, microclimatic and vegetative variety, plus the additional influence of factors of history and culture. Italy possesses roughly half of all the plant species found in European territory, and it is the leading nation on the continent for number of species in absolute terms; as for animal species, Italy holds approximately a third of those currently found in Europe: certain groups, including a number of families of Invertebrates, are present at two or three times the concentration, if not higher, than in other European countries. All the above reflects what is known as the "latitude gradient" of richness of species, or the fact that diversity falls as latitude rises.

Based on the studies carried out to date, as well as the recent *European Fauna*, Italy has the highest number of animal species in Europe, with a noteworthy incidence of endemic species. Italian fauna are estimated to include more than 58,000 species, of which approximately 55,000 are Invertebrate species and 1,812 are species of Protozoa. Taken together, these categories account for roughly 98% of the total number of species, in addition to which there are 1,258 Vertebrate species (2%). The most abundant



phylum is that of the Arthropods, with more than 46,000 species, of which approximately 65% belong to the Insect class³.

Approximately 42,000 species of terrestrial fauna have been identified to date in Italy, of which over 9% are of particular importance, being endemic species. The number of species found in freshwater habitats (not including Protozoa) is estimated at 5,500, meaning approximately 10% of all Italian fauna. The checklist of Italy's marine fauna holds more than 9,000 species, and, given the country's geographic position, these probably account for the majority of the species in the Mediterranean.

Italian bryological flora, including Mosses and Hepaticae, are among the most abundant in Europe, consisting of 1,130 species, of which 851 are Mosses and 279 are Hepaticae⁴. It should also be remembered that knowledge of the number of these groups is continuously being updated, thanks to further exploration of little known areas of the national territory, together with the ongoing development of techniques of genetic research. Italy can also be counted among the European countries presenting the largest variety of Lichens, with 2,323 *taxa* recorded⁵.

Italy's vascular flora consist of 6,711 species, breaking down into 144 species of Pteridophytes, 39 Gymnosperms and 6,528 Angiosperms⁶, with endemic species accounting for 15.6% of the total. The greatest number of flora is found in the regions with the most extensive environmental variations and the largest territories, such as Piedmont (3,304 species), Tuscany (3,249), Veneto (3,111), Friuli Venezia Giulia (3,094), Lazio (3,041) and Abruzzo (2,989). Looking at the flora species that are most rare, and found in small areas, the regions that possess the greatest number of endemic species and exclusive species, meaning those

Italy's bryological and lichen flora are among the most abundant in Europe.

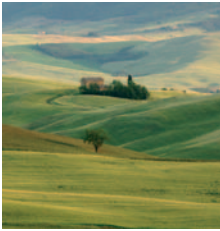
Of Italy's more than 6,700 species of vascular plants, 15.6% are endemic species.

³ Source: *GIS NATURA II GIS delle conoscenze naturalistiche in Italia*, Ministry of Environment and Defence of the Land, Department for the Protection of Nature, Milan Polytechnic, 2005; *Stato della Biodiversità in Italia*, Blasi *et al.*, 2005

⁴ *Check-list and red-list of liverworts (Marchantiophyta) and hornworts (Anthocerotophyta) of Italy*, Aleffi & Schumacker, 1995; *Check-list of the Mosses of Italy*, Cortini Pedrotti, 1992; *New Check-list of the Mosses of Italy*, Cortini Pedrotti, 2001

⁵ *ITALIC, the information system on Italian lichens*, Nimis & Martellos, 2002; *Licheni*, Nimis & Martellos, 2005, in: *Stato della biodiversità in Italia. Contributo alla strategia nazionale per la biodiversità*, Blasi *et al.*, 2005

⁶ *An annotated checklist of the Italian vascular flora*, Conti *et al.*, 2005



The national forest area index is 22,8%, and it is constantly growing.

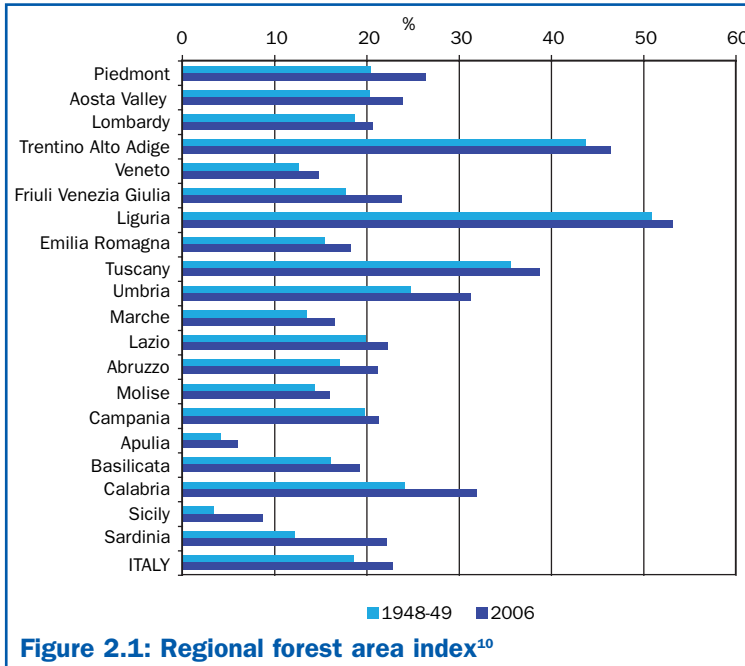
found in that region alone, are Sicily (322 endemic species and 344 exclusive ones) and Sardinia (256 endemic species and 277 exclusive ones).

Italy also possesses an especially rich stock of forests, whose quantity, depending on the type of specifications adopted for the statistics, can be estimated at approximately 6,860,000 hectares⁷ and 8,760,000 hectares⁸, in addition to which there are 1,710,000 hectares of sparse or low forest formations, as well as bushes and shrubs (CFS-INFC, 2005). Taking the most restrictive approach, the national forest area index is equal to 22.8%, a figure that is increasing in a gradual but constant manner (Figure 2.1). The CFS-INFC also reports that a significant portion of the new forests is recently planted and in the growing phase. These last results, together with the dynamics in the change of the cover and land use, as shown by a comparison of the *Corine Land Cover 1990* and the *Corine Land Cover 2000* (the two European projects for surveying and monitoring the characteristics of cover and land use), point to an expansion of national forest resources estimated at approximately 5,500 hectares per year⁹. From the time there have been precise statistics on the land uses in our country, this is the largest recorded extension of forest area. The trend, which involves not only Italy, but the rest of Europe as well, has been underway for a number of decades and is destined to continue in the future. It is caused not only by policies and measures for the preservation of existing resources, combined with forestation and reforestation activities, but also, and to an even greater extent, by natural forest expansion in abandoned farming areas found in hilly and mountainous zones.

⁷ ISTAT data 2006 processed by ISPRA

⁸ CFS-INFC, 2005

⁹ *La realizzazione in Italia del progetto europeo Corine Land Cover*, APAT, 2005

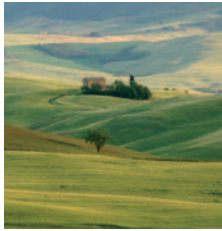


Italy has an especially rich stock of forests, and its forest area index is constantly on the rise, thanks to activities of forestation and reforestation, plus the natural expansion of forests.

In addition to natural and semi-natural environments in the strict sense of the terms, Italy also possesses urban green areas that constitutes an important component of its natural assets, in light of the increasing expansion of urban areas. Green areas within cities serve a variety of functions: in addition to improving appearances and setting the stage for recreational activities, they also mitigate pollution in the different environmental matrices (air, water, soil), in addition to improving the micro-climate and contributing to the preservation and enrichment of biodiversity. But despite the importance of urban green areas, there is still a shortage of data, both on account of a lack of shared data-banks and due to the failure to arrive at a universally accepted definition of “urban green areas”. In cities that are provincial seats, the quantity of urban greenery managed (directly or indirectly) by government entities (municipalities, provinces, regions, the central govern-

The quantity of urban greenery in provincial seats followed a positive trend between 2000 and 2008, in terms of both density and per capita availability.

¹⁰ Source: ISTAT data processed by ISPRA



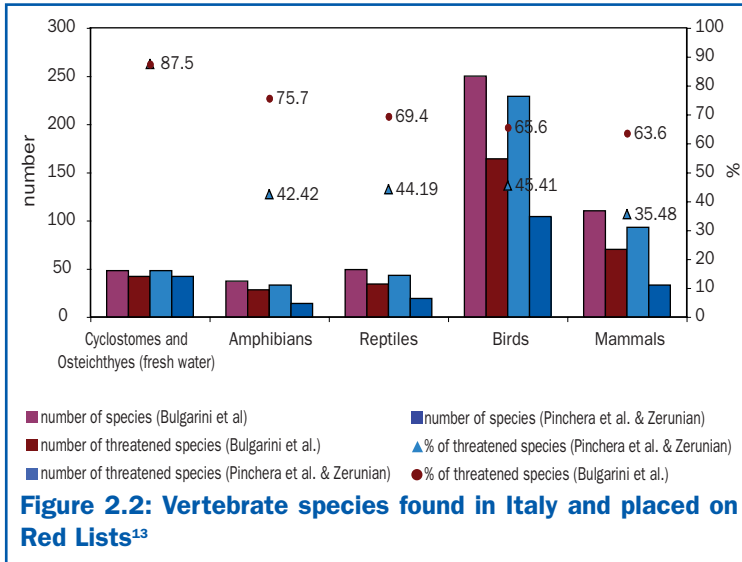
The percentage of Vertebrate species at risk fluctuates, depending on the author consulted, from 47.5 % to 68.4%.

Of the threatened species, a third of the fish, a sixth of the Reptiles and no less than 66% of the Amphibian species are endemic.

ment) showed a positive trend between 2000 and 2008, in terms of both density (percentage of the total municipal surface area) and per capita availability (ISTAT, 2008). The average density of urban greenery in these cities went from 7,8% in 2000 to 8.3% in 2008, while the average per capita availability went from 88.40 square metres per inhabitant in 2000 to 93.60 square metres per inhabitant in 2008. The wealth of biodiversity illustrated up to this point, however, is seriously threatened and risks being lost forever. The outlook in terms of threats to animal species within the national territory has been illustrated by a number of different authors in specific Red Lists, especially with regard to autochthonous Vertebrate species. In evaluating the different categories and levels of threats, the authors make reference to the IUCN categories¹¹. An analysis shows that the percentage of Vertebrate species at risk fluctuates, depending on which author is consulted, from 47.5 % to 68.4%¹² (Figure 2.2). In the specific cases of Cyclostomes and Fishes in inland waters, more than 40% of the threatened species were found to be in an especially critical condition (the IUCN categories of CR – *critically endangered* and EN – *endangered*), while, with regard to Birds and Mammals, respective percentages of 23% and 15% of the threatened species were in serious danger of extinction. A further analysis, carried out on endemic and sub-endemic species, confirmed the overview just formulated. A third of the threatened Fishes species, and a sixth of the Reptiles species at risk, are endemic. But the most critical situation is that of the Amphibians, which show the highest percentage of all for endemic species in danger, at more than 66%. As of today, for obvious reasons, there exists no similar evaluation for the levels of threat faced by Invertebrates. Nevertheless, considering the elevated number of species, plus the fact that the percentage of endemic species is higher than in the case of Vertebrates, being equal to more than 10% of the total, as well as the elevated niche specialisation and the limited areas of distribution of many species, it can reasonably be assumed that, when faced with the same conditions as the Vertebrates, in terms of threats,

¹¹ *The World Conservation Union, 1994*

¹² *Libro rosso degli Animali d'Italia, Bulgarini et al., 1998; Application to the terrestrial vertebrates of Italy of a system proposed by IUCN for a new classification of national Red List categories, Pinchera et al., 1997; Condannati all'estinzione? Biodiversità, biologia, minacce e strategie di conservazione dei Pesci d'acqua dolce indigeni in Italia, Zerunian, 2002*



The percentage of Vertebrate species at risk fluctuates, depending on the author consulted, from 47.5 % to 68.4%. The situation is especially critical for freshwater Fishes, Amphibians and Reptiles.

the level of danger for the Invertebrates, and thus the threat of extinction, will prove decidedly higher. The statistics on the threat faced by plant species in Italy are also taken from Red Lists published by specialists. In 1992 the number held to be in risk of extinction was 458¹⁴, a figure that rose to 1,011 in 1997, with publication of the Regional Red Lists on Plants in Italy¹⁵, to which the IUCN categories of threat (version 2.3) were applied. This list was subsequently revised and combined with the Atlas of Species at Risk of Extinction¹⁶, resulting in the identification of 1,020 specie, whose precise distribution is also indicated. At present, therefore, 15.2% of Italy's vascular flora are threatened with extinction, a situation that proves even more acute for lower plants, approximately 40% of which, out of all the known species, were found to be in danger (Figure 2.3).

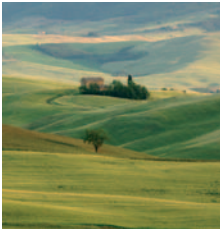
15% of the higher plants are at risk and 40% of the lower plants.

¹³ Source: ISPRA processing of data taken from: *Libro rosso degli Animali d'Italia*, Bulgarini et al., 1998; *Application to the terrestrial vertebrates of Italy of a system proposed by IUCN for a new classification of national Red List categories*, Pinchera et al., 1997; *Condannati all'estinzione? Biodiversità, biologia, minacce e strategie di conservazione dei Pesci d'acqua dolce indigeni in Italia*, Zerunian, 2002

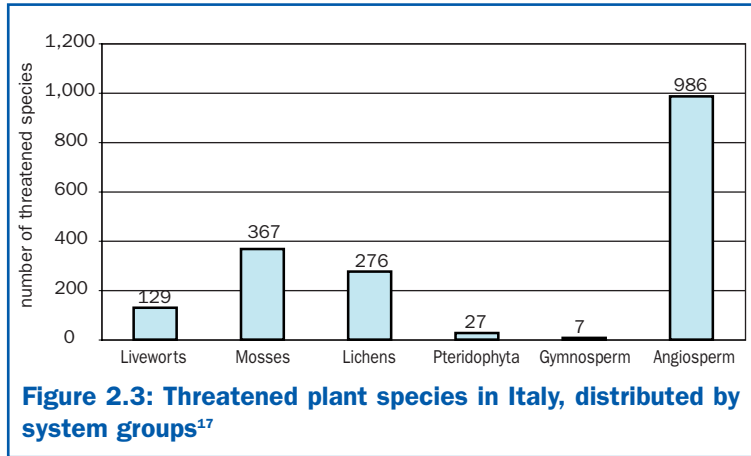
¹⁴ *Libro Rosso delle Piante d'Italia*, Conti et al., 1992

¹⁵ Conti et al., 1997

¹⁶ Scoppola & Spampinato, 2005



15% of the vascular flora in Italy are threatened with extinction, while the situation is even more critical for the lower plants, with approximately 40% of all known species found to be in danger. In detail, the Italian plants at risk include 772 species of Hepaticae, Mosses and Lichens, plus 1,020 vascular plants.



Current knowledge of Italian vegetal units at risk is far from complete, and so the state of preservation of the *taxa* of Italian flora should be evaluated according to the most recent criteria, published by the IUCN in 2001, in order to draw up a New Red List for Italy. To this end, the Italian Botanical Society undertook the “Italian Initiative for the Implementation of the IUCN Categories and Criteria (2001) for Formulation of new Red Lists” in 2006. In 2008 the experts involved in this initiative published the initial results of application of the IUCN criteria to 40 target species of Italian flora¹⁸. The experts’ assessment work continues, as new reports are currently being prepared for publication on other Italian plant species at risk.

Based on the Habitat Directive, over 50% of the European habitats to be protected are found in Italy.

Closely connected with the state of preservation of the different species is the state of preservation of habitats. As we shall see further on, in applying the “Habitat Directive” (92/43/EEC), which constitutes one of the most important regulatory instruments for preserving habitats and biodiversity, Italy plays a role of noteworthy importance. In fact, the country’s geographic characteristics place

¹⁷ Source: *Libro Rosso delle Piante d’Italia*, Conti et al., 1992; *Liste Rosse Regionali delle Piante d’Italia*, Conti et al., 1997; *Atlante delle specie a rischio di estinzione (CD-ROM)*, Scoppola & Spampinato, 2005

¹⁸ *Informatore Botanico Italiano*, vol. 40, suppl. 1, 2008



it within three different bio-geographic zones (Alpine, Continental and Mediterranean), while, according to the directive, over 50% of the habitats to be protected are found in Italy.

Our country holds 130 of the habitats in annex I to the Habitat Directive, as well as a total of 455 of the species found in annexes II, IV and V¹⁹. In Italy there are 212 animal species, including 7 species of cetaceans and sea turtles, whose presence in our seas is held to be occasional, plus 113 plant species, when the species of 3 different genera of lower plants are considered in a joint evaluation.

Of the habitats listed in annex I to the Habitat Directive, no fewer than 24, of which 13 are given top priority, are found only in Italy within their bio-geographic region of reference²⁰. Nevertheless, the “Italian Manual for Interpretation of Directive 92/43/EEC”, recently published by the Ministry of Environment, Land and Sea, together with the Italian Botanical Society, points to the need to update the directive annexes to include 15 new habitats found in our country and worthy of being listed, in addition to reviewing the “priority” status attributed to certain habitats. As a rule, the habitats at risk in Italy are uniformly distributed throughout the national territory, with this being true for the quantities of the different types of habitats as well²¹. Worthy of separate mention are the 9 marine habitats protected under the directive, of which only the Prairie of Posidonia is a marine habitat in the strict sense of the term. Regarding the latter, it should be noted that the European Commission does not hold the network of sites proposed to date by Italy for the Nature Network 2000 to be complete.²² The state of conservation within Italian territory of the habitats and species of Community interest included in the annexes of the Directive was illustrated in the 2nd National Report, which Italy drew up and sent to the European Commission in 2007, in accordance with the provisions of art. 17 the same Directive. This Report,

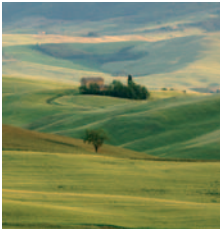
24 habitats listed in the Habitat Directive as requiring protection, of which 13 are given top priority, are found only in Italy within their bio-geographic region of reference.

¹⁹ *Attuazione della Direttiva Habitat e stato di conservazione di habitat e specie in Italia*. Ministry of Environment, Land and Sea, 2008

²⁰ *Reference list of habitat type*, EU Commission and EEA, 2009

²¹ *Libro rosso degli Habitat d'Italia*. Petrella S. et al., 2005, WWF Italia Onlus Roma

²² *Ruling of the Commission approving the list of SCI for the Mediterranean region*, 2006



The Italian habitats in the worse state of conservation are those of the dunes, followed by freshwater and rocky habitats.

Roughly 42% of the national territory is devoted to agricultural activity, and approximately 21% of the UAA (Utilised Agricultural Area) presents characteristics of noteworthy naturalistic value.

The decrease in UAA frequently corresponds to an operational abandonment of agricultural soil, following which processes of vegetative renewal are possible, though also processes of soil deterioration, erosion and desertification.

covering the period 2001-2006, provides a benchmark for comparisons with the results to be presented by subsequent national reports, which, as stipulated under art. 17, are to be drawn up every six years. The current results show that the habitats in the worst state of conservation are those consisting of dunes, followed by freshwater and rocky habitats. It was also found that the available data are not sufficient for forecasting the future prospects of much of the habitats, meaning that their fate will depend, in large part, on the management strategies followed, inside and outside the Nature 2000 Network.

In addition to natural environments, agricultural areas also play an important role when it comes to biodiversity and other environmental factors. Not only do they support the production of food and fibres, but they are closely tied to the environment, giving rise to extremely complex relations, at times in contradiction the one with the other. In demonstration of the importance of agriculture with regard to natural resources, it should be remembered that roughly 42% of the national territory is earmarked for agriculture (ISTAT, 2007), and that a portion of this area, the equivalent of approximately 21% of the UAA (Utilised Agricultural Area), presents characteristics of noteworthy naturalistic value in terms of genetic and species biodiversity, as well as that of the landscape, also serving as zones of connection with natural spaces. Italy, together with Spain, Greece, northern Great Britain and Scandinavia, preserves an elevated percentage of agricultural areas of significant natural worth, such as Alpine meadows and pastures.

In recent decades, running parallel to the stagnation in demographic growth and in the demand for agricultural products, as well as to the exodus from rural areas and the rise in productivity per unit of surface area, Italy has registered a noteworthy decrease in the number of farming enterprises and in the UAA. This last measure fell by 2.3 million hectares between 1990 and 2007, meaning a loss of more than 15% (ISTAT). It is important to note, however, that this decrease has been accompanied by a gradual rise in the UAA of the average enterprise, which went from 6.1 hectares in 2000 to a figure of 7.6 hectares in 2007, making for an increase of 25.1%. The reduction in the overall UAA frequently corresponds to an operational abandonment of farmlands, which can then undergo



processes of renewed colonisation on the part of tree, bush and herbal vegetation (re-vegetation), though they can also be subject to processes of soil deterioration, erosion and desertification. The process of vegetative renewal can be sharply limited by a loss of natural qualities caused by agricultural activities, with the extent of the loss depending on the characteristics of the agricultural activities and their duration. The fertility of the soil in abandoned farmland always proves to be impoverished, while the composition of the original seed bank of the soil is totally compromised. These factors, together with the situations of deterioration and fragmentation typical of the agricultural areas of industrialised countries, block or slow the natural dynamics of vegetative succession.

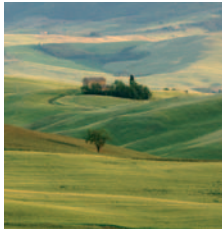
In Italy, as in many other countries of the Western world, the process of agricultural specialisation and intensification underway between the 1950's and the early nineties, together with the globalisation of the agricultural economy, have resulted in a serious loss in biodiversity. At present, almost half of the 12.7 million hectares of UAA are dominated by only five crops: wheat, corn, rice, olives and grapes. And even these crops are subject to a worrisome level of genetic erosion.

At the same time, it should be noted that the set-aside policies promoted under the 1992 reform of Common Agricultural Policy, calling for subsidies to be paid to farmers to put to rest 10% of the cultivated surface area, has facilitated the restoration of habitats that had almost disappeared, such as wetlands, meadow areas alternating with shrubs and flooded meadows, with the result that meadows and pastureland (currently 27.1% of the UAA), together with fallow land and other crops (currently 4.1% of the UAA), have registered growth over the last ten years.

Confirming the loss of agricultural biodiversity is a study carried out by *BirdLife International*, *European Bird Census Council* and the *Royal Society for the Protection of Birds*, showing that, of the 124 species of birds most widespread in Europe, 54 have decreased over the last 40 years. Of these species, no fewer than 33 are typical of agricultural environments, and their numbers have been nearly halved in 25 years' time. The decrease in agricultural species is even more pronounced in Italy, specifically affecting the Swallows, Martins, Warblers, Stonechats, Larks, Shrikes, the White Wagtail, the Italian Sparrow and the Tree Sparrow.

The specialisation and intensification of agriculture, as well as the globalisation of the agricultural economy, have resulted in a serious loss in biodiversity, even though set-aside policies have facilitated the restoration of habitats that had almost disappeared, such as wetlands, meadow areas alternating with shrubs and flooded meadows.

In recent decades, there has been a noteworthy decrease in ornithological species tied to agricultural environments.



The primary threats to biodiversity are human activities and the growing demand for natural resources and ecosystem services.

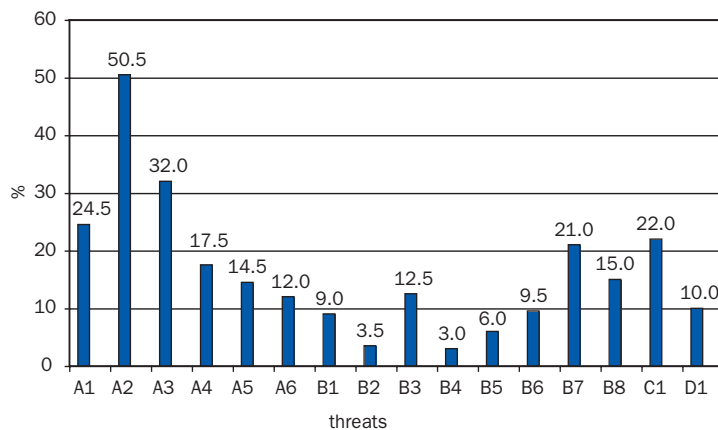
The transformation and modification of habitats threatens 50.5% of the Vertebrate animal species.

The main causes of threats to biodiversity

The main threats to the natural heritage are tied to the impact of human activities and to the growing demand for natural resources and ecosystem services, which proves increasingly incompatible with the preservation of those resources and services in a state able to guarantee their survival and transmission to future generations. In Western and Central Europe, and throughout the Mediterranean basin, the presence of man from ancient times has led to alterations in the natural ecosystems and habitats, which today, in the majority of cases, appear fragmented and subject to various types of disturbances. Five main causes for the loss of biodiversity are particularly worthy of note²³: the deterioration and destruction of habitats, fragmentation, the introduction of alien species and the excessive exploitation of resources and species. This last factor is traceable, first and foremost, to a lack of adequate regulation for governing, according to ecological criteria, the procurement of supplies of resources, plus, as a secondary consideration, the collection and sale of wild species. These threats lead to a reduction in biodiversity, as a result of the deterioration and impoverishment of ecosystems, together with the local extinction of many species, primarily the most sensitive, the endemic species, the rare ones and those that prove most vulnerable. At times there is a turnover involving different types of species, with the often irreversible disappearance of many species typical of a natural habitat being accompanied by the entry of species that are exotic, competitive, generalist, ruderal or connected to human phenomena. With respect to Vertebrate animal species, Figure 2.4 shows the overall outlook for the various factors of risk and their relative incidence on the state of preservation, determined on the basis of the Red Lists published to date on the different categories of threats by the IUCN. Generally speaking, the analysis shows that the most frequent threat (50.5% of the species at risk) of all the indirect influences of human origin consists of the transformation and modification of natural habitats (A2), while poaching and illegal fishing (B7) constitute the predominant threat among direct influences of human origin.²⁴

²³ *Conservazione della natura*, Primack & Carotenuto, 2007

²⁴ *Libro rosso degli Animali d'Italia*, Bulgarini et al., 1998; *Application to the Terrestrial Vertebrates of Italy of a System Proposed by IUCN for a New Classification of National Red List Categories*, Pinchera et al., 1997; *Condannati all'estinzione? Biodiversità, biologia, minacce e strategie di conservazione dei Pesci d'acqua dolce indigeni in Italia*, Zerunian, 2002



Legend:

Indirect influences of human origin:

- A1: Reclamation of wetlands
- A2: Modifications and transformations of habitats (construction, buildings, roads, ports, lining of riverbanks with concrete, variations in climate tied to influences of human origin, barriers blocking water ways, intakes of water supplies, modifications of flow)
- A3: Use of pesticides and water pollution
- A4: Fires and cutting of forests
- A5: Changes in farming, livestock and fishing activities
- A6: Leisure time activities (tourism, bathing, excursions, nautical sports, sport fishing, photographic hunting, mountaineering or free climbing)

Direct influences of human origin:

- B1: Hunting

B2: Suppression of pests

B3: Harvesting of eggs, chicks, larva and adults for the purpose of sale or collection

B4: Vandalism

B5: Genetic pollution

B6: Excessive fishing

B7: Poaching and illegal fishing

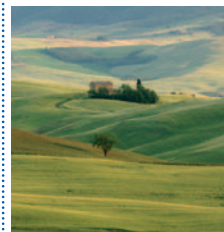
B8: Competition or predatory behaviour on the part of outside species and/or populations

C1: Natural causes

D1: Unknown causes

The figure refers only to threatened species for which confirmed chorological information is available.

It should be noted that the categories of threats indicated in the reference source were later modified by the IUCN, and so do not correspond to those currently in use (ver. 3.0).



In Italy the primary threats to biodiversity are human activities and the growing demand for natural resources.

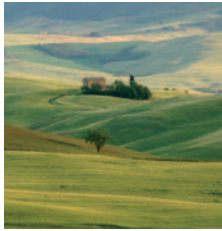
Of all the indirect threats of human origin, the most frequent involve the transformation or modification of natural habitats, while poaching and illegal fishing constitute the primary threats among the direct influences of human origin.

Figure 2.4: Incidence of the risk factors for Vertebrates out of the total species threatened²⁵

Though difficult to quantify, poaching represents a very serious threat to Birds and Mammals in Italy. In many regions the illegal capture of wild animals with traps, snares and jaw traps is still widespread, as is the killing of animals with poison and firearms. These practices are especially common in certain critical areas, such as the Brescia and Bergamo valleys, the Tyrrhenian Islands and the Strait of Messina²⁶.

²⁵ Source: ISPRA processing of data taken from: *Libro rosso degli Animali d'Italia*, Bulgarini et al., 1998; *Application to the Terrestrial Vertebrates of Italy of a System Proposed by IUCN for a New Classification of National Red List Categories*, Pinchera et al., 1997; *Condannati all'estinzione? Biodiversità, biologia, minacce e strategie di conservazione dei Pesci d'acqua dolce indigeni in Italia*, Zerunian, 2002

²⁶ *Braconaggio e trappolaggio*. Todaro G., 2006, Perdisa Ed., Bologna



Worth mentioning among the causes of impact are those tied to hunting, which can be practiced in more than 62% of the national territory, though hunting pressure differs from one region to the next.

Fishing is an important factor of impact in marine environments. Italy accounts for approximately 5% of the total European catch, but, as do the other countries of the Union, it takes part in efforts pursued by the EU for some time now to limit fishing.

Moving on to a more detailed analysis of the causes of impact, mention can be made of those tied to hunting, an activity that, it should be noted, can be practiced in more than 62% of the national territory (ISTAT, 2007). Pressure from hunting is not uniformly distributed throughout the country: in certain regions, such as Liguria, Umbria, Tuscany and Lazio, the level is definitely higher than in others. The greatest levels of pressure are to be found both in large-size regions (Tuscany, Lazio, Lombardy, Campania) and in those of limited extension (Umbria and Liguria). Assuming that the number of hunters constitutes the primary factor of hunting pressure within a given territory, a decrease in this pressure was observed between 2000 and 2007, due to a drop of 6.2 percent in the number of hunters on the national level. Looking at the different regions, no fewer than eleven showed percentage reductions in the number of hunters higher than the decrease for Italy as a whole. Only five regions (Trentino Alto Adige, Lazio, Calabria, Sardinia and Molise) showed increased numbers of hunters.

As far as fishing is concerned, it has a major impact on the marine environment. Italy accounts for approximately 5% of the total European catch, though, together with the other countries of the Union, it takes part in the efforts to limit the impact of fishing pursued for some time now by the EU and forcefully confirmed in the new Common Fisheries Policy (CFP), which went into effect on 1 January 2003. The year 2008 registered a continuation of the trend begun in 2000, with the size of the fishing fleet falling in terms of both ships and overall engine power, while the figure for the total tonnage of the national fleet, which had reversed its downward trend in 2007, increasing by 20% over 2006, once again showed a decrease, though a slight one, in 2008. The primary fishing indexes (fishing effort and CPUE - *Catch Per Unit of Effort*) moved in the same direction, as both figures, though their results had differed in previous years, showed decreases in 2008²⁷.

As a rule, the Italian fishing fleet consists of modest and medium-size vessels, with non-industrial-scale fishing in many regions accounting for 80% of the entire fleet (Ministry of Agricultural, Food and Forestry Policies-IREPA, 2008). Naturally, the situation varies throughout the national territory: in 2008 more than 55% of the vessels

²⁷ Ministry of Agricultural, Food and Forestry Policies-IREPA, 2008



of the national fishing fleet were registered in Sicily (24%), Apulia (13%), Sardinia (9%) and Campania (9%), while the highest figures for average days of fishing were recorded in Apulia, Campania, Marche and Molise. The most frequently used fishing systems are bottom and mid-water trawling, together with small-scale coastal fishing, confirming the general tendency of the Mediterranean to favour non-industrial modes of fishing. In the case of small-scale coastal fishing, it is common for different systems to be used in different periods of the year. In 2008, 37.3% of the total catch in Italy was made by trawling, with the boats of Sicily and Apulia responsible for 44% of the overall figure²⁸. Even though the vessels are generally small in size, and fishing activities have been successfully limited in recent years, more than 50% of the vessels still operate exclusively along the coast (MIPAAF, 2008), subjecting this zone, in which a large part of the resources of the entire marine system are located, to greater pressure.

The biodiversity of forest ecosystems is also subject to a variety of threats, though, as noted earlier, the trend in total forest surface area in Italy has been positive for a number of years now. This increase largely reflects decisions made in other economic sectors rather than being the result of deliberate forestry or environmental defence policies, as demonstrated by the growing wooded area is increasingly subject to abandonment and the accompanying deterioration, first and foremost in the form of fire. An especially critical period for forest fires was recorded in the mid 80's, followed by years in which the level remained high, on the whole, with a gradual falling off up to 2006, then a sharp rise in 2007, followed by another lessening of the level in the year 2008, during which slightly less than 6,500 events occurred, involving approximately 66,000 hectares, of which 30,000 can be classified as forest area in the strict sense of the term (CFS, 2008).

The expansion of Italy's forest area is accompanied by a rise in the volume of roundwood and large branches (the latter figure, equal to 1.269 billion cubic metres, for an average of 145 cubic metres per hectare), making for a current total increase in forests of roughly 36 million cubic metres (4.1 cubic metres per hectare)²⁹.

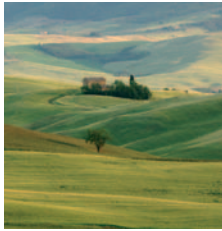
The biodiversity of forest ecosystems is also subject to a variety of threats, despite the positive trend.

After a sharp revival in the number of forest fires in 2007, the level dropped once again in 2008.

The increase in wood volume is limited by the harvesting of supplies, fires, plant disease and mortality.

²⁸ Source: Ministry of Agricultural, Food and Forestry Policies-IREPA data processed by ISPRA

²⁹ CFS-INFIC, 2005



Use of forests appears extremely limited, following a downward trend since 2005, especially as regards firewood.

The rate of harvesting gradually fell between 1999 and 2002, registering constant annual values in the years that followed.

Harvesting of a number of non-wood products decreased in 2007, as compared to 2000, though with certain exceptions.

This last statistic is limited by the harvesting of wood supplies, by fires, by plant disease and by mortality.

Wood harvesting, as registered by ISTAT (though numerous independent studies hold the figure to be significantly underestimated), appears very limited, and on the decrease since 2005, especially in terms of the harvesting of firewood. This last activity fell from 5.2 million cubic metres in 2005 to 5.0 million cubic metres in 2007. Total supplies harvested in 2007 were equal to 8.5 million cubic metres (7.5 million cubic metres, not counting wood outside of forests), of which 66.8% was firewood. In recent years, the trend in the harvesting of wood has been downward, accompanied by a noteworthy reduction in the average surface area cut.

In terms of the harvesting rate (the ratio between the cubic metres harvested and the forest area), it fell gradually between 1999 (the year when it reached the level of 1.3 cubic metres per hectare) and 2002 (0.8 cubic metres per hectare), after which a constant annual figure of 0.9 m³/ha was registered in the years that followed. This decrease was especially pronounced for firewood (-40% compared to 2000), which still constitutes more than 60% of overall wood production.

A decrease in the harvesting of some non-wood products was registered in 2007 as compared to 2000 (ISTAT, 2008), with the noteworthy exceptions of mushrooms and pine seeds with shells, while the year 2005 also registered a significant truffle harvest. In all likelihood the downward trends were tied to processes of urban development, with the resulting difficulty of recruiting labour, not to mention the loss of local traditions, while the growth exceptions involve niche and/or industrial products with a market. As a rule, these trends can be interpreted as a lessening of pressure on forest ecosystems, though consideration should also be given to the fact that a renewal of production activities, if properly managed, can end the state of abandonment of forests and improve the manner in which they are managed, with positive fallout in terms of conservation as well.

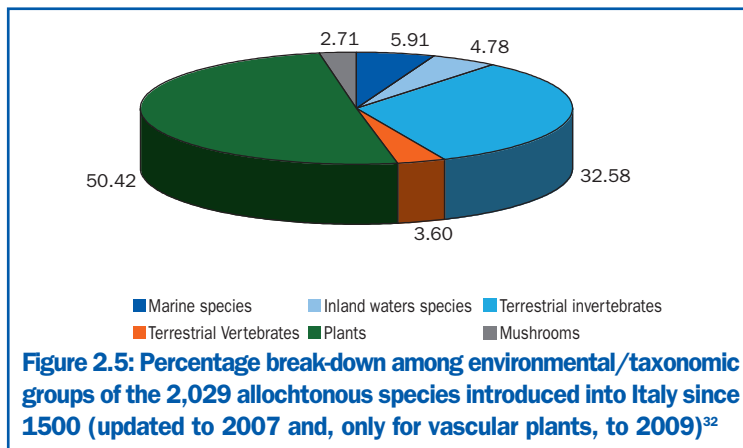
The introduction of potentially invasive allochthonous species – or alien, exotic or non-native ones - constitutes another threat to biodiversity. Their presence in Nature can essentially be traced to three modes of introduction: intentional (through raising, culti-



vation, as a hobby etc.), accidental or secondary (i.e. through the transport of cargo, ballast water in ships, fouling etc, or *taxa* originally introduced in areas outside Italy's borders, only to enter our country, at a later point in time, on their own) and unknown. Based on the available data for the presence of alien animal or plant species introduced in Italy since 1500, the year used as the benchmark for species introduced into Europe, the current overall number of documented alien species is 2,029³⁰⁻³¹. It is important to stress, however, that this figure underestimates the true extent of the situation, both on account of the limited number of specific studies and focussed monitoring efforts available and due to the delay with which the species, once they are identified, are placed on the lists or databases.

The introduction of potentially invasive allochthonous species constitutes another threat to biodiversity. The number of alien animal and plant species in Italy currently stands at 2,029.

An analysis of the percentage break-down of the alien species into the various taxonomic/environmental groups (Figure 2.5), based on the taxonomic categories of the DAISIE, shows that, of the 2,029 documented alien species in Italy, plants account

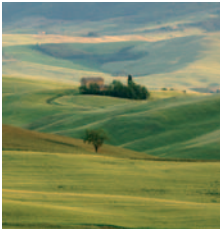


Plants account for 50% of all documented alien species in Italy, followed by terrestrial Invertebrates, at 33%.

³⁰ DAISIE European Invasive Alien Species Gateway (<http://www.europe-aliens.org>) – updated to 2007

³¹ *Non-native flora of Italy*. Celesti-Grappo et al. (eds), 2009

³² Source: ISPRA processing of data taken from DAISIE European Invasive Alien Species Gateway (<http://www.europe-aliens.org>) – updated to 2007; *Non-native Flora of Italy*, Celesti-Grappo et al. (eds.), 2009



The rapid increase in alien species introduced into Italy from 1900 on is traceable to the rise in trade and the development of transportation systems, and would not appear to have had any saturation effect on ecological systems.

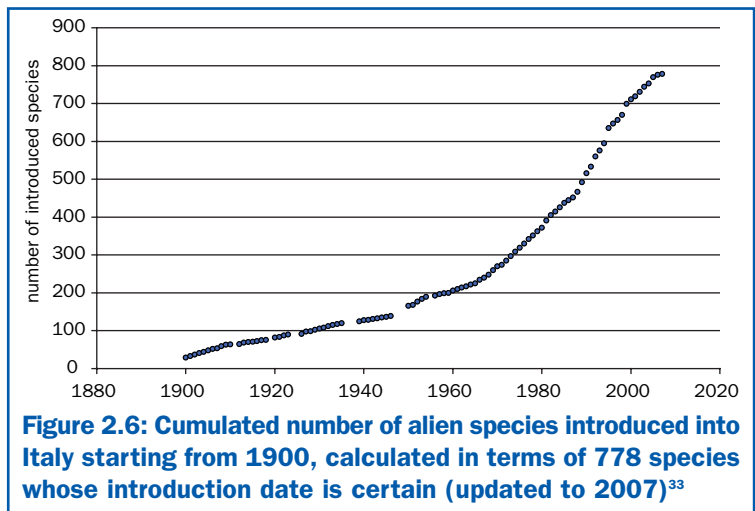
The trend for species introduced in Italy from 1900 on points to an exponential increase in the number of alien species, especially from the 1950's onward.

The average annual rate of new introductions, calculated from the year 1900 on, points to an exponential increase in the average number of alien species introduced per year.

for 50% of the total, followed by terrestrial invertebrates, at 33%. The other groups register significantly lower percentages: marine species almost 6%, those of inland waters 4.8%, terrestrial Vertebrates 3.6% and Mushrooms 2.7%.

A trend analysis, involving calculation of the cumulated number of alien species introduced into Italy from the year 1900 on (Figure 2.6), points to an exponential increase in the number of species introduced, specially from the 1950's onward.

This rapid increase, traceable to the growth in trade and the development of transportation systems, would not appear to lead to a saturation effect, backing the assertion that ecological systems are rarely saturated by the new species introduced.



Furthermore, the annual average rate of new “introductions”, calculated from 1900, on the basis of the same contingent of species, points to an exponential increase in the average number of alien species introduced each year, with the rate going from slightly more than one species a year in the early 1900's to approximately 15 species a year by the end of that same century.

³³ Source: ISPRA processing of data taken from DAISIE European Invasive Alien Species Gateway (<http://www.europe-aliens.org>) – updated to 2007



Though “introductions” of unknown origin have risen at a higher rate than the other mechanisms of introduction, intentional modes are still the most widespread, especially for certain groups of animal species, such as Mammals, or freshwater species involved in sport fishing.

Mention should also be made of the indirect effects of actions of human origin, and especially those traceable to climate changes, already referred to and noted in numerous studies and reports. A widely read article in the review *Science*³⁴ stated that, before the year 2050, climate change is destined to become the second leading cause (after deforestation and forest deterioration) of loss of biodiversity on both sea and land. Various studies conducted over extended period of time have shown that the climate anomalies that have occurred to date, and especially those involving daytime temperatures and levels of rain, have altered certain physiological processes (photosynthesis, respiration, the growth of plants, efficient use of water, composition of tissues, metabolism and decomposition), as well as the distribution and phenology of plants, plus the reproduction periods of many animal species and the interactions between these species and both biotic and abiotic factors.

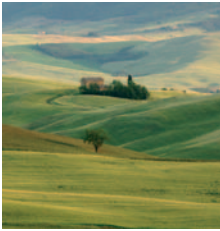
In Italy, the impacts observed up to this point include the shifting northwards, and towards higher altitudes in the geographic range, of many species. The lengthening of the vegetative season has led to increased productivity in the Alpine bio-geographic region, while the drier, hotter climatic conditions are responsible for a decrease in forest productivity and an increase in the number and severity of forest fires in the Mediterranean region.

One of the scenarios proposed by the Intergovernmental Panel on Climate Change (IPCC) points to a rise of 4 °C in the average temperature of our peninsula and the country’s islands before the end of the century. The impact of a similar change would translate into a “latitudinal transgression” of 400 km of many species, along with a “transgression in altitude” of 400 m, as these species

The indirect effects of actions of human origin, and especially those traceable to climate changes, have been noted in numerous studies and reports.

In Italy the impacts of climate change influence the geographic ranges of many species, as well as the vegetative seasons.

³⁴ *Global Biodiversity Scenarios for the Year 2100*. Sala O.E. et al. (2000). *Science* 287:1770-1774



The capacity of natural, semi-natural and agricultural areas to resist climate change, as well as their resilience in the face of its effects, is closely tied to biodiversity.

search for more fitting climatic conditions. Many areas, for example, could become suitable for growing grapes, or for new varieties (replacing others no longer suited to the changed climate); on the other hand, certain grape-growing regions may lose their capacity to bring the traditional varieties of grapes to ripening; regions with hot-arid climates (Pantelleria, Salento) could be pushed outside of the grape-growing zone (as well as that for growing olives and citrus fruit). Interesting studies carried out at the University of Padova point to the problems that could arise during the production of raisin wines (Recioto, Amarone, Gambellara).

There is ample scientific evidence demonstrating that the capacity of natural, semi-natural and agricultural areas to resist climate change, and to adjust to its effects in resilient fashion, is highly dependent on biodiversity, in terms of specific locations, bioregions, the gene pool and the ecosystem.

On the topic of climate change, it should be remembered that natural and agricultural areas play a significant role in the global carbon cycle, and thus on the problem of the greenhouse effect. The primary sector is a net emitter of greenhouse gases, generated by the enteric fermentation of livestock, the defecations of these same animals, the physical-chemical and biological processes that occur in agricultural soil, by rice paddies and by the combustion of agricultural waste. According to the national inventory of greenhouse gas emissions³⁵, in 2007 agriculture was responsible for introducing into the atmosphere 37.2 million equivalent tons of CO₂ (MtCO₂eq), equal to 6.7% of Italy's total greenhouse gas emissions, for an increase of 1.6% over 2006 (when the figure was 36.6 MtCO₂eq), making agriculture the second leading sector in terms of quantity of greenhouse gas emissions, after the energy sector (83%). On the other hand, certain modes of using and managing agricultural and forest lands make possible increases in the quantities of CO₂ temporarily fixed through the conservation or expansion of stocks of carbon in forest ecosystems or agricultural soils. This possibility is tied to the ongoing development of the sector, and, therefore, to policies of agriculture and rural development, as well as energy and climate poli-

³⁵ *Italian Greenhouse Gas Inventory 1990-2007. National Inventory Report 2009. ISPRA Report 98/2009, Rome - Italy*



cies that influence the procedures for managing the land, as well as the sector's capacity for "spontaneously" reacting to the process of climate change.

According to the inventory cited earlier, the sector of Land Use, Land Use Change and Forestry (LULUCF³⁶) accounted for the capture of 70.9 MtCO₂eq, equal to 12.8% of the total national emissions of greenhouse gases, marking a reduction of 36.8% compared to 2006 (when the fixing capacity was estimated at 112.2 MtCO₂eq). It should also be noted that local activities geared towards mitigating the greenhouse effect can generate social, economic and ecological benefits, as well as income for the owners and managers of the land involved.

There is controversy over the role of activities tied to agriculture as causes of impact on the natural heritage. On the one hand, agricultural areas are subject to the negative impacts of other activities and other spheres of production, given that they frequently are affected by urbanisation, illicit dumping of waste and industrial pollution. At the same time, agricultural activities themselves are frequently identified as one of the main causes of water pollution, loss of stability of terrains and soil pollution, as well as of increases in the greenhouse effect, loss of biodiversity and simplification of the landscape.

In Italy, the main impacts on the environment and biodiversity directly traceable to agriculture are tied to use of fertilisers and plant care products.

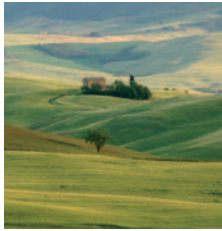
The distribution in agricultural soil of synthetic fertilisers, the spread of runoff from livestock enterprises and small agro-food companies, the distribution of sludge from purification operations are all key factors in the pollution of surface and underground water bodies, as well as marine coastal habitats, plus the eutrophication of waters, all with consequences on human health, not to mention the flora, the fauna and the sum total of the ecosystems to which they belong.

What is more, numerous studies indicate that a decrease in agricultural biodiversity (meaning a decrease in the varieties of the species grown, in the "buffer" strips of unfertilised grass and in

Agricultural areas are subject to the negative impact of other economic activities, while, at the same time, they can cause pollution and loss of biodiversity.

In Italy, the main impacts on the environment and biodiversity directly traceable to agriculture are tied to use of fertilisers and plant care products.

³⁶ LULUCF: *Land Use, Land Use Change and Forestry*



Surface and underground waters frequently present concentrations of plant care products in excess of the legal limits.

During the years 1998-2007, there was an increase of 22.1% in the quantity of fertilisers placed on the market.

The quantity of plant care products placed on the market fell by 8.2% during the period 1997-2007, but rose by 3% between 2006 and 2007.

the hedgerows along waterways and ditches to meet the internal production concerns of the enterprises), together with the abandonment of crop rotation and of marginal, uncultivated zones, can have specific consequences on the migration of nutrients and other pollutants towards the surrounding watersheds.

An ISPRA survey on the contamination of surface and underground waters from plant care product residues placed in the environment, involving the analysis of 11,703 samples by the regional governments and by the ARPA's, point to surface water contamination of 57.3%, highlighting that, in 36.6% of these cases, the concentrations exceed the limits set under the law for drinking water. In underground bodies of water, on the other hand, the level of contamination is 31%, with the concentrations exceeding the legal limits in 10.2% of the cases. The figures for Italy's primary watersheds show that, in the course of a century, the average concentration of nitrogen in the water rose threefold, with the level increasing ten times over in certain Italian rivers that run through heavily cultivated areas, such as the Po Valley Plain, where over 50% of the fertilisers sold are concentrated.

On the subject of fertilisers, it should be noted that the quantity placed on the market in Italy, after a slow but continuous decrease that began in the 70's, returned to an upward trend in the period 1998-2007, registering growth of 22.1% (ISTAT, 2007). The national figure for the year 2007 moved above the 5.4 million ton mark, with more than 3 million tons consisting of mineral fertiliser, of which the most widely used type are those based on nitrogen.

As far as plant care products are concerned, the quantities placed on the market in the period 1997-2007 shrank by 8.2%. In 2007 more than 153,000 tons were sold, for an increase of 3% compared to the previous year, with 76.5% of the total consisting of "unclassifiable" products, and the remaining 23.5% including those products classified highly toxic, toxic and harmful, which, being the most dangerous from a toxicological, eco-toxicological and chemical-physical point of view, are subject to special restrictions in terms of their sale and preservation. Compared to 2006, the unclassifiable products were practically unchanged, while the toxic and highly toxic products decreased by approximately 242 thousand tons, though this decrease was more than offset by the noteworthy increase in harmful products (more than 4,700 tons). Taken as a whole, there-



fore, the most dangerous products increased by 14.3%.

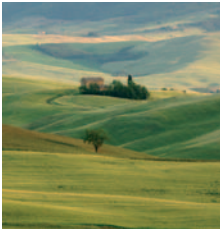
The main initiatives for protection

As already noted, the preservation of biodiversity often conflicts with man's models for putting resources to use. Efforts to reconcile its defence as best as possible with the demands of society frequently result in agreements and legislative instruments, key elements that prove indispensable when it comes to combining the need for conservation with economic, social and cultural concerns, as well as those of local populations. Italy has endorsed numerous conventions and international agreements designed to safeguard biodiversity. Especially worthy of note, give its strategic importance on a global scale, is the Convention on Biological Diversity³⁷, signed in Rio de Janeiro on 5 June 1992 during the United Nations World Summit on the Environment and Development³⁸. The CBD sets three specific objectives: 1) the preservation *in situ* and *ex situ* of biological diversity; 2) the sustainable use of the components of biological diversity; 3) an equitable distribution of the benefits produced by the use of genetic resources. In Italy the CBD was ratified with Law no. 124 of 14 February 1994. Later, on 16 March 1994, the CIPE (Inter-Ministerial Committee for Economic Planning) approved the document "Strategic Guidelines and Preliminary Program for the Implementation of the Convention on Biological Diversity in Italy". The CBD acknowledges the importance of the ecosystem approach as a strategy for the integrated management of the territory, of water and of living resources, in such a way as to promote their conservation and sustainable, equitable use; the application of the ecosystem approach favours a balanced approach to pursuing the three objectives of the CBD. The ecosystem strategy is based on the application of suitable scientific methodologies focussed on levels of biological organisation that include key processes, functions and interactions between the organisms and their environment. It acknowledges that human beings, with all their cultural diversity, are an integral part of ecosystems.

Italy has endorsed numerous conventions and international agreements geared towards safeguarding biodiversity, such as the Convention on Biological Diversity.

³⁷ Convention on Biological Diversity - CBD

³⁸ United Nations Conference on Environment and Development - UNCED



The “Siracusa Charter on Biodiversity”.

Also worthy of note among the international agreements is the recent “Siracusa Charter on Biodiversity”, signed by the Ministers of the Environment of the G8, in concert with the ministers of other countries and with the international organisations taking part in the meeting held at Siracusa on 22-24 April 2009. The Charter calls for a series of initiatives to be taken regarding interconnections between biodiversity and the climate, the economy, ecosystem services, science, research and politics. Based on these initiatives, a shared path is proposed towards the post-2010 context, taking into consideration the following elements:

- the need to intensify efforts to conserve and manage in a sustainable manner both biodiversity and natural resources;
- the need for appropriate programs and timely actions designed to reinforce the resilience of the ecosystems, seeing that a loss of biodiversity or a non-sustainable use of the same can give rise to noteworthy economic losses;
- the need to give due consideration, in establishing the context to follow the 2010 objective, to the numerous elements that can cause a loss of biodiversity or generate a medium or long-term threat to biodiversity, as these elements are identified through scientific research;
- the need for a far-reaching communications strategy that fully involves all the sectors, as well as the stakeholders, the local communities and the private sector, so as to emphasise participation and determine responsibilities;
- the need for a reform of environmental governance at all levels, of key importance to integrating biodiversity and ecosystems services in political procedures, so as to transform what are currently weaknesses of economic systems into opportunities, while supporting sustainable development and employment, with particular consideration for the conditions in which the developing countries find themselves.

The EU is deeply committed to defending nature and biodiversity. The strategic topics of the EU Environmental Action Plan for policies in defence of Nature are highly integrated in both the Strategy for Sustainable Development and the objectives of the Lisbon Treaty, as well as in the policies for the individual sectors, including agriculture, fishing, industry, energy and transport.

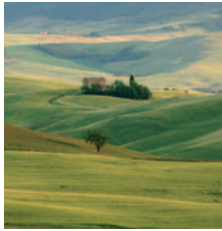


The cornerstones of EU policies on the conservation of nature and biodiversity are two key directives: the Bird Directive (79/409/EEC) on the protection of wild birds and the Habitat Directive (92/43/EEC) on the preservation of the natural and semi-natural habitats of wild flora and fauna. The specific objectives of the Habitat Directive include the creation of a cohesive European ecological network entitled Nature 2000 and consisting of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), with these last being determined in accordance with the provisions of the Bird Directive. The Bird Directive was transposed into national legislation with Law 157 of 11 February 1992, while the list of Italy's SPAs was published as part of a Ministerial Decree issued on 25 March 2005. The Habitat Directive was fully transposed into Italian law under Presidential Decree no. 120 of 12 March 2003. Later the lists of the Sites of Community Importance (SCIs) were published for the Alpine Bio-geographic region (Ministerial Decree of 25 March 2004), for the Continental region (Ministerial Decree of 25 March 2005) and for the Mediterranean region (Ministerial Decree of 5 July 2007). At present, Italy's Nature Network 2000 consists of 597 SPAs, with a surface area of 4,377,721 hectares, equal to 14.5% of the national territory, and of 2,288 SCIs, with a surface area of 4,530,866 hectares, equal to 15% of the national territory (*Databank of the Nature Network 2000*, Ministry of Environment, Land and Sea, 2009). In order to correctly interpret these data, it should be remembered that some SCI's and SPA's overlap, either partially or totally.

Another fundamental reference for the conservation of biodiversity in Italy is Framework Law no. 394 of 6 December 1991 on protected areas, an act that "lays down the underlying principles for the establishment and management of natural protected areas, in order to guarantee and promote, in a coordinated manner, the preservation and optimal use of the country's natural heritage". Accompanying the law are a series of measures meant to protect fauna and flora, regulate hunting, protect marine species and regulate fishing, in addition to safeguarding forest resources. Taken as a whole, the legislation approved has made it possible to carry out a number of different initiatives that attempt to safeguard and improve the conditions of our natural heritage. According to the 5th EUAP – Offi-

The two cornerstones of EU policies for the conservation of nature and biodiversity are the Birds Directive and the Habitat Directive.

In Italy, the Nature 2000 Network currently consists of 597 SPAs, with a surface area of 4,377,721 hectares, equal to 14.5% of the national territory, plus 2,288 SCIs, with a surface area of 4,530,866 hectares, equal to 15% of the national territory.



There are 772 protected areas in Italy, occupying a terrestrial surface area of almost 3 million hectares (9.7% of the national territory).

Of particular importance among the protected areas of the sea are the Marine Protected Areas (MPA's), as well as the "Pelagos" Marine Mammals Sanctuary.

Law 394/1991 introduces the "Plan for the Park", which, by subdividing the territory into areas under different levels of protection, guarantees ongoing efforts to preserve biodiversity through reconciliation with activities of human origin.

cial List of Protected Areas (2003) – there are 772 protected areas in Italy, occupying a terrestrial surface area of almost 3 million hectares (9.7% of the national territory)³⁹. More recent data, not yet made official through issue of the 6th EUAP, which is currently being approved, indicate that there are 875 protected areas in Italy, making for a terrestrial protected surface area of almost 3,095,000 hectares (10.3% of the national territory)⁴⁰.

Of particular importance among the protected areas of the sea are the Marine Protected Areas (MPAs), consisting of marine environments made up of the waters, sea bottoms and the portions of coastline running along them and proving to be of significant interest, in light of their natural, geo-morphological, physical and biochemical characteristics, especially as regards marine and coastal flora and fauna, as well as their scientific, ecological, cultural, educational and economic importance. In Italy, MPAs can be established if they have been previously identified as *areas foreseen by law*. Laws 979/82, 394/91, 344/97, 426/98 and 93/01 provide a list of 50 areas as above; to date, 25 MPAs have been established, including the two underwater parks of Baia and Gaiola called for under Law 388/2000. The MPAs simultaneously meet the dual objective of safeguarding biodiversity and maintaining and developing the local economy through three levels of differentiated protection (A, B and C Zones).

Finally, mention should also be made of the "Pelagos" Sanctuary for Marine Mammals, which, being an international protected pelagic area established under an agreement between France, the Principality of Monaco and Italy, has been subject to different administrative procedures and is currently governed by measures for maintaining the good state of conservation of the populations of marine mammals and prohibiting offshore speedboat races.

The same Law 394/1991 referred to above introduces the "Plan for the Park", which, by subdividing the territory into areas under different levels of protection, guarantees ongoing efforts to preserve biodiversity through reconciliation with activities of human origin. In the course of its complex regulatory development, this key instrument for the management of areas with a priority need

³⁹ 5th EUAP, Ministry of Environment and Defence of the Land, 2003

⁴⁰ *Le sfide ambientali. Documento di sintesi sullo stato dell'ambiente in Italia*. Ministry of Environment, Land and Sea, 2009



for conservation has encountered numerous problems. For example, the current framework, which regards 24 Italian national parks and is based on official regulatory provisions, shows that 7 of these parks (29%) have still not initiated any procedure for the formulation of the Plan for the Park, while 8 (33%) are in the phase of preparing and enacting the Plan, 5 (21%) are in the phase of public consultation and only 4 (17%) actually have the Plan in place. It should also be stressed that, despite the timing forecast under the law for carrying out the procedure leading to the Plan (roughly 30 months), the Park that completed the process more rapidly than the other Parks took 8 years to do so, well beyond the upper limit indicated above.

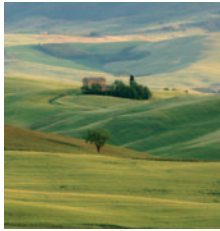
Completing the overview of nature areas subject to protection in various forms, and for various reasons, it should be remembered that, thanks to Italy's endorsement of the Ramsar (Iran) Convention of 1971 on wetlands of international importance, 51 sites of major ecological importance, covering a total surface area of approximately 58,800 hectares, are protected.

Figure 2.7 shows the regional distribution of the protected areas, as per the provisions of the legislative instruments illustrated earlier.

In compliance with the international conventions on the protection of biodiversity, as well as the European Community directives on birds and habitats, plus national laws on protected areas and the preservation of fauna, a number of different "Action Plans" have been implemented for threatened species of fauna, while "Guidelines" have been drawn up to limit species that damage native fauna and natural habitats. The Action Plans and Guidelines were drafted by the former National Institute for Wild Fauna (currently ISPRA), on assignment from the Ministry of Environment, Land and Sea. Participating in the work, depending on the specific case, were the leading experts for each species (selected by the Ministry of Environment, Land and Sea, by the main research agencies, by the Italian Zoological Union and/or by the most significant non-government associations), as well as the national authorities (national parks, the State Forestry Corps) or local authorities (protected areas, regions, provinces) territorially responsible for undertaking the actions found in the Plans.

Thanks to Italy's endorsement of the Ramsar Convention, 51 wetland sites of major ecological importance are protected.

In Italy a number of different "Action Plans" have been implemented for threatened species of fauna, while "Guidelines" have been drawn up to limit species that damage native fauna and natural habitats.



14.5% of the surface area of Italian territory holds SPAs, 15% holds SCIs and 9.7% contains protected terrestrial areas. There are also 25 Marine Protected Areas and 51 Ramsar sites.

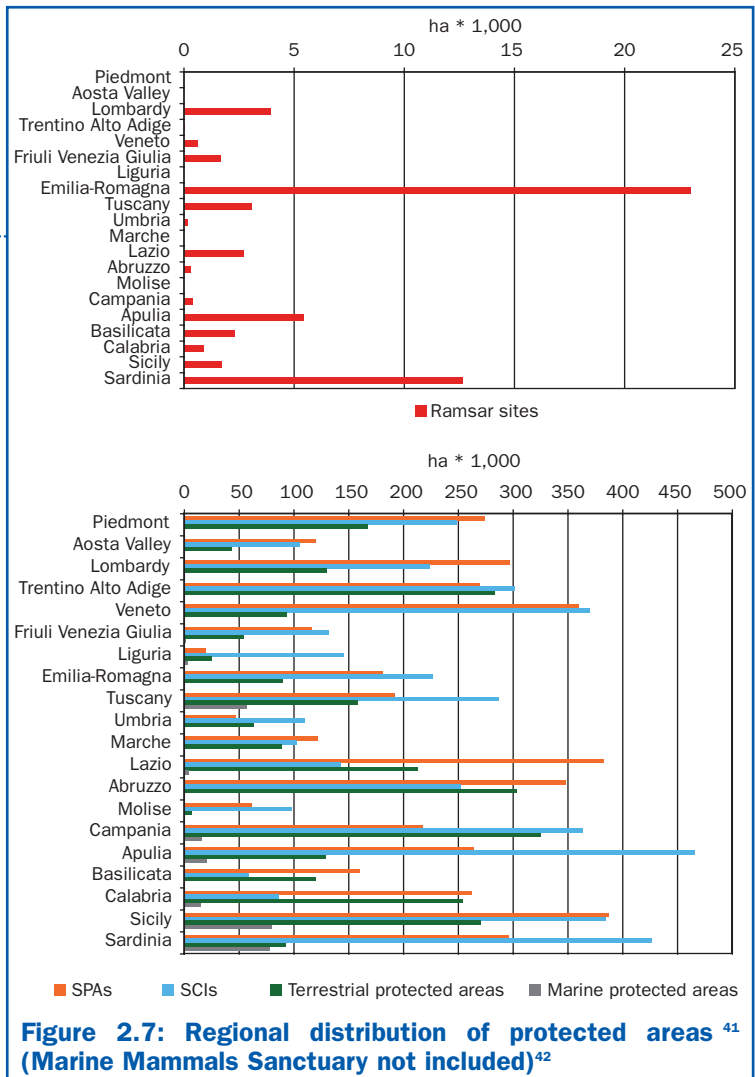


Figure 2.7: Regional distribution of protected areas ⁴¹ (Marine Mammals Sanctuary not included)⁴²

⁴¹ Source: for terrestrial protected areas: see *Official List of Protected Areas*, Ministry of Environment and Defence of the Land, 2003; for marine protected areas: ISPRA processing of data from the *5th Official List of Protected Nature Areas*, Ministry of Environment and Defence of the Land, 2003, Managing Authority of the “Plemmirio” Marine Protected Area, Managing Authority of the “Bergeggi Island” Marine Protected Area, Managing Authority of the “Regno di Nettuno” Marine Protected Area; for the Ramsar Areas: Ministry of Environment, Land and Sea, 2008; for SCIs and SPAs: ISPRA processing of data from the Ministry of Environment, Land and Sea (respectively updated to 30 July 2009 and to 18 August 2009)

⁴² The surface area of the SCI and SPA found in the Gran Paradiso National Park, a portion of which lies inside the Aosta Valley Region and a portion in Piedmont, was distributed under a criterion that attributed the majority of the areas to Aosta Valley. The SPA surface area of the Gran Sasso-Monti della Laga National Park, which falls within the territories of Abruzzo, Lazio and Marche, was assigned primarily to Abruzzo. The SPA surface area of the Abruzzo National Park, portions of which are found in Abruzzo, Lazio and Molise, was attributed in full to Abruzzo

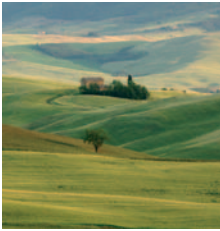


As is true for agriculture, which we shall address further on, the fishing sector is one of the areas of responsibility shared by the European Union and its member states. The instrument used by the EU to manage all the different aspects of fishing and aquaculture (biological, environmental, economic and social) is the Common Fisheries Policy (CFP). The current CFP is based on a reform implemented in 2002, the underlying principles for which were laid out in the Council's Regulation (EC) no. 2371/2002 on the conservation and sustainable exploitation of fishing resources under the Common Fisheries Policy, which provides the legal framework for all subsequent legislation approved by the European Community. The Policy introduced a precautionary approach designed to protect and conserve resources while reducing the impact of fishing on ecosystems to a minimum and attempting to find responses to certain specific problems in areas such as the conservation of living marine resources, the preservation of the environment, the management of the fleet, the organisation of markets, systems of control etc. From a structural perspective, the European Fisheries Fund (EFF) constitutes the financial component and is based on seven-year programs (2007-2013). One of the most significant measures introduced under the CFP is the setting of maximum limits on catches (in the Mediterranean, this involves red tuna); there are also technical measures, such as the minimum size of the mesh on the net, the use of selective fishing equipment, prohibitions against fishing in certain areas and during certain periods, the minimum sizes of fish that can be unloaded; reduction in accessory or accidental catches; limitation on fishing efforts in terms of capacity (draught, engine power and days spent at sea); reduction in illegal, undeclared and unregulated fishing.

Despite the progress made under the CFP in ensuring the environmental and socio-economic sustainability of fishing, the reality of the sector is a fragile one. The objectives set for the reduction of fishing capacity have not been reached, fishing stocks are commonly subjected to over-fishing while catches and profitability both decline. Though the environmental and economic aspects of fishing can clash in the short term, they should be considered inseparable in taking a farsighted approach to the management of fishing resources. This is why a revision of the CFP was initiated: the process is currently in the consulting phase, following publication

The Common Fisheries Policy (CFP) is the instrument used by the EU, and therefore its member states, to manage all the different aspects of fishing and aquaculture: biological, environmental, economic and social.

The CFP is currently being revised, in order to expand it beyond its current role as a principle of precaution and a mean of pursuing sustainability, as part of an "ecosystem approach".



Many other initiatives, including some undertaken on the regional and local levels, are focussed on the monitoring of the species and habitats, on environmental reclamation and restocking, on the creation of ecological networks, on the implementation of criteria of sustainability in the various production sectors, on the certification of products and on environmental education.

by the Commission, in April of 2009, of a *Green Book on the Reform of the CFP* (COM(2009)163). This revision should expand the CFP beyond its current role as a principle of precaution and a mean of pursuing sustainability, making it an “ecosystem approach” that treats fish stocks as individual elements of complex networks of connections and interdependencies, of which human activities are a full and integral part. Seen in this light, the CFP is part of the European Union’s new integrated maritime policy, which posits as the lynchpin for implementation of the ecosystem approach the recent framework directive for the strategy on the marine environment (2008/56/EC), whose objective is to reach a good environmental state for Europe’s marine waters by 2020, as well as the Habitat Directive referred to earlier (92/43/EEC).

Many other initiatives, some of them taken on the regional or local levels, focus on the study and monitoring of species and their habitats, as well as efforts of environmental restoration and restocking, plus the creation of ecological networks, the introduction of criteria of sustainability in the various production sectors, product certification and environmental education. Many of these efforts are directly or indirectly controlled by the series of programs carried out on the local or national levels by public or private bodies, as well as by universities and other organisations. Monitoring plays an important role in the preservation of biodiversity, and it is approached as monitoring not only of the components of biodiversity, but also of the categories of activities that can prove detrimental to biodiversity. The Chart of Nature, established under the aforementioned Framework Law no. 394/1991 on protected nature areas, the monitoring networks of the Agencies System and the reporting activities involving environmental data, such as the ISPRA Environmental Data Yearbook, are direct offshoots, or are closely tied to, the objectives found under art. 7 of the CBD.

An applied example worthy of note is the indicator referred to as “Ecological Value” and calculated under the Chart of Nature on a scale of implementation of 1:50,000. The “Ecological Value” is understood as being a natural strength and is calculated as a set of indicators traceable to three different groups. The first group regards the so-called institutional values referred to in Community directives; the second takes into account the components of biodiversity; and the third considers indicators typical of the ecology of the countryside.

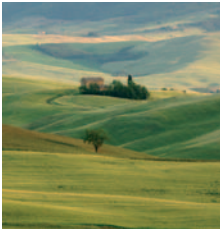


The “Ecological Value” is significant (high and very high) in 62% of the territory of the Aosta Valley, in 54% of Friuli Venezia Giulia, in 34% of Veneto, in 26% of Sicily and in 16% of Molise, seeing that these are the regions in which the Chart of Nature has already been fully implemented.

Efforts of preservation *in situ* include not only the establishment of protected areas, as illustrated above, but also the identification of areas for the implementation of special measures of conservation. Falling under this objective are the measures of protection contemplated for areas adjoining the protected areas, as well as the various initiatives - noteworthy examples of which can be observed within the national territory - for the establishment of ecological networks, both terrestrial and marine.

On the subject of the ecological network, which plays an extremely important role in guaranteeing the ecological connection between the different ecosystems and the territorial zones, it is interesting to observe the extent to which it has become a part of ordinary planning. In fact, references to the ecological network can be found in 88.2% of the Territorial Plans for Provincial Coordination (PTCP) approved, enacted or in the drafting stage. Of those being drafted, almost a quarter do not present references to the ecological network, while it is much more likely to be found in the plans that have been enacted and approved. It remains to be seen whether this less frequent presence in the plans being drafted, meaning the more recent ones, should be interpreted as a sign of decreased interest towards the subject in general or as the result of difficulties encountered in achieving operational integration of the ecological network with the normal planning instruments.

The Italian Network of Germoplasm Banks for the *ex situ* preservation of wild flora (RIBES) is another major initiative for the preservation of germoplasm, as well as an incentive for studies on the subject (art. 9 of the CBD). As part of an initiative recently undertaken by ISPRA, together with BIOFORV (the workgroup on Forestry and Nursery Biodiversity) and RIBES, a document was drawn up summarising the situation of *ex situ* conservation of wild and cultivated plants in Italy. The document, which is currently under publication, presents the state of the art with regard to the *ex situ* conservation of the different categories of plants and in the individual

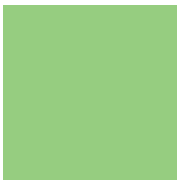


research sectors, though it also throws light on the critical problems and lists the main actions to be taken to resolve the more serious ones. Among those actions, note should be taken of the special nature of on-farm conservation, a form of *in situ* conservation that involves continuing to grow and raise local varieties and races, meaning those populations of crop or livestock species arrived at after centuries of natural selection by the environment, by farmers and by raisers of livestock within a given territory, confirming the key role of agricultural enterprises in conserving biodiversity.

As for the objective of the long-term use of biological components (art. 10 of the CBD), it includes initiatives designed to encourage the habitual use of biological resources, in accordance with traditional cultural practices that prove compatible, with one option for their implementation being the involvement of the local populations in the planning of actions for the restoration of biodiversity, together with improved cooperation between government authorities and the private sector. Major steps in this direction are the enactment of the 21 Agendas, plus efforts focussed on participation and access to information, as well as environmental certification and seals of quality for local products, with various examples of the application of such efforts on the local level found throughout the national territory. The Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA) and the assessments of the incidence of plans and projects, as well as surveys meant to gauge environmental damage, are all actions contemplated under art. 14 of the CBD and designed to assess, and therefore minimise, impacts that can prove harmful to biodiversity. Last but not least are the activities of research and training in the environmental sector (art. 12 of the CBD), as well as those of instruction and dissemination to the public (art. 13 of the CBD). In the case of these last programs, the Ministry of Environment, Land and Sea, together with the Ministry of Education, has carried out the program of the INFEA initiative on information, training and environmental education of 1995, a noteworthy effort of coordination meant to channel experiences and isolated initiatives on a local level in such a way that they can contribute to national programs and structures.

An initiative of note in the forestry sector is the promotion of a series of partnerships and collaborative efforts between the public and private sectors, for the primary purpose of favouring actions

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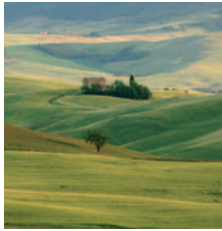
designed to spread information, heighten awareness and increase the use of voluntary instruments for the promotion of responsible forestry management, as well as, in more general terms, the development of practices centred around the social responsibility of businesses and opposition to illegal procedures. These instruments include: compensating investments by companies that intend to offset, at least in part – for example, through the restoration of deteriorated natural areas or through reforestation initiatives – the impacts of their activities; forest certification, involving not only the management of forests on a national scale, but also the chain of custody, and, therefore, the use of certified raw materials by transformation enterprises in the wood/paper sector. Nationally, two alternative systems of forest certification can be identified: the PEFC (Pan-European Forest Certification, promoted by owners of forests and the forest industry) and the FSC (Forest Stewardship Council, drawn up by environmentalist organisations and in operation for a longer period of time). With the first Italian forest certification (FSC) having been awarded to the Magnificent Community of Fiemme (Province of Trento) in 1997, as of 31th October 2009, a total of 748,065 hectares of the national forest area had obtained this recognition, meaning more than 8.5% of all Italian forest area. In addition to the Alpine regions, which hold the majority of Italy's certified forest areas, numerous zones in the central and southern Apennines have also been certified. A further development of note was the first certification of an Italian cork oak forest (FSC), in Tempio Pausania (Province of Sassari), in 2005. Under both systems, certification of private forest holdings is predominant, but certification of public property is on the rise as well.

In the agricultural sector, after decades of policies of rural development centred around the specialisation and intensification of agriculture, with the primary objective of increasing agricultural productivity, in the nineties, the Community Agricultural Policy (CAP) was geared towards integrating the objectives of environmental policy with the agricultural policies of the marketplace and rural development, in part to correct the impacts on the environment caused by the agricultural strategies followed in earlier years. In 2003, a reform of the CAP for the medium term introduced a

collaborative efforts between the public and private sectors, for the primary purpose of favouring actions designed to spread information, heighten awareness and increase the use of voluntary instruments for the promotion of responsible forestry management, as well as, in more general terms, the development of practices centred around the social responsibility of businesses and opposition to illegal procedures.

8.5% of the total hectares of national forest area is certified.

Starting with the medium-term reform of the CAP in 2003, and to an even greater extent with the Health Check of 2008, spending on rural development in Italy and other countries of the EU shifted from market measures towards forms of



income support for farmers, not only in their role as producers of food, fibre and wood and non-wood products, but, even more importantly, because of their contribution to the conservation of the countryside and the environment.

During the revision of the planning for rural development in 2007-2013, many regions have opted for measures reinforcing the defence of biodiversity.

system of support for agricultural operators no longer based on the types of crops grown and the quantities produced, but rather on the exercise of agricultural activities and on the awarding of a “single payment for each enterprise”, on the condition that a number of obligatory operating criteria are met in the areas of environmental defence, as defined in the environmental directives regarding natural habitats, flora and wild fauna (based on the Directives on birds and habitats), as well as water (based on the Directives on nitrates, underground waters and purification mud), food safety, the wellbeing of animals and biodiversity, as established under the Lisbon Agenda of March 2000 and in line with the interests and expectations of society.

In November of 2008, the Ministers of Agriculture of the EU reached agreement on a *Health Check* for the CAP. The objective of the Health Check, a revision of the medium-term reform initiated in 2003, was to respond more effectively to six “new challenges”, which include Climate Change, Bio-Energy, the Management of Water and Biodiversity. On that occasion, the Ministers also decided to increase the modulation and to transfer funds from the direct payments to agricultural operators to the financing of policies involving the market (Pillar I of the CAP) and Rural Development (Pillar II). The *Health Check* did not regard the set-aside measures.

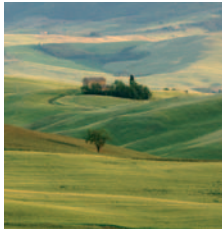
In revising the Community Strategic Orientations (Decision 2009/61/EC of the Council of 19 January 2009), the objective of defending biodiversity was reinforced, with identification of a slowing in the decline of biodiversity as one of the most important Community objectives to be reached. With this in mind, rural development plays a strategic role, seeing that the concept of biodiversity is unquestionably linked to and dependent on agriculture and forestry growing as well.

To this end, many regions, during the revision of the program of rural development for 2007-2013, decide to utilise a wide range of measures to reinforce the defence of biodiversity.

An analysis of the financial resources of the Health Check (and of the Recovery Package) allocated under the Rural Development Plans of the Regions to the six «new challenges» shows that 158.3 million euro, or 20.4% of the total were concentrated on the challenge of “biodiversity”, while 140,8 million euro, or 18,2%, was allocated to “climate



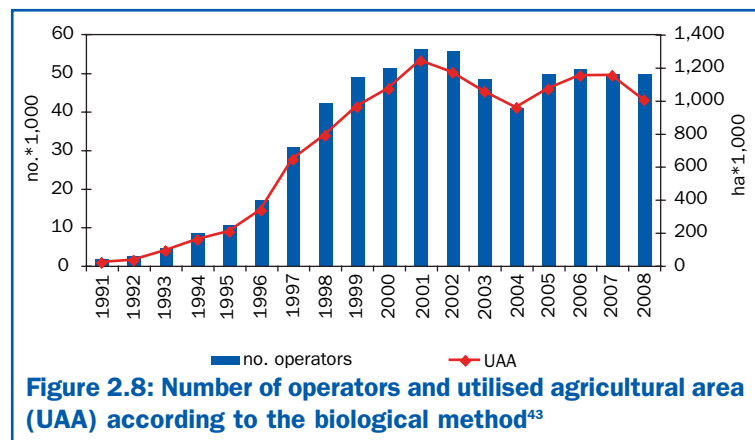
change”; and “management of waters” received 173.7 million euro, accounting for 22.4% of the total. Seventeen regions decided to reinforce this priority, primarily through agro-environmental measures, in particular measure 214, “agro-environmental payments”, which was reinforced by 13 regions, and measure 216, “non-production investments”, used by 4 regions. The types of operations to be funded with the agro-environmental payments are all geared towards safeguarding genetic biodiversity, conserving types of vegetation with a wide range of species, protecting and maintaining grassy formations, protecting birds and other wild fauna, improving the network of biotypes, reducing the presence of harmful substances in the surrounding habitats and conserving protected flora and fauna. Furthermore, considering the high level of interdependence between biodiversity and a number of the challenges of the Health Check, in particular climate change, bio-energy and the management of water, many of the measures taken under the regional plans will also prove as measures in defence of biodiversity, though they do not address the topic directly. Examples of such measures are the initiatives meant to favour the adaptation of forest and agricultural ecosystems to climate change, the reconstruction of dry walls and tree and hedge rows to favour the control of water and erosion, as well as measures taken to diversify the rural economy and support family-run agricultural enterprises and agro-tourism undertakings. In terms of maintaining or increasing the dimensions of the UAA nationwide, it should be noted that no specific objectives are set under either international or national legislation, though the last two European Action Programs in the field of the environment, as well as the 21 Agenda, set a number of general objectives, such as the sustainable use of the territory, the protection of Nature and biodiversity and the maintenance of the levels of production. These objectives are reiterated in the resulting thematic strategies, in the associated legislative proposals and in the numerous existing legislative measures. Community policies for agriculture and the environment call for incentives promoting production systems featuring low environmental impact, such as integrated and biological agriculture, as well as increased extensive production, safeguarding of habitats of elevated naturalistic value, maintenance of biodiversity and the low-intensity management of pasturelands. Equally important are the national guidelines, geared towards promoting a generational turnover, together with



In Italy the surface areas involved in or being converted to biological agriculture were equal to 1,002,414 hectares in 2008, representing roughly 8% of the national UAA.

economic and social development of agriculture, in addition to providing incentives for the reconstitution of farmlands and farming enterprises. Within this framework of measures and facilitations, particular attention is focussed on Italian biological agriculture (often referred to as “bio”), which constitutes a genuine success story for European agriculture. As shown by Figure 2.8, in 2008 the surface areas involved in or being converted to biological agriculture were equal to 1,002,414 hectares (-12,8% compared to 2007), representing roughly 8% of the national UAA. The majority of the “bio” surface area is used in growing grain, as permanent meadows and for the cultivation of trees and green forage from seed crops. At the end of 2008, the number of operators was 49,654, for a decrease of 1.2% compared to 2007. The largest number were found in Sicily, while Molise is the region that registered the largest increase in operators compared to earlier years. Sicily, followed by Calabria, has the most producers. Calabria, followed by Basilicata, leads in terms of the number of producers per UAA. Within the EU, Italy ranks in terms of biological agricultural, with regard to both the number of enterprises and the surface area utilised, and in light of the evident advantages as regards the quality of the soil, the fixing of carbon, the reduction of greenhouse gas emissions, the conservation of biodiversity and reduced introduction into the environment of residues of pesticides and fertilisers.

Following a decrease on the mid 2000's, the surface area and number of biological enterprises in Italy has stabilised, representing a major success story on both the national and European levels.



⁴³ Source: SINAB



The various actions listed up to this point to safeguard nature and biodiversity can be effectively applied only if they are supported with adequate funding. An examination of the available data, supplied by ISTAT⁴⁴ shows that spending by different government bodies (grouped by COFOG)⁴⁵ on the defence of biodiversity and the countryside totalled 4.357 billion euro in 2007. In 2000, total spending on such efforts was 2.864 billion euro, making for growth of approximately 52% during the period and confirming the attention placed on the sector under public policies.

As seen, there are various responses to the unceasing loss of biodiversity, as well as various modes for safeguarding natural and agricultural areas. These efforts definitely including increasing designation of new protected areas, but also further reinforcement of existing instruments of conservation, especially in terms of increased application and spread of controls, availability of more financial resources, attention focussed on new and emerging problems, such as the spread of alien species and global climate change. A key role shall also be played by increasingly widespread practice of sustainable management and conservation on both land and sea natural environments that are not classified as protected. Italian agriculture also holds a key role at this juncture, being called on to make difficult choices between the growing demand for both “conventional” and “new” products (first and foremost bio-fuels) and the need to safeguard biodiversity and the environment through activities such as bio-remediation, carbon sequestration etc.: all valid solutions to specific, highly relevant problems.

In 2007, government bodies spent more than 4,0 billion euro on defending biodiversity and the countryside, for an increase of 52% compared to 2000.

Apart from direct conservation, a key role in responding to the problem of losing biodiversity will be played by the sustainable management and conservation of natural environments, on both land and sea, not strictly classified as protected.

⁴⁴ Spending of government bodies by function, level II, Years 2000-2007

⁴⁵ Classification Of Function Of Government: a classification draw up on the international level by the leading institutions involved in national accounting

