Republic of TURKEY

Ministry of Forestry And Water Affairs

UN Convention on Biological Diversity

Fifth National Report

August 2014

This fifth national report of Turkey is prepared by General Directorate of Nature Conservation and National Parks under Ministry of Forestry and Water Affairs of Republic of Turkey, as per COP Decision X/10 and in accordance with Article 26 of the Convention on Biological Diversity.

ABBREVATIONS

MFWA: Ministry of Forest and Water Affairs

MFAL: Ministry of Food, Agriculture and Livestock

MEU: Ministry of Environment and Urbanization

MCT: Ministry of Culture and Tourism

SHW: State Hydraulic Works

GDNCNP: General Directorate of Nature Conservation and National Parks

GDF: General Directorate of Forestry

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PART I: AN UPDATE ON BIODIVERSITY STATUS, TRENDS, AND THREATS AND IMPLICATIONS FOR HUMAN WELL-BEING

Q1: Why is biodiversity important for your country? Please elaborate on the importance of biodiversity by highlighting contributions of biodiversity and related ecosystem services to human well-being and socio-economic development, using information from completed and ongoing biodiversity assessments or studies. Where possible provide estimates of economic, social and cultural values (the economic value can be presented in monetary terms or, for example, in numbers of people supported). Also highlight a few examples of exceptional biodiversity and ecosystems in the country.

A. 1.1. IMPORTANCE OF BIODIVERSITY FOR TURKEY

As the concept of importance represents a value either absolute or relative, it should be mentioned that Turkey has a detailed methodological approach to "Biodiversity and Axiology" developed in 2012 with the project "Training of Interest Groups and Guideline Preparation for Integration of Nature Conservation Into Economical System". Other than the well known ecological, heritage, cultural, ethical and spiritual values in Turkish Culture, i.e. importance of biodiversity for Turkey, the specifically economical importance of biodiversity is also being heavily studied in Turkey.

There are many monetary valuation studies, measurement of socioeconomical importance of biodiversity by pilot studies carried out by Government, NGOs and independent researchers and academicians.

Furthermore the following strategic objectives are established in the National Rural Development Strategy and Plan of The Republic of Turkey.

- Economic Development and Increasing Job Opportunities
- Attaining a competitive structure for agriculture and food sectors
- Diversification of the Rural Economy
- Strengthening Human Resources, Organization Level and Local Development Capacity
- Strengthening Education and Health Services
- Combating Poverty and Improving Employability of Disadvantaged Groups
- Improving Rural Physical Infrastructure Services and Life Quality
- Improvement of Rural Infrastructure
- Improvement and Protection of Rural Settlements
- Protection and Improvement of Rural Environment
- Improvement of Environmental-Friendly Agricultural Practices
- Protecting Forest Ecosystems and Sustainable Utilization of Forest Resources
- The Management and Improvement of Protected Areas

A.1.2. EXAMPLES OF EXCEPTIONAL BIODIVERSITY AND ECOSYSTEMS IN TURKEY

IMPORTANT NOTE: The information provided in this section is not updated, and is currently being updated within the framework of the NBSAP Revision Studies that have started in early 2014 and the "National Biodiversity Inventory and Monitoring Project" that started in 2013. The final data will be published in ***Noah's Arc Database***[1].

A.1.2.1. BRIEF INTRDUCTION TO BIOGEOGRAPHY OF TURKEY

Turkey displays the character of a small continent in terms of biological diversity. Among the reasons for this situation, one may count the fact that the country has three different types of bioclimate and three Biogeographical Zones, namely Euro-Siberian, Mediterranean and Irano-Turanian, its topographic, geological, geomorphologic and soil diversity, the existence of different types of aquatic bodies such as the sea, lakes, rivers, and fresh water, salt water and mineral water lakes, the altitude differences that range between 0 and 5,000 metres, the fact that the country has deep canyons and very different types of ecosystem and that it was less affected by the glacial period in comparison with European countries, the existence of the Anatolian Diagonal which links Northern Anatolia to Southern Anatolia and the resulting ecological and floristic differences, and the fact that the country is at the point where three continents intersect. In brief, Turkey has agricultural, forest, mountain, steppe, wetland, coastal and marine ecosystems and different forms and combinations of these ecosystems.

Of the biogeographical zones, the Euro-Siberian Biogeographical Zone extends throughout Northern Anatolia and in those parts of the Thracian Region which face the Black Sea. This is the climatic region with the highest rainfall and is largely covered with forests. The Mediterranean Biogeographical Zone covers all areas on the Mediterranean cost and the western parts of Thrace and includes very different types of ecosystem. The Irano-Turanian zone is the largest of the Biogeographical Zones, starting in Central Anatolia and extending as far as Mongolia. The continental climate and steppe flora are predominant in this zone.

A.1.2.2. ECOSYSTEM DIVERSITY

A.1.2.2.1. AGRICULTURAL AND STEPPE ECOSYSTEMS

Turkey's main ecological regions from the agricultural point of view are the Mediterranean Coastal Region, the Aegean Coastal Region, the Black Sea Coastal Region, the Thrace and Marmara Regions, the Central Anatolia Region, the South-eastern Anatolia Region, the Eastern Anatolia Region and the Transition Regions (North-western Transition, Western Transition, North-eastern Transition, Eastern Transition, and South-eastern Transition). This zoning system, based on main climatic features such as rainfall and temperature, covers agricultural product diversity and the regional and phenological characteristics of agriculture. The Coastal Regions may be defined as agricultural production regions generally located in the Mediterranean climatic zone. The Central, Eastern and South-eastern Anatolia Regions are dominated by the hard continental climate, and their agricultural product characteristics carry the influences of these ecological regions. The transition regions are agricultural regions differing more or less from each other in terms of both climatic factors and overall agricultural characters, each covering several provinces in the transitions from the middle of Central Anatolia to other regions.

[1] Noah's Arc Database is the national database of Turkey on biodiversity with many different modules allowing the monitoring of different levels of biodiversity as well as emerging issues such as invasive species.

Cultivated areas, most of which are located in steppe zones, constitute about 35 % of Turkey's total surface area. Of the total agricultural area, 70 % is formed by cropland, 5 % by orchards, 2.7 % by vegetable gardens, 2 % by vineyards and 2 % by olive groves. The remaining 18 % of the agricultural area is left fallow according to the cultivation pattern implemented in those regions. Grasslands and meadows constitute about 19 % of Turkey's total surface area.

In Turkey, steppes and grasslands, defined as areas covered with herbaceous plants, are currently about 21 million hectares.

A.1.2.2.2. FOREST AND MOUNTAIN ECOSYSTEMS

In Turkey, forest ecosystems cover a total area of 21,188,747 hectares. Forests consisting of broad-leaved trees are more widespread in Turkey. Coniferous trees occur at all altitudes from sea level to the highest limit where forests exist. In the Aegean and Mediterranean regions, there are humid and semi-humid coniferous and dry forests (oak, black pine and red pine) as well as shrubs and maquis.

The forest types observed in Turkey according to the biogeographical regions are as follows:

Euro-Siberian Biogeographical Region:
Broad-leaved and coniferous forests (Beech, Chestnut, Hornbeam; 500-1200m),

Humid and semi-humid coniferous forests (black pine, Scotch pine, spruce, fir; 1000-1500m),

Dry oak and pine forests (Oak:<1500m; black pine: >600m; red pine: 400-500m)

Shrub (maquis and pseudo-maquis) formation (Red pine: <500m)

Mediterranean Biogeographical Region:

Shrub (maquis and garigue) formation (Oaks, Sandal, gum, myrtle, etc. 350 m Marmara, 600 m Aegean; 800 m Mediterranean),

Low-Altitude Mediterranean Belt forests (Red pine: <1000m; Black pine: 800-1500m),

Aegean High Mountain Forests (Chestnut: <1000m; Beech, Linden, Hazelnut: >1500m; Scotch pine: >1600m; Oak and Black pine: >700m, Red pine: <600m),

Mediterranean High Mountain Forests (Oak: 500-1200m; Black pine: 1200-2000m; Fir: 1200-1800m; Cedar: 1000-2000m; Juniper: 100-1800m; Beech-Hornbeam: 1100-1900m)

Irano-Turanian Biogeographical Region:

Central Anatolia Steppe Forests (Mossy and white oak, Black pine, Juniper: 800-1500m),

Central Anatolia Dry Black Pine, Oak and Juniper Forests (Oaks: <1200m; Black pine: 1000m-1500m; Scotch pine >1500m),

Eastern Anatolia Dry Oak Forests (oak species <850m).

These rich forest ecosystems of Turkey provide habitats for a great number of endemic plant species, important bird species and other wildlife species. These ecosystems also include the wild relatives of many cultivated plants which are important for agricultural biological diversity.

In Turkey, there are mountain systems formed by folding, faulting and volcanism. The types of the mountain ecosystems vary according to biogeographical regions, to patterns of formation and to altitudes.

The mountains formed by faulting exist in the Aegean Region. These mountains extend perpendicular to the coast and are rich in water resources. The Kaz Mountains, the Yunt Mountains, Boz Mountains and the Aydın and Menteşe Mountains are important mountains of this region. The Kaz Mountains are the habitat of the Kaz Mountain Fir (Abies nordmanniana ssp. equi-trojani).

Among the mountain chains of Turkey formed as a result of the Alpine-Himalayan folding, the most important ones are the Yıldız, Köroğlu, Küre, Canik and Eastern Black Sea Mountains to the north, the Western and Central Taurus Mountains to the south, the Nur and Southeastern Taurus Mountains to the southeast, and the Hınzır, Tahtalı, Munzur, Palandöken, Allahüekber and Aras Mountains in Central and Eastern Anatolia. These mountain systems are important ecosystems from the point of biological diversity with their high rates of endemism. The higher parts of the Eastern Black Sea Mountains and the northern and north-eastern parts of Eastern Anatolia are dominated by sub-alpine and alpine meadows and the high mountain floors of other regions by steppe and meadow ecosystems. Forest ecosystems that differ according to regions begin as altitude decreases. In addition, lakes in high mountain sections isolated from each other and having different characteristics, form special habitats.

Of the volcanic mountains, which add special value to biological diversity with their volcanic lake formations in particular, the most important ones are Ağrı, Tendürek, Nemrut, Süphan, Karacadağ, Erciyes, Hasan and Kula. With their mineral-rich soil, they also have a special importance for agricultural biological diversity.

A.1.2.2.3. INLAND WATERS ECOSYSTEMS

With its rivers and lakes covering an area of about 10,000 km^2, Turkey has very important inland water resources to maintain biological diversity. In studies conducted so far, 135 wetlands of international significance have been identified and 12 of them designated as Ramsar sites. In Turkey, there are 7 drainage basins including 26 river basins, and the ground waters are estimated at 94 billion m^3. The average annual rainfall is about 640 mm, roughly one third of which reaches water reserves and thus contributes to the maintenance of wetlands.

The largest natural lake is Lake Van in Eastern Anatolia, with a surface area of 374,000 hectares and with high salinity. In the Central Anatolian Plateau, there are some shallow salt lakes, the largest of which is Lake Tuz (128,000 hectares) and which have significant importance for halophytic plant diversity and bird diversity.

In Turkey, there are nine rivers more than 500 km in length: Kızılırmak, Fırat, Sakarya, Murat, Aras, Seyhan, Dicle, Yeşilırmak and Ceyhan. Among these Dicle and Fırat which discharge into Basra Bay over Syria and Iraq; Aras which discharges into Caspian Sea over Turkey, Armenia, Iran and Azerbaijan; Asi which discharges into Mediterranean over Turkey are the transboundary waters of Turkey. Meriç which discharges into Aegean Sea is boundary water between Turkey and Bulgaria. Deltas are of great importance for biological diversity, especially for water birds. The Meriç, Gediz, Büyük Menderes and Küçük Menderes Deltas, formed by rivers that discharge into the Aegean Sea, and the Göksu, Seyhan and Ceyhan Deltas, formed by rivers that discharge into the Mediterranean, provide suitable habitats for a large number and variety of water birds, particularly as lakes in Anatolia freeze in winter. The delta formed by the Kızılırmak, which discharges into the Black Sea, has great importance especially for migratory birds that pass directly over the Black Sea.

Turkey's highly complex geography and the fact that rivers are separated by mountainous areas from each other, thus preventing to a large extent the diffusion of species, have resulted in high endemism and genetic diversity. For this reason, a great majority of the invertebrates living in river ecosystems are endemic.

236 fish taxa belonging to 26 families have been identified in inland waters ecosystems as a result of the studies conducted so far. The most common species present in our waters are the brown trout, the pike, the carp, the tench, the striped mullet, the roach, the zander and the inland waters bass. Located on bird migration routes, Turkey is a key country for many bird species. It is known that there are about 460 bird species in our country. The stork, the flamingo, the spoonbill, the black-winged stilt, the avocet, the crane, the Ardeae and ducks are bird species commonly observed in Turkey's wetlands.

FIGURE 1: Bird Migration Route This route is evolutionarily determined by the biogeography, particularly by the 500 wetlands of Turkey

A.1.2.2.4. COASTAL AND MARINE ECOSYSTEMS

The different characteristics of the seas that surround Turkey, namely the Black Sea, the Marmara, the Aegean and the Eastern Mediterranean, have resulted in the diversification of the biological resources they contain. The Mediterranean, which has the highest salinity and temperature among the Turkish seas, is the area with the richest biological diversity. After the opening of the Suez Canal, many species belonging to the Indian-Pacific area migrated through the Red Sea to the Mediterranean and settled in this area. 26 alien species were identified to have settled in the area through migration. There are 388 fish species in the Turkish waters of the Mediterranean, 389 in the Aegean, 249 in the Sea of Marmara and 151 in the Black Sea.

The Black Sea is the largest enclosed sea of the world and the most isolated from oceans. In the Black Sea, there are 151 fish species, 1,619 fungus, alga and high water plant species and 1,983 invertebrate species. Fish species such as the sturgeon which are important both for biological diversity and for economic value and 4 sea mammal species live in the Black Sea. There are 6 different sea meadow species (Zostera marina, Z. Noltii, Potamogeton pectinatus, Ruppia maritima, R. Spiralis and Zannichellia major) which are the spawning grounds of 34 fish species even if the areas covered by them are getting smaller.

The Turkish Straits System, consisting of Strait of Istanbul and Strait of Çanakkale and the Sea of Marmara, has the position of an inland sea system providing water transport between the Aegean Basin of the Eastern Mediterranean and the Black Sea and performs the function of a biological corridor for the bonito, the large bonito, the bluefish and similar fish species. It has been observed that the surface of the Sea of Marmara is under the influence of the Black Sea waters coming through the Turkish Straits. The deeper regions of the Sea of Marmara contain Aegean-Mediterranean waters and host more than 400 species of benthic organisms. The Sea of Marmara is the spawning ground of many pelagic fish species. *Gerardia savaglia*, a coral species, still maintains its life at the depth of 30 m.

With a surface area of about 180,000 km^2, the Aegean Sea has a very complicated bottom topography and coastal geometry. In addition, there are hundreds of islands, big and small, on this sea. It may be said that the basin generally consists of 3 deep depressions. The northern depression is about 1,500 m deep and connected to the 1,100 metre-deep middle Aegean depression by a hill 200-500 m deep. In the southernmost part, there is the deepest region of the Aegean Sea with depths exceeding 2,000 m. Sponges, which are generally black in their natural environment, are one of the commercial products harvested from the deep waters of the Aegean, and a decrease has been observed in their populations in recent years. As in the Black Sea, the coasts of the Eastern Mediterranean are connected to the deep basin by a topographic slope belt of 10-20 km. The major depressions of the Northern Mediterranean are the basins of Rhodes (4,000 m), Antalya (2,500 m), Çukurova (1,000 m) and Latakia (1,500 m). The Çukurova Basin is shallower than the Antalya Basin, and they are separated from each other by a wall-shaped topography.

Coastal ecosystems are highly special ecosystems as they are important sudden transition zones (ecotones) where marine and terrestrial ecosystems intersect. Coastal ecosystems form 4.1 % of the terrestrial resources that make up the country's surface area. The fact that the patterns in which mountains come down to the sea, and the coastal topography, differ from each other in the coastal areas of our country have resulted in various coastal ecosystems such as dunes, caves, deltas, lagoons, marshes and calcareous terraces. Among all these coasts, particularly the coastal areas in the Eastern Mediterranean region are rich ecosystems with very high flora and fauna diversity.

A.1.2.3. SPECIES DIVERSITY

Plant species

Turkey may be considered quite rich in plant species, especially seed plants, considering the climate zone in which it is located.

Although there are an increased number of studies on algae, conducted by members of teaching staff at universities, the inventory of the algal flora in Turkey has not yet been completed.

The number of known lichen species in Turkey is around 1,000 and steadily increasing.

It has been determined that 3 Horny Liverworts, about 165 Liverworts and about 740 Mosses occur in Turkey.

They occur in all areas of Turkey except very arid areas but the Black Sea region is the area where this plant group occurs most widely. Among the ferns, 8 species of the Equisetales, 6 species of the Lycopodiales and about 80 species of the Filicineae are present in Turkey.

The number of seed plant species identified in Turkey is currently about 9,500. The number of species and sub-species taxa has reached 12,000. This number increases every day with the identification of new species. Turkey has the character of a continent in terms of seed plant diversity. The number of species in all of Europe is about 12,500. At the same time, 34 % of the species in Turkey (about 4000) are endemic. This high rate of endemism makes Turkey interesting in terms of seed plants and maintains its character as a centre of attraction in this regard.

Plant Groups	*Defined Species/ subspecies*	*Endemic Species*	*Rare and Endangered Species*	*Extinct species*
Algae	*2.150*	----	*unknown*	*unknown*
Lichen (Lichenes)	*1000*	----	*unknown*	*unknown*
Moss (Bryophytes)	*910*	*2*	*2*	*unknown*
Pteridophytes Ferns	*101*	*3*	*1*	*unknown*
Gymnospermae (Gymnosperms)	*35*	*5*	*1*	*unknown*
Monocotyledonous (Monocotyledons)	*1.765*	*420*	*180*	-

Dicotyledonous (Dicotyledons)	*9.100*	*3500*	*1100*	*11*

Table1. Taxon numbers of species and subspecies of various plant groups; endemism, rare and endangered species, extinct species

Endemic/endangered plant species

In its geographical zone, Turkey is one of the richest countries in endemic plants. Because species that belong to seedless plant groups are widely distributed as in the rest of the world, their rate of endemism is low. In addition, studies on seedless plant groups in our country are not yet at the desirable level. The Ferns (Pteridophytes) are the best-known plant group among seedless plants. The number of ferns at species and sub-species level identified in Turkey is 101, only 3 of which are endemic.

The rate of endemism is low in the Gymnospermae, the most primitive group of seed plants. In this group, there are only 5 endemic taxa at variety and sub-species level. The rate of endemism is very high in the Angiospermae, which are among seed plants, and 3,925 of the nearly 11,000 flowery plant species and sub-species are endemic, which means an endemism rate of about 34 %. The narrowly distributed endemics live mainly in certain mountains and mountain chains and in certain habitats. The principal mountains with a high rate of endemism are the Amanos Mountains, the Sandras Mountain, the Bey Mountains, the Bolkar and Ala Mountains, the Uludağ Mountain, the Kaz Mountain and the Munzur Mountains. Among the areas with a high rate of endemism other than mountain chains, one may count the Middle Taurus (Ermenek, Gülnar, Mut, Anamur), the Anti-Taurus (Maraş, Adana, Niğde), the gypseous areas around Sivas and Çankırı, the vicinity of Lake Tuz, the high mountains around Rize and Artvin, and the region covering the provinces of Van, Bitlis and Hakkari. The Compositae are the richest family in terms of endemic seed plants with some 435 endemic species. This family is also the family in Turkey that contains the greatest number of species. The second rank in this respect is held by the Leguminosae family with about 400 endemic species. This family also comes second in Turkey with respect to the total number of species it contains. The third rank is held by the Labiatae family with about 310 endemic species. The tragacanth (Astragalus) is the richest genus in terms of the number of endemic species, at about 250, followed by the motherwort (Verbascum) with 175 species, the centaury (Centaurea) with 115 endemic species and the Hieracium with 66 species. The rate of endemism is 100 % for the genera Ebenus (14 species) and Bolanthus (6 species), all of whose species distributed in Turkey are endemic, although they have a small number of species. Turkey may be considered rich in endemic genera as well as in endemic species. The endemic genera represented by one species are Kalidiopsis and Cyathobasis (Chenopodiaceae), Phryna and Thurya (Caryophllaceae), Physocardamum and Tchihatchewia (Cruciferae), Nephelochloa and Pseudophleum (Gramineae), Dorystoechas (Labiatae), Sartoria (Leguminosae), Crenosciadium, Ekimia, Postiella and Aegokeras (Umbelliferae).

Among the phytogeographical regions, the Irano-Turanian region contains the greatest number of endemic species. It is followed by the Mediterranean and Euro-Siberian phytogeographical regions. Among the geographical regions in Turkey, the greatest number of endemic species exists in the Mediterranean region with some 800 species, followed by Eastern Anatolia with 380 species and Central Anatolia with 280 species.

Distribution of endemic plant species among the phyto-geographical regions (including subspecies and varieties)	
Euro-Siberian	320
Mediterranean	1325
Irano-Turanian	1250
Non-specific to particular phytogeographical region	1030
Total	3925

Table 2. Distribution of endemic plants of Turkey based on the phytogeographical regions

Although Turkey is very rich in endemic plants, some of these species are faced with serious threats. According to the IUCN 2001 criteria, about 600 of our endemic species are in the category of "Critically Endangered-CR" and about 700 in the category of "Endangered-EN". Through the "Turkish Endemic Plants Project" implemented with SPO support between 1992 and 1997, seeds of many endemic plants were collected and placed under conservation at the Gene Bank of Menemen within the Aegean Institute of Agricultural Research affiliated to the Ministry of Food, Agriculture and Livestock.

The Turkish flora, which has a rather high rate of endemism, is also quite rich in medical and aromatic plants. Some of the important genera and species used for medical and aromatic purposes are: Delphinum sp., Digitalis sp., Gypsophila sp., Helichrysum sp., Leucojum aestivum, Linum sp.,Liqiudambar orientalis, Malva sp., Matricaria sp., Mentha sp., Nigella sp., Orchis sp., Ophrys sp., Origanum sp., Pimpinella sp., Rosa sp., Salvia sp., Sideritis sp., Teucrium sp. and Thymus sp.

Animal species

Considering the zone in which it is located, Turkey is rich and interesting in fauna as well as in flora. Among the main reasons for this situation, one may count the fact that Anatolia forms a bridge between the continents of Europe and Asia and is therefore located on migration routes, that it has different types of climate and ecosystem, that it has a rich flora and, consequently, that many animal species can find here suitable habitats for themselves. All these diverse ecological factors are reflected in the diversity of the fauna.

Thanks to the large number of studies on the Turkish vertebrate fauna, it has largely been brought to light. According to latest data, 460 bird species, 161 mammal species, 141 reptile species, 480 sea fish species and 236 inland waters fish species are known to live in Turkey.

The group of insects (Insecta) is very rich in Turkey as in the rest of the world. However, it is not possible to give any estimates concerning the insect fauna in Turkey for reasons such as the complete lack of studies in certain groups and the insufficiency of studies in certain others. The number of insect species identified in Turkey so far is about 30,000, although the estimated number is between 60,000 and 80,000. These figures indicate how insufficient the studies are concerning insects. Nevertheless, the faunistic list of certain insect groups has largely been completed. For example, the dragonflies (Odonata) are represented in Turkey by 114 species, the locusts (Orthoptera) by 600 species (270 of them endemic), the beetles (Coleoptera) by 10,000 species, the mollusks (Molluska) by 522 species (203 of them

endemic), the bugs (Heteroptera) by 1,400 species, the plantlice (Homoptera) 1,500 species, the butterflies (Lepidoptera) by 6,500 species (600 of them diurnal, the others nocturnal) (Table 3).

Although some of the habitats in Turkey are degraded or even damaged, they provide shelter for endangered species such as the Mediterranean seal (*Monachus monachus*), the sea turtle (*Caretta caretta*) and the green sea turtle (*Chelonia mydas*).

The following table below shows the numbers of fauna species in Turkey:

Animal Groups	Defined Species	Endemic Species/ subspecies, Variety	Rare and Endangered Species	Extinct Species
VERTEBRATES				
Reptiles/Amphibian (Reptilia/Amphibia)	141	16	10	-
Birds (Aves)	460	-	17	-
Mammals (Mammalia)	161	37	25	7
Freshwater Fish (Pisces)	236	70	-	4
Marine Fish (Pisces)	480	-	-	-
INVERTEBRATES				
Mollusk (Mollusca)	522	203	unknown	unknown
Butterflies (Lepidoptera)	4.500	89	89	unknown
Locusts (Orthoptera)	600	270	-	-
Dragonflies/Damselflies (Odonata)	114	-	-	-
Beetles (Coleoptera)	~10.000	~ 3.000	-	-
Half-winged (Heteroptera)	~1400	~200	-	-
Aphids (Homoptera)	~1500	~200	-	-

Table 3. Taxon numbers of Species and Subspecies of various animal categories, endemism situation, number of rare and endangered species, extinct species

Endemic/endangered animal species

Many studies have been made and continue to be made on Turkish vertebrates. For this reason, healthy data are available concerning the endemism status of vertebrates, their danger classifications and the species placed under conservation. According to these data, 16 of the 141 reptile and amphibian species distributed in Turkey are endemic and 10 endangered. There are no endemic species of bird in Turkey. However, 5 mammal species and 32 sub-

species, 16 reptile species and subspecies, and 70 inland waters fish species and sub-species are endemic.

Some of the endemic and endangered reptile and amphibian species are the following:

• Terrestrial salamander (*Mertensiella luschani*),
• Spotted salamander (*Neurergus crocatus crocatus* and *N. strauchii barani)*),
• Little crested salamander (*Triturus vulgaris kosswiigi*),
• Band crested salamander (*Triturus vittatus cilicensis*),
• Red frog (*Bombina bombina arifi yensis*),
• Taurus frog (*Rana holtzi*),
• Rock lizard *(Lacerta saxicola),*
• Kayseri lizard *(Lacerta cappadocica),*
• Taurus lizard *(Lacerta danfordi anatolica),*
• Great green lizard *(Lacerta trilineata),*
• Caucasian viper *(Elaphe hohenackeri),*
• Small viper *(Vipera ursinii),*
• Striped viper *(Vipera pontica).*

Of the 460 identified bird species, although none of them endemic, 17 are endangered. Some of the endangered bird species are the following:

• Dalmatian pelican *(Pelecanus crispus),*
• White-fronted goose *(Anser albifrons),*
• Red-breasted goose *(Branta rufi collis),*
• Ferruginous duck *(Aythya nyroca),*
• White-headed duck *(Oxyura leucocephala),*
• Spotted eagle *(Aquila clanga),*
• Imperial eagle *(Aquila heliaca),*
• Lesser kestrel *(Falco naumanni),*
• Corncrake *(Crex crex),*
• Great bustard *(Otis tarda),*
• Slender-billed curlew *(Numenius tenuirostris).*

The bald ibis (*Geronticus eremita*) whose natural population is exhausted is under effective conservation. A great majority of the other bird species are included among the species requiring conservation. Of the 161 mammal species recorded in Turkey, 37 sub-species and/or varieties are endemic. 23 of these species are endangered and now under conservation. The gazelle (*Gazella subgutturosa*), the fallow deer (*Cervus dama*) and the wild sheep (*Ovis orientalis)*, naturally occurring in Turkey, may be mentioned among important species. In addition, the hyena (*Hyena hyena*) is thought to have become extinct over the last 20-30 years. It is known that the leopard (*Panthera pardus tulliana*), the Caspian tiger (*Panthera tigris virgata*) and the lion (*Panthera leo persica*) have also become extinct in Anatolia.

Among the sea fish, there are no endemic and endangered species, but 70 of the 236 species occurring in inland waters are endemic and 4 are extinct. Some of the endemic and endangered species occurring in inland waters are the following:

• Salton pupfish (*Aphanius asquamatus*)
• "gökçe" fish (*Alburnus akili*)

• Bleak (*Alburnus timarensis*)
• Barbel (*Barbus plebejus kosswiigi*)
• Siraz (*Capoeta antalyensis*)
• Gudgeon (*Gobio gobio insuyanus*)
• Chub (*Leuciscus kurui*)
• Salmon trout (*Salmo trutta abanticus*)

Although the Turkish invertebrate fauna is not as well known as the vertebrates, it is known that the total number of species may be around 60,000 to 80,000 although only some 30,000 of them have been identified. The rate of endemism is much higher among invertebrate animal groups.

A.1.2.4. GENETIC DIVERSITY

Plant genetic diversity is of great importance for both Turkish and world agriculture. Turkey has a very special position in terms of plant genetic resources. Of the centres of diversity and origin explained by Vavilov, the Mediterranean and Near Eastern Centres overlap in Turkey. According to J. Harlan, our country has 5 micro-gene centres where more than 100 species display a broad variation and is the origin or diversity centre of many important cultivated plants and other plant species.

Turkey is situated at the intersection of two important Vavilovian gene centres: Mediterranean and Near East. These two regions have a key role in the emergence of cereals and horticultural plants. Some of the cultivated plant species of Anatolian origin are the following: Linum sp., Allium sp., Hordeum sp., Triticum sp., Avena sp., Cicer sp., Lens sp., Pisum sp., Vitis sp., Amygladus sp., Prunus sp., Beta sp., etc. Turkey has five different “micro-gene centres”:

• Thracian-Aegean Region: Bread wheat, durum wheat, Poulard wheat, stick wheat, small red wheat, lentil, chickpea, melon, vetch, lupine and clover.

• Southern-Southeastern Anatolia: Double-grain wheat (Tritucum dicoccum), small red wheat, Aegilops speltoides, squash, watermelon, cucumber, bean, lentil, broad bean, vine and fodder plants.

• Samsun, Tokat, Amasya: Large number of fruit species and varieties, broad bean, bean, lentil and various leguminous crops used for animal feed.

• Kayseri and its vicinity: Almond, apple, pea, fruit species, vine, lentil, chickpea, lucerne (alfalfa) and sainfoin.

• Ağrı and its vicinity: Apple, apricot, cherry, sour cherry, leguminous fodder crops and water shrubs and maquis melon.

Turkey, situated where two different gene and diversity centres overlap, is the gene and origin centre of the following cultivated plants among others: Triticum, Hordeum, Secale, Avena, Linum, Allium, Cicer, Lens, Pisum, Medicago and Vicia. In Turkey, wheat (Triticum and Aegilops) has 25 wild relatives, barley (Hordeum) 8, rye (Secale) 5 and oat (Avena) 8. Turkey is also rich in wild relatives of edible grain legumes and fodder crops. Our country has 4

varieties of lentil (Lens), 10 of chickpea (Cicer), 104 of trefoil (Trifolium) of which 11 are endemic, 34 of lucerne (Medicago), 42 of sainfoin (Onobrychis), and 60 of vetch (Vicia) of which 6 are endemic (Açıkgöz et al. 1998). Turkey is also the micro-gene centre of the species Amygdalus spp., Cucumis melo, C. sativus, Cucurbita moshata, C. pepo, Malus spp., Pistachio spp., Prunus spp., Pyrus spp. and Vitis vinifera (Tan, 1998). Turkey is the home of many decorative plants including the tulip and the snowdrop.

Aware of the importance of agricultural plants, the Ministry of Food, Agriculture and Livestock grows many species and varieties of each such plant under the Seed Production and Distribution Programme. Field crops include wheat, barley, corn, chickpeas, lentils, dry beans, sunflowers, potatoes, soy beans, peanuts, sesame, tobacco, cotton and beet-roots, and fodder plants include sweet sorghum, rye, flat scots broom and spring grass. The programme covers more than 200 plant species. In addition, there are thousands of local varieties, ecotypes and transition forms raised by farmers out of their own resources.

The total number of cereal types developed through the use of local and imported breeds and recorded during the last thirty years in Turkey is 256, of which 95 are wheat types, 91 corn, 22 barley, 22 rice, 16 sweet sorghum, 11 oat and 2 rye. The National Seed Programme constantly raises new varieties and the number of cultivated species thus steadily increases, while field crops such as small red wheat (*Triticum monococcum*), double-grain wheat (*Triticum dicoccum*), bitter vetch and lupine are not used as much as in the past and consequently tend to disappear today.

Horticultural plants include about 50 genera which are cultivated and 100 varieties grown and distributed. Among them one may count tomatoes, peppers, aubergines, lettuce, cabbage, radish, onions, squash, cucumbers, melons, watermelons, beans, pumpkin, peas, spinach, carrots, broad beans, leeks, rocket, purslane, fennel, cauliflower, parsley, beans and gherkins. Considering the local varieties and the types obtained from other resources, it is estimated that the total number of varieties grown in the country reaches 200.

The richness of variety is also noticeable in fruit production. Of the fruit types estimated to number 138 in total, 80 are grown in Turkey. Among the fruit and nut varieties in Turkey, one may count apples, pears, quinces, cherries, sour cherries, apricots, peaches, figs, pomegranates, mulberries, almonds, hazelnuts, walnuts and pistachios. Viniculture holds an important place in our country's agriculture. Anatolia which hosts the wild vine (*Vitis silvestris*) is the gene centre of the grape vine (*Vitis vinifera*).

Turkey is also quite rich in gene resources, including the valuable gene resources of the Taurus cedar, the oriental spruce and the oriental beech together with 5 pine, 4 fir, 20 oak and 8 juniper species among the local forest trees of national and global importance. The important forest trees are as follows: Pine species (*Pinus brutia, P. nigra, P. sylvestris, P. halepensis and P.pinea*), fir species (*Abies nordmanniana subsp. nordmanniana, A. nordmanniana subsp. bornmulleriana, A. nordmanniana subsp. equitrojani, A. cilicica subsp. cilicica, A. cilicica subsp. isaurica*), the Taurus cedar (*Cedrus libani*), the beech (*Fagus orientalis*), the spruce (*Picea orientalis*), the linden tree (*Tilia spp.*), the alder (Alnus spp. 2 species, a total of 6 taxa), the juniper (Juniperus spp. 8 species), and the oak (Quercus, about 20 species).

Turkey is an agricultural country where plants and animals have been raised since ancient times. Our Southeastern Anatolia region, also called Northern Mesopotamia, is considered

one of the centres of cultivation where mankind first started sedentary agriculture. For this reason, it is considered that many local animal races were first bred here by past civilizations and spread to other regions of the world. Turkey has rich gene resources with 8 cattle, 18 sheep, 4 goat, 7 horse and 9 poultry races as can be seen in Table 4. The cross-breeding of local race farm animals with imported culture races has led to the danger of the loss of local gene resources. On the Black Sea coastal strip, almost all local cattle have been turned into the Jersey race. Nevertheless, only 25 % of the local races have been crossbred with culture races and 75 % maintain their purity. Again, the 'Kıvırcık' sheep of Thrace has been crossbred with the German 'Ots-Friz' race to develop the Tahirova race, causing the genetic erosion of both endemic species. Certain sheep varieties such as 'Karakul' which lives in the northern transition zone; and 'Tuj' which lives in the Kars region are faced with the danger of extinction. Another local animal race under threat is the Angora goat, which has been placed under protection to prevent its total extinction. There are not sufficient studies on the genetic diversity of aquatic species and invertebrates (especially insects).

DOMESTIC ANIMAL BREED	BREEDING REGION
CATTLE BREEDS	
Yerlikara	All regions except northeastern Anatolia and Thrace
Doğu kırmızısı	Eastern Anatolia to Ankara
Bozırk	Eskişehir, Kütahya
Kulak cattle	Çorum
Güney sarısı	South and Southeastern Anatolia
Kilis cattle	Gaziantep
Domestic buffalos	Afyon,Kütahya,Uşak,Denizli,Kayseri
SHEEP BREEDS	
Akkaraman	From Eskişehir to Hakkari
Morkaraman	Erzurum, Erzincan, Bingöl
Ulaş-Kangal karamanı	Sivas, Malatya,
Güney karamanı	South and Southeastern Anatolia
Karakaş sheep	Southeast, especially Diyarbakır
Ödemiş sheep	Izmir
Dağlıç	Bilecik, from Eskişehir to the Aegean
Ivesi	Southeast Anatolia
Herik sheep	Eastern Black Sea Region
Hemşin sheep	East of Black Sea Region
Tuj sheep	Kars
Wool sheep	Trakya, South Marmara
Karakaya sheep	Eastern Black Sea Region
Sakız sheep	Aegean Coasts
Imroz sheep	Çanakkale
Turkish Merino	Marmara
Central Anatolian Merino	Central Anatolia
Malya sheep	Central Anatolia
GOAT BREEDS	
Angora Goat	Ankara, Central Anatolia
Wool goat	At all regions
Kilis goat	Southern Anatolia
Akkeçi (1)	Central Anatolia
HORSE BREEDS	
Anatolian horse	Central Anatolia
Çukurova horse	South and Southeast
Domestic Arabian horse	Southeast
Uzunyayla horse	Kayseri, Sivas
Canik horse	Black Sea Region
Malakon horse	Kars
Arabian horse	Southeast
POULTRY	
Domestic breeds of fowl	At all regions
Denizli breed	Denizli and its locations
Gerze breed	Sinop
Çıplak boyun	Muğla
Zile breed	Sivas
Domestic breeds of turkey	Throughout the country
Domestic breeds of goose	Throughout the country
Domestic breeds of duck	Throughout the country
Angora rabbit	Throughout the country

Table 4. Local steppe animal races

Q2: What major changes have taken place in the status and trends of biodiversity in your country? Focus on changes that have occurred, or that have become known, since the fourth or last national report was prepared. The analysis or synthesis should provide a succinct overview of biodiversity status, trends and threats sufficient to inform decision-makers, rather than an exhaustive assessment of these issues. There is no need to repeat detailed descriptions of your country's biodiversity that were provided in the fourth or previous national reports. However, countries that have not presented a comprehensive analysis of the status and trends of biodiversity in their previous reports could do so in this report. Where possible, show changes in biodiversity or other trends over time and use quantitative indicators (with technical details of the indicators provided in an annex). Also draw upon expert qualitative assessments. Illustrate trends with charts, graphs, figures and tables. Where possible, analyse how actions taken (i.e., actions described in part II) have resulted in changes in biodiversity. Use case-studies to illustrate general points. The case-studies should demonstrate significant reductions in the loss of biodiversity (or a specific component) within a defined scale, and a clear rationale of how this is linked to the actions taken. The case will be most useful if it contains lessons that are more widely applicable.

A.2.MAJOR CHANGES

This data is being collected for the ongoing revision studies of NBSAP. Moreover a new project with a comprehensive inventory of Turkish biodiversity is being carried out since 2013 and will be finished in 2018. The project also provides developing new indicators and regional monitoring. It is the first project of Turkey with a systematic and comprehensive biodiversity monitoring component at national level.

Q3: What are the main threats to biodiversity? (Or, what are the main causes of the negative changes described in the answer to question two?). For the main biomes and/or components of biodiversity, describe the main direct drivers of biodiversity loss (pressures) and the main indirect drivers (underlying causes) and relate these to the relevant economic sectors. Be specific about the direct drivers (e.g., "dynamite fishing", "coastal development"), but also categorize them (habitat change, climate change, overexploitation, invasive species, pollution), with some detailed analysis.

A.3. MAIN THREATS

IMPORTANT NOTE: The information provided in this section is not updated, and is currently being updated within the framework of the NBSAP Revision Studies that have started in early 2014 and the "National Biodiversity Inventory and Monitoring Project" that started in 2013.Also there are ongoing sectoral integration studies carried out by GDNCNP which also provides new data on sectoral effects on biodiversity.

It is the responsibility of the MFWA and MEU and their affiliated organizations to formulate the policies concerning the conservation and sustainable use of the environment and biological diversity, to designate and manage protected areas under various statuses, to develop and implement plans and programmes, to carry out activities in this scope and to

ensure coordination among different institutions. These duties and responsibilities are performed through the central and provincial units of the mentioned Ministries and their affiliated organizations.

The Ministry's unit with primary authority and responsibility for the conservation and sustainable use of biological diversity is the General Directorate of Nature Conservation and National Parks, which is also the CBD focal point.

A.3.1 THREATS TO AGRICULTURAL AND STEPPES BIOLOGICAL DIVERSITY AND THEIR CAUSES

Farming enterprises in Turkey are small, fragmented and scattered. With negative results for agricultural production, this structure creates an advantage in terms of biological diversity as it provides small habitats for wild plant and animal species. On the other hand, the fact that farming areas are generally located in steppe ecosystems makes it difficult to distinguish agricultural biological diversity and steppe biological diversity from each other. For this reason, these two ecosystem structures have been considered together.

In Turkey, the most reduction and loss is in steppe ecosystems are on ecosystem basis. The major cause of this is that steppe areas mainly occur in flat plains, that they are proximate to settlement areas and that they are abandoned. Table 4.6 summarizes the threats to agricultural biological diversity and steppe ecosystems. While some of these threats arise out of internal factors connected with agricultural practices, the external factors that affect land and resource utilization cause some other to happen.

Meadow management: Turkey's meadows are considered a state property, but the government gives a right to meadow use to the farmers living in the region. However, the right to meadow utilization given to villagers has not come with the terms or rules of utilization. Overgrazing is a case because grazing starts with early spring grasses and does not end until cold weathers begin affecting the animals. Central Anatolian meadows must be grazed for maximum 6 months in a year; however, the grazing lasts for 9 to 10 months. Also, there are a high number of animals grazing the country's meadows. The decades-long-waited Pasture Law provides for arrangements and projects for the solution of the above problems. Of course, it is not expected to improve centuries-long negligence and losses in a very short period of time, however, the implementation projects which involve farmers may bring forth good prospects for the future.

Use of agricultural inputs: In Turkey, the Çukurova and Aegean regions are the two areas where pesticides are highly applied. Over- and insensible application of pesticides have adverse impacts on these two regions' flora and fauna. When pesticides are properly applied as tailored to the related method of application, it may be possible to avoid all adverse environmental impacts as well as take intended results from pesticide application. In today's methods of biological combat, integrated combat and ecological farming, the pesticides have long before left their places to the use of the above production technologies both in Turkey and in several countries in the world. However, even in those countries where the environmental awareness is very high and the most advanced farming technologies are used, the level of the use of methods excluding pesticide application is low. In Turkey, the fertilizer amount per unit area is not high, as in pesticides, compared to other countries. Over use of chemical fertilizers is not common today. However, Turkey might face soil and water

contamination problem in connection with the use of chemical fertilizers, a problem which threatens biological diversity. In particular, chemical fertilizers with nitrogen content, which shows a high washing rate, must be seen as a potential threat.

Irrigation: Only a half of Turkey's arable lands are irrigable. In addition, only a half of irrigable arable lands see irrigated farming. Even in some parts of Turkey's class I soils that offer the highest yield potential, fallow and non-fallow unirrigated farming takes place. Only a part of those soils, which offers the highest yield, is irrigated. On the first three classes of soils, unirrigated farming takes place with a high proportion, and therefore those soils don't give high yields. Out of Class IV soils, which are the most susceptible to erosion, on 4.5 million ha processed farming takes place. However, on 6.1 million ha from Class V to VII, which are not suitable for processed farming, the processed farming takes place. On more than half of those farmlands, fallow farming takes place, making soil surface susceptible to erosion. Yet, those marginal lands have low profile depthness, and therefore fallowing does not contribute much to annual water accumulation. On the other hand, since most of farms where irrigated farming is applied use the flood method, both the salinization and acidization of soil and drainage problems appear. Recently, efforts to make widespread dripping and sprinkling methods have been accelerated.

Erosion: Although there has been a moderate level of erosion in previous centuries in Turkey, it has become faster with wrong soil usage in the last five to six decades. 73% of Turkey's soils is affected by erosion to varying degrees. The soil will become more susceptible to erosion when the soil surface is deprived of vegetation and as the inclination increases, depending on the wind force and precipitation volume. 27.8 million ha of Turkey's soils have an inclination of 12% and below. 12% is recognized as the upper limit of inclination for use as a farmland, provided, however, that appropriate technical measures are taken to this effect. In Turkey, the areas with the above level of inclination are 35.7% of the entire soil surface. Since all the processed soils either as being farmed or planted have a surface area of around 28 million ha, most of farmlands are susceptible to erosion and are losing their yield efficiency. The main cause of the increase of yield at a slower pace despite the technical measures taken is the reduction of natural yield efficiency on the inclined soils. Productive soil layers erode with the loss of more than around 600 million tones soils every year due to the moderate erosion of 20% of soils (15.6 million ha), to the severe erosion of 36% of soils (20.3 million ha), and to the very severe erosion of 17% of soils (13.2 million ha) of Turkey.

Land usage: Turkey's steppes and pastures, so-called herbaceous vegetation cover, is around 21 million ha today. Considering 44,300,000ha and 37,800,000ha steppes and pastures cover of Turkey in 1935 and 1950, respectively, it can be clearly understood the degree of destruction in this ecosystem. The major cause of this reduction of steppes and pastures cover of the country is that the steppe areas mainly occur in flat plains, that they are proximate to settlement areas and that they are abandoned. Most of the steppe areas have been turned into farming lands and settlement areas in order to meet the food and accommodation needs of growing population.

A considerable part of the steppes and pastures cover which constitutes 28% of the country's surface area, has been degraded or become unproductive as a result of uncontrolled grazing, unplanned settlement development and industrialization.

Economic policies: Today, the global economic policy that is being tried to be exported to the remaining parts of the world by the industrialized countries pose progressive threats on

agricultural biological diversity. Countries are gradually pushed towards agricultural production systems which focus on single product variety and intensive production, and therefore both the local varieties disappear and the food security becomes at risk with the expansion of the mono-cultivation-based agriculture. For example, although there were more than 100 different varieties of apple and more than 600 different varieties of pear in Turkish bazaars 50 years ago, since the appealing races have become widespread, the original apple and pear races have almost been lost today. Modern races do not have the pleasant odour, aroma, taste and deliciousness of original races. Also, the former do not have the latter's genetic diversity that provide resistance to the environmental stress and diseases. That is to say, modern races have seen genetic degradation. Genetically Modified Organisms' (GMO) becoming widespread insensibly is another progressive threat of the global economic policy on biological diversity. GMOs bring along a risk of genetical pollution for especially the countries like Turkey which are a centre of genetic diversity and origin.

Threats to agricultural biological diversity	*Threats to steppe ecosystems*
• *The inappropriate usage of farmlands* • *Insensible irrigation and growing methods* • *The insensible use of agricultural inputs* • *The cross-breeding of local races with foreign ones* • *Deficiencies in land registry and cadastre areas*	• *The destroying effects of infrastructure and superstructure works* • *The over gathering of plants having an economical value* • *Wrong and insensible afforestation* • *Overgrazing*
Common threats to agricultural biological diversity and steppe ecosystems	
• *The adverse effects of global economic policies (mono-cultivation in agriculture, GMOs, etc.)* • *Unplanned and intensive urbanization* • *Unplanned and intensive industrialization* • *Soil erosion* • *Climate change* • *Bush fire* • *Wrong mining activities* • *The non-presence of a meadow rehabilitation and usage management and usage of meadows for farming purposes until '90s.*	

Table 5. Common threats to agricultural biological diversity and steppe ecosystems

Gaps and Needs

Having regard to Turkey's plant genetic diversity, the In-situ Conservation of Plant Genetic Diversity National Plan was adopted in 1998. The plan establishes legal, institutional and financial requirements for the in-situ conservation of the species that are important for agriculture, food, economy and culture (www.bcs.gov.tr). However, an effective system has not been developed for the in-situ conservation of agricultural genetic diversity due to gaps in the legislation and to insufficient infrastructure. There is a need for strengthening the infrastructure for ex-situ conservation.

Despite having rich agricultural genetic resources and other medical and aromatic plant genetic resources which offer a very important economical potential, Turkey can use the least of its current potential in improvement, cultivation and production due to insufficient financial resources and to gaps in the conservation programme. Another aspect of this is the lack of legal and institutional mechanisms that will reexport to Turkey the benefits the other countries gain from the Turkish genetic resources.

Most of the endemic plants with narrow occurrence in steppe ecosystems fall into Critically Endangered (CR) category. Also, as read from the Red Book of Turkey's Plants, the habitat of the most of extinct plants was steppes. However, there is a legislative gap regarding the

designation of conservation zone in steppe ecosystems. First of all, there is the need for the identification of the would-be zones of conservation from those which represent best each subhabitat based on the current studies on the steppe ecosystems with different sub-habitats, and for removing legal and institutional gaps for the design of management plants related to those zones. In addition to these studies, it should be identified how many of the species that have to be conserved on steppe ecosystems are under conservation and whether there is a need for new conservation areas, in the light of scientific data.

On the other hand, some cereals species have gradually become restricted to the narrow farming areas, and therefore they serve no more as a statistics input. Among these species are: the canary grass (Phalaris canariensis); the millet of Milo variety (Sorghum bicolor Moench); Sorghum saccharatum; Panicum miliaceum; and Seteria italica. For the future usage for special ecological and consumption purposes, the genetic resources of this and this kind of species must be protected.

The lack of comprehensive knowledge about the functions of agricultural ecosystems makes it difficult to achieve holistic conservation and sustainability objectives. For example, there are no sufficient biological studies on pollinators. In particular, there is little, if not at all, study showing the relationship between natural species and pollinators. Similarly, the studies on soil biota are insufficient.

The identification and diagnosis of the species specific to steppe ecosystems is a matter of specialization. There is a need to hire more technical staff members who are specialized at steppe ecosystems in the relevant institutions. Since these ecosystems bear importance in terms of genetic diversity, more importance must be attached to increasing the number of researchers of genetic resources and to the improvement of infrastructure and facilities for the research and conservation of genetic diversity.

A.3.2. THREATS TO FOREST AND MOUNTAIN BIOLOGICAL DIVERSITY AND THEIR CAUSES

Mountain ecosystems include wetland, forest and steppe ecosystems, and therefore any pressure on those ecosystems in turn becomes a threat to mountain ecosystems. In addition, the factors that cause the reduction of Turkey’s mountain biological diversity include:

• The excessive use of forests in mountain ecosystems without considering their bearing capacity both at ecosystem and species levels (hunting, grazing, lumbering, visitors, in-forest constructional activities, etc.);

• The impacts of atmospheric pollution and global climate change;

• Pressures arising from the dependency of communities living in and around forests on agricultural and forestry products (livestock, uncontrolled use, gaining farmlands and forest fires) and the insufficient number of income-generating programmes;

• Increasing construction due to tourism incentives, uplands tourism, the high number of visitors in the archaeological sites, and other tourism activities exceeding the bearing capacity;

• Alien species;

• The over gathering of plants having an economical value;

• Wrong mining activities;

• Wrong and insensible afforestation.

More than half of Turkey's forest ecosystems have been destroyed. The factors that cause the reduction of Turkey's forest ecosystems biological diversity include:

• The excessive use of forests without considering their bearing capacity both at ecosystem and species levels (hunting, grazing, lumbering, visitors, in-forest structures, etc.);

• The impacts of atmospheric pollution and global climate change;

• Pressures arising from the dependency of communities living in and around forests on agricultural and forestry products (livestock, uncontrolled use, gaining agricultural lands and forest fires) and the insufficient number of income-generating programmes;

• Increasing construction due to tourism incentives, uplands tourism, the high number of visitors in the archaeological sites, and other tourism activities exceeding the bearing capacity;

• Alien species;

• Taking forests out of the forest regime;

• The destroying of forests for gaining farmlands;

• Forest fires;

• Destruction by insects;

• The uncontrolled taking of flora and fauna samples.

The challenges against the mountain and forest biological diversity conservation include:

• Despite the presence of institutional, legal and other capabilities, the dependency of people living in and around forests on agricultural and forestry products (livestock, uncontrolled use, gaining farmlands, and forest fires) and the insufficient number of alternative income-generating programmes block the implementation of an effective conservation in many mountain and forest ecosystems.

• The lack of coordination between the MFWA and the MCT blocks the implementation of an effective conservation in forest and mountain ecosystems in the areas where an intensive tourism business takes places. Increasing construction in forest and mountain ecosystems, uplands tourism, the excessive number of visitors in the agricultural sites, and other tourism activities exceeding the bearing capacity can be counted among the issues on which coordination has failed.

• The lack of coordination between the MFWA and MFAL blocks the implementation of an effective conservation in the in-forest and mountain meadows.

• Both coordination and assistance between the MFWA and MFAL are needed for the gene resources of non-forest products, but are aromatic, medical and have another economic value in forest and mountain ecosystems.

Gaps and Needs

The main obstacles to the conservation and sustainable use of mountain and forest biological diversity can be the lack of sufficient coordination between institutions regarding biological diversity studies, the non-completion of inventory studies, the non-completion of the setting up of a national database and monitoring unit yet, the insufficient number of experts and technical staff in the relevant institutions, and the most important of all, the lack of resources. Although the ratio of conservation zones to the country's surface area has shown an increase in the recent years, this has not reached at the desired level, yet. The biological diversity inventory of conservation zones and of mountain ecosystems, which are many in numbers, has not been completed.

The relevant institutions do not allocate much from their budgets to biological diversity conservation activities, which vary from planning to programming.

There is a need to design administration and conservation plans that should be integrated with biological diversity conservation for mountain ecosystems and high-mountain steppe ecosystems.
The coordination among the relevant institutions is not at the desired level, and therefore tourism activities give damage to biological diversity, and the targets set for sustainable use, i.e. the protection of herbaceous and ligneous genetic resources and gaining them in economy, cannot be achieved.

The lack of technically qualified/specialized staff is one of the biggest constraints to the conservation programmes in Turkey. Governments' instable policy regarding personnel allocation shows itself in frequently displaced personnel, and therefore they cannot focus on a specific region or subject. The lack of qualified personnel for field studies in rural areas and conservation zones where high biological diversity is seen, in particular, is a common challenge for all the Ministries.

There is a need to make widespread the integration of the targets set for biological diversity conservation with forest management planning process and with administration plans, and to put to work similar practices in such a manner that these can be expanded to cover non-forestry products. Also, there is a need to provide technical training to plan executors.

A.3.3. THREATS TO INLAND WATERS BIOLOGICAL DIVERSITY AND THEIR CAUSES

The threats to inland waters biological diversity can be the occurrence of alien species, excessive or illegal fishing, pollution, the illegal hunting of birds, reptiles and their youngs or the gathering of their eggs, excessive grazing, the destruction of habitat, the uprooting of aquatic plants, the burning of reeds and uncontrolled cutting of them, secondary buildings,

sedimentation, pressure from tourism, and interventions with the water regime. The excessive use of inputs like fertilizers and pesticides to have better yield in agricultural products and both domestic and industrial wastewaters cause the contamination of inland waters, changes in food chain, and the degradation of water quality.

Fish and similar species released to inland waters for economic purposes either knowingly or unconsciously lead to irrecoverable changes in the natural inland waters biological diversity of the country. For example, the pike-perch species released to the Lakes Beyşehir and Eğirdir has caused the endemic Phoxinellus and P. Handlirschi species to become extinct.

Climate changes brought along with global warming with impacts felt more day by day and the resulting new practices that must be implemented in water sources utilization and management (e.g. the increased utilization of groundwater, increased utilization of inland waters resources as either drinking or irrigation water) will pose a stronger threat to the sustainability of many inland waters ecosystems.

Gaps and Needs

The main constraint to the conservation of inland waters biological diversity and its sustainable use is the population pressure which comes either directly or indirectly on water resources. The fact that water resources are invaluable for human beings in meeting fundamental needs as well as their main function in particular in agricultural, energy and industrial investments and the development process is a considerable challenge in striking a balance between conservation and utilization. Since Turkey is still a developing country and there exists a failure to integrate biological diversity issues with other sectors and to build a common understanding on this and the insufficient level of economic incentives, it becomes more difficult to strike such balance. There is a need to undertake a progressive modelling, by which the adverse changes in the ecosystem can be demonstrated, in wetlands investments which seek public benefit.

With regard to the improvement and implementation of conservation and sustainable use measures, the insufficient number of academic researches, the lack of experience and technology transfer, and the poor level of staff and technical facilities for monitoring and supervision are some major constraints. At the lakes and streams at high altitudes, the inventory studies have been limited, except for those on fish species. There is an urgent need to build a detailed inventory, accomplish quality and dedicated-to purpose bearing capacity identification works, and make mapping and gap analysis works, considering what purposes should be pursued for the future usage of Turkey's inland waters resources.

Although SHW's planning studies and practices suit to the "basin management approaches to inland waters ecosystems conservation and utilization planning", the criteria and indicators are still incomplete. The integrated land and discharge basin management approach should be made widespread.

A.3.4. THREATS TO COASTAL AND MARINE BIOLOGICAL DIVERSITY AND THEIR CAUSES

The threats to coastal and marine biological diversity can be listed as the entry of foreign species, over fishing, illegal fishing, pollution, the destruction of habitats, tourism activities, and interventions with the water regime.
The coastal sand-dunes are the ecosystems that have become sensitive and vulnerable to destruction, even at some parts have been destroyed, due to the pressures of human origin in Turkey, as in the other parts of the world. Because of coastal erosion caused by road construction works, afforestation, sand hauling, secondary buildings and tourism investments, currently only 30 (27%) of 110 coastal sand-dunes on the Mediterranean and Aegean coasts are relatively in good condition.

Since the calcareous algae and mollusks-larva terraces are found in coastal areas, they are affected from the activities of human-origin like pollution, riprapping for gaining beach, coastal constructions and erosion. Studies on the lithophyllum formations of the Mediterranean demonstrate that pollution can give harm to algae and therefore cause erosion. Following the eutrophication, the ulva of green algae cover the terrace surface and compete with each other and cause bioerosion and the resulting destruction of calcareous algae like lithophyllum, which are valuable formations.

The Black Sea ecosystem, which has been known to have had a rich biological diversity and fish potential, has become so degraded today due to a number of climatic factors as well as to the factors of human origin in the last 20 to 30 years. Major factors of this kind include: terrestrial pollution from the countries bordering both the Black Sea and the River Danube which has increased in the last twenty-five years; adverse changes in water budgets as a result of over fall in inland waters input flow due to interventions with the water regime; the invasive alien species and some non-nutrient organisms carried to the Black Sea from other seas by shipping business which then have become dominant in the ecosystem and changed the biological structure; over fishing with the rapid technological advancements in the fisheries sector and the resulting reduction of fish stocks. Among the above factors, the pollution poses the highest risk. Because the Black Sea has one of the biggest hydrogen sulphur (H_2S) reserves in the world, and the bacteria in the sea takes oxygen from sulphur ions instead of solved oxygen due to excessive euthrophication, there is the risk of degradation of the two-layer water body and of the passing of hydrogen sulphur at the bottom to the explosive phase and there resulting in an environmental disaster. Another significant threat comes from alien species. A total of 48 alien species were identified in the years between 1996 and 2005 in the Black Sea. Of those species, Mnemiopsis leidyi and Rapana thomasiana have the biggest adverse impact on anchovy stocks and mussel stocks, respectively. Organochlorine pollutants of PCB and DDT type have been found at the threshold levels on dolphin species. On the other hand, the sea mammals are under threat due to the pollution in the Black Sea and to by-catch. The endangered monk seal has almost completely been lost in the Black Sea as a result of genetic isolation and the destruction of its habitats.

The major threats to the Black Sea ecosystem, which is important, include the sea accidents in the Turkish Straits, pollution and alien species. The accidents in the Turkish Straits, where there is more intensive marine traffic than the other straits in the world, can be attributed for the great part to the navigational errors of vessels/tankers due to poor visibility and strong currents. For example, out of 50,000 vessels that passed through the Turkish Straits in 1999, 6,000 were oil tankers. With the marine traffic becoming more intensive constantly, an increase in the number of accidents, a higher environmental risk, and possibly higher numbers of alien species carried to the Black Sea in tankers' ballast waters should be expected.

In the Aegean and the Mediterranean, main pressure on the coastal and marine ecosystems comes from tourism and industrialization processes. The over pumping of water, pollution, the displacements of water flow directions, and natural threats like earthquake, settlement, abrupt flood can be counted among the major factors that cause the destruction of sea caves and the extinction of marine organisms.

Gaps and Needs

There are gaps at the legal and institutional levels in regard to the designation and management of marine conservation zones though some Special Environmental Conservation Zones, i.e. the Special Environmental Conservation Zones of Foça, Gökova, Datça-Bozburun, Köyceğiz-Dalyan, Patara, Kaş-Kekova, Belek, Göksu Delta, have been designated along the Turkey's shoreline. There is a need to designate more areas as Special Environmental Conservation Zone and marine conservation zone, e.g. underwater national parks, to devise management plans for those areas, and to designate strict conservation zones. Below is a summary of the gaps regarding the sustainable use of coastal and marine resources:

• The lack of political will and support (priority given to gaining economic benefit and to production increase in the use and development of fishing gears, fishing nets and fish finder, etc.);

• Biological diversity issues disintegrated with other sectors and the lack of common understanding (failure to take measures to minimize the adverse impacts of fishing practices on the fishery stocks in the marine and coastal ecosystems, etc.);

• Insufficient capacity to take action due to institutional weakness;

• The lack of financial, human and technical resources (being unable to use developments in fishing technology for a multi-dimensional sustainable use of fish resources, the non-presence of inventories of fishing technology and fishing gears, insufficient research works on the identification of fishery stocks and on sustainable fishery, insufficient technical capabilities for protection/control/monitoring, etc.);

• The Lack of benefit-sharing (the lack of cooperation with the international fishing and marine sciences committees, failure to stop the pollution of the Black Sea and the number of international attempts to protect biological diversity in the area being not at the desired level, etc.);

• Pressure from population (support to the alternative livelihoods of people being not at the desired level, over and unplanned constructional activities on the coasts, etc.).

Below is a summary of the needs for the sustainable use of coastal and marine resources:

• An inventory of marine and coastal flora and fauna should be built up to collect available information; any lacking information should be completed; and more resources should be allocated to maintaining inventory studies concerning marine and coastal biological diversity.

• Measures should be taken to ensure information exchange, cooperation and coordination between experts, laboratories and organizations; guides should be prepared; the participation

of those experts in the international studies should be ensured.

• Studies concerning the conservation of eelgrasses (Posidonia oceanica), which have a very important role for the marine organisms in the Mediterranean Sea and have a wide occurrence, should be maintained and both short- and long-term scientific monitoring methods should be developed for the other important species and plant categories.

• Information booklets and documents should be prepared for the executives, the related groups and public on the endangered species and the Specially Protected Areas, and people's awareness should be raised using visual media.

• Sea aquariums should be built in big coastal towns and in the ecologically-sensitive regions of Turkey in order to contribute to the training of wider communities and establishing a marine culture in the country.

• Effective methods for the identification and observation of alien species should be developed and implemented; regulations on the entry of alien species into the new ecosystems, in particular, should be reviewed and made agreeing to the international conventions; and strict controls should be exercised to prevent foreign invasive species from entering Turkey's waters both at the national and international levels.

• Measures should be taken to minimize the adverse impacts of fishing practices on the fishery stocks in the marine and coastal ecosystems; fishing control infrastructure, e.g. remote monitoring system, should be strengthened.

• An inventory of fishing technology and fishing gears should be built up, first at regional and then at the national levels.

• Research projects, which will establish a fishing structure that will not give any harm to the existing fishery stocks of the country and which will identify catch amounts on species and fishing gear bases should be designed in the shortest time possible, and such initiatives of project designing should be supported.

• Restocking by means of aquaculture of those species which were affected from over fishing pressure and saw a fall in their populations should be performed.

• Artificial reef application should be made widespread.

• With regard to aquaculture, off-shore cage culture should be supported with a view to protecting the environment.

• Regulatory actions should be taken to protect the sea caves of Turkey and conserve the organisms in those caves, and conservation and utilization models should be established.

A.3.5 CROSS-CUTTING ISSUES

A.3.5.1 ACCESS TO GENETIC RESOURCES AND BENEFIT-SHARING

Current Situation

Below is a list of the current regulations on the access to genetic resources and benefit-sharing in Turkey:

• Those foreign researchers who will do researches in Turkey are subject to the Requirements for those Foreigners or those applying on behalf of Foreigners and for Foreign Members of the Press who will Do Scientific Research and Examination and Shoot Film in Turkey, which were put into force by the Resolution of the Council of Ministers No. 8/12839 of 4 April 1988. By the Resolution of the Council of Ministers No. 2003/6270 of 6 October 2003 amending articles 2, 3 and 7 of the above-cited Resolution of the Council of Ministers, the authorization to issue research permits other than those concerning archeological excavations and surface researches was granted to the relevant authority. Therefore, the MFWA receives and finalizes any applications for research permits for living natural resources. The permits do not entail gathering materials and taking samples from the wild. Where a research entails gathering materials from the wild, there will arise a necessity for different regulations by different agencies depending on the categories of living things.

• For the research and gathering from the wild of the materials showing the qualities of plant genetic resources and of fauna and aquatic organisms genetic resources, the authority is granted to the MFAL pursuant to the Regulation on Gathering, Storage and Utilization of Plant Genetic Resources, which was entered into force upon its publication on the Official Journal No. 21316 of 15 August 1992, to the Regulation on the Protection of Fauna Gene Resources, which was entered into force upon its publication on the Official Journal No. 25145 of 21 June 2003, and lastly to the Fisheries Regulation, which was entered into force upon its publication on the Official Journal No. 22223 of 10 March 1995.

• The catching of hunting and wild animals and the gathering of their larvae from the wild (all the mammals, birds and reptiles specified by the MFWA, except for the animals which are hunted, protected and listed by the MFWA and the aquatic mammals) is prohibited pursuant to the Regulation on Procedures and Requirements for the Protection of Hunting and Wild Animals and their Habitats and combat with Pests (Article 10), which was entered into force upon its publication on the Official Journal No. 25976 of 24 December 2005. For the purposes of scientific research and training, the catching of hunting and wild animals and the gathering their larvae from the wild can be permitted in accordance with the relevant provisions of the above-cited regulation, provided, however, that the individuals to be caught and the larvae to be gathered do not have an adverse impact on the continuity of population in the natural occurrence of the species.

Being a member of the European network (EUFORGENE) for Forest Trees, Turkey fulfils its obligations concerning access to genetic resources with regard to the obtaining of agricultural plant genetic resources under the Agreement on Material Transfer. Turkey has very restricted access to other countries' genetic resources in agriculture and forestry sectors and this access is based on agreements on material transfer and therefore Turkey shares benefit with the resource-provider country.

Gaps

Since the sharing of benefits from genetic resources is directly related with taking measures to ensure the conformance of access countries to the Convention, the measures taken at the national level is not at the desired level. As a result, foreigners are engaged in genetic material transfer, which action is neither bound to a permit nor taken legally.

The non-presence of an effective international mechanism, involving sanctions against biological material smuggling, as well, the insufficient number of technical equipment, the use of which will facilitate to detect rapidly any biological materials at the customs gates, the failure to keep records of genetic resources and to monitor them due to technical incapabilities are some of the significant issues.

A.3.5.2 ALIEN SPECIES

Current Situation

The Agricultural Combat and Agricultural Quarantine Law 6968 of 15/05/1957 and Animal Health and Surveiallance Law 3285 of 08/05/1986 are the two important laws provide for border controls for both the health control and protection of living thing species entering/exiting Turkey. International quarantine and health certificate practices for biological material transfer are legal requirements and constitute one of the control mechanisms. Also, any gathering and transfer of living things are subject to the MFAL regulations.

A permit from the MFAL is required for selling, transport, catching in harvesting areas, gathering, handling at any plants, releasing into water of fish, their broodstocks, fry, larvae, juveniles and spawners, as well as aquatic plants in order to ensure the nationwide control of fisheries production in accordance with the Communiques on Commercial Marine and Inland waters Capture Fisheries Production, which are renewed every year under both the Fisheries Law and Fisheries Regulation. The Communiques on Marine and Inland waters Recreational (Sport) Fishing classify both ecologically-unfavourable inland waters fish and potential ecologically unfavourable inland waters fish and prohibits release of the fish of this class into rivers and lakes in an uncontrolled manner and without permission, use them as a live bait and the transportation of them from one place to another for the same purpose.

With a Draft Bill on the Amendment of the Fisheries Law, it is expected that the release of any alien species into water resources will be prohibited, unless this action is taken with the permission of the MFAL.

The Maritime Undersecretariat continues its efforts to prevent the carrying of alien species in ballast waters.

Gaps

In Turkey, only the main alien species that have newly and recently entered the country have been identified; however, no tracking of the past entries is in place currently. There is no system which will enable the monitoring of alien species entries into Turkey has been set up. The only species monitored is Caulerpa, a foreign alga species, and this takes place only at the local level.

The risks posed by the alien species on ecosystems, habitats and species have been identified for only some alien species. Section 4.4.1 provides details on the invasive alien species

entering the marine ecosystems. Some alien species, e.g. Caulerpa racemosa and Minemiopsis leidyi, have been a subject of some studies.

Turkey has established regional cooperation mechanisms concerning the invasive alien species, although these are small in number. However, Turkey could implement only a part of the guidelines on the alien species, which threaten ecosystems, habitats or species. For example, although national biological diversity strategies and action plans have been devised regarding the invasive alien species, these have not been integrated into the sectoral and cross-sectoral policies since the designation of the coordinating institutions is at an early stage. Turkey should develop ways and means to establish cooperation with the neighbouring countries in order to determine the threats of the invasive alien species on biological diversity in the transboundary ecosystems.

A sufficient capacity should be built to enable the making of a risk assessment and analysis on the threats to biological diversity by the invasive alien species, and integrating the related methodologies into the Environmental Impact Assessment (EIA) and Strategic Impact Assessment (SIA).

A.3.5.3 INCENTIVES

Current Situation

There are no special incentive programmes for the conservation and sustainable use of biological diversity. However, the SPO's Development Plans and Annual Programmes establish measures and policies which in a way work as incentives for the conservation and sustainable use of biological diversity. In addition, the Undersecretariat of Treasury establishes and implements incentives for the prevention of the environmental pollution based on Article 29 of the Environmental Law upon the recommendation from the Ministry.

Gaps

The lack of financial, human and technical resources as well as of economic incentives and policies and legislation dedicated to purpose is identified as constraints to and gaps for the implementation of incentives for biological diversity conservation and sustainable use. Some incentives put to work in the other sectors can have adverse impacts on biological diversity. For example, despite the known adverse impacts of the Tourism Incentives Law on biological diversity and in particular on the coastal ecosystems, a full coherence of the development policy with the conservation policy could not be achieved since the tourism is a sector open to development. However, the Special Environmental Conservation Zones of Belek, İztuzu and Ihlara are good examples to that coherence (between tourism and environmental conservation).

The local administrations need funding to be able to effectively implement sustainable tourism activities with the cooperation of voluntary organizations.

A.3.5.4 MONITORING AND INDICATORS

Current Situation

The conservation zones (6%) in the entire country are monitored at the ecosystem level. The regular monitoring of the species listed in the Hunting and Fisheries Laws is in place at the species level. A national monitoring unit has been established in the MFWA to perform monitoring at both the species and ecosystem levels, and it is currently gaining effect.

The MFWA conducts controls and investigations at the local level under the Regulation on the Environmental Impact Assessment and monitors any activities that may have adverse impacts on the environment and takes measures to remove the impacts to the greatest extent possible. Also, any activities that may have adverse impacts on the monk seals and sea turtles (sand hauling from the sea, fishing, industrial wastes, etc.) are followed up under the monitoring programmes implemented for the two species, which are endangered.

Climate change is monitored by means of meteorological data and air quality parameters.

Pollution/euthrophication is monitored by means of regular controls by local authorities.

Land changes and degradation throughout the country are monitored via a Central Remote Monitoring System (GIS).

The Turkey's Plants Data Service of TÜBİTAK (www.tubitak.gov.tr/tubives) has established coordination in part in data collection and management concerning plants. The Turkey Biological diversity Information System Project, TUBIOS, was initiated in 2003 to improve the system in such a way as to fully cover biological diversity with all aspects.

Gaps

There are difficulties in standardized and systematized data collection and management. The data in various institutions and non-governmental organizations which have been prepared for different purposes should be transferred to national databases. The lack of coordination and cooperation is observed among national databases which are important for the updating of and benefiting from biological diversity data.

The lack of accessible available information, the poor level of the available scientific and traditional information use, the lack of financial, human and technical resources, and the lack of commitments from the academic circle are challenges to developing indicators and implementing a systematized monitoring programme.

A.3.5.5 ENVIRONMENTAL IMPACT ASSESSMENT

Current Situation

The EIA Regulation has been issued based on the related article of the Environmental Law and is currently being implemented, going through regular revisions to adapt to current conditions. The factors causing a reduction in biological diversity are dealt with in the sectoral investments and measures regarding those factors are motivated under the EIA Regulation.

The Annex to the Regulation classify EIA requiring activities as the Projects for which an EIA will be implemented and the Projects for which Selection and Elimination Criteria will be implemented. The activities under the first group of projects are evaluated by the MFWA

central administration, while those under the second group of projects are evaluated by the local administrations of the MFWA.

Gaps

The activities are evaluated on case basis since the biological diversity data at the genetic diversity level, in particular, is not sufficient in Turkey. Strategical evaluation is restricted and can only be made in certain situations based on the complaints raised either at the meetings aiming at ensuring public involvement in the EIA process or communicated to the local administration. New regulations are needed for a comprehensive SIA.

The environment-related issues do not receive much attention during the decision-making process due to the priority development issues, economic constraints, and increasing need for resource and investments in connection with the rapid population growth. Although sustainable use understanding tends to become widespread in the sectoral applications, there are practical difficulties arising from development needs. The lack of awareness concerning biodiversity loss, together with the loss of benefits from it, and the failure to document the loss also is a challenge to application.

A.3.5.6 LIABILITY AND REDRESS

Current Situation

Article 28 of the Environmental Law 2872 brings forth an approach, which envisages that the private or legal person giving damage to the environment should be held responsible with no negligence proviso. Further, the liability to recompensing the losses occurred by those giving damage to the environment is reserved in accordance with general provisions under the cited article.

Considering the conservation of biological diversity and the ecosystems having biological diversity as specified in article 6 of the Law 5491 of 24/04/2006 amending the Environmental Law within the framework of revision to the latter, article 14 of the cited law establishes administrative penalties regarding damages to biological diversity.

Further, regulations on special issues bring forth sanctions regarding liability and compensation, in support of biological diversity conservation and sustainable use. The Hunting Law (4915-01/07/2003) and Fisheries Law (1380-04/04/1971), both laying down the sanctions to be imposed in the event of any breaches of hunting and fishing bans; the National Parks Law (2873-09/08/1983) and Law on the Protection of Cultural and Natural Assets (2863-23/07/1983), both laying down the sanctions to be imposed in the event of any breaches of regulations and bans in conservation zones; the Forest Law (6831-31/08/1956), laying down the sanctions to be imposed in the event of forest damage; the Coastal Law (3621/3830-04/04/1990), laying down the sanctions to be imposed in the event of any breaches of coastal regulations; and the Law on Soil Protection and Land Use (5403-03/07/2005), laying down the sanctions to be imposed in the event of farmlands use out of purpose are all examples to the above.

Gaps

Since currently it is not known to what degree damage is given to biological diversity, the punitive sanctions provided for by the Law cannot be implemented fully. There is a need for the specialized lawyers at this area.

A.3.5.7 EDUCATION AND AWARENESS-RAISING

Current Situation
The MFWA and the Ministry of National Education conduct regular training and awareness-raising activities. A national strategy which urges public awareness-raising and involvement under the Biological diversity and Resource Management, a GEF-fi nanced project, has been developed. This is followed by a strategy and action plan which urges capacity building of NGOs concerning biological diversity under the same project. The national biological diversity website has been constructed both in English and Turkish. On the other hand, NGOs from the environmental sector play a significant role in public-awareness raising and enhancing their sensitivity.

Gaps
There is a need for more financial resources and a better coordination mechanism between institutions for an effective implementation.

A.3.5.8 TECHNOLOGY TRANSFER

Current Situation
Turkey opens its available technology to the developing countries' access through either bilateral and regional agreements or joint programmes. However, Turkey needs technology transfer in regard to clean and environment-sensitive technologies, in particular.

Gaps
Turkey cannot make use of technology transfers which will support either directly or indirectly biological diversity conservation and sustainable use because of the fact that the other countries do not take actions that facilitate technology transfer, that no access is made to the technologies owned by the private sector, and that no technology transfer is in place to support research and development fitting to the country's needs.

Q4: What are the impacts of the changes in biodiversity for ecosystem services and the socio-economic and cultural implications of these impacts? Describe the impacts of declining biodiversity and ecosystems on human well-being, livelihoods, poverty reduction, etc. Consider all relevant and significant ecosystem goods and services.

Optional question: What are possible future changes for biodiversity and their impacts? Describe plausible future scenarios for biodiversity in terms of underlying causes, pressures, impacts on biodiversity and implications for human well-being. For example, compare what might happen under "business as usual" policies with what might happen with greater investment in biodiversity and ecosystems. Such scenarios may be simple "what if?"

narratives, or based on models if such models are available. Any presentation of future scenarios should describe scientific uncertainties.

A.4. IMPACTS OF CHANGES

The aforementioned monitoring studies newly established will produce results related to this question.

PART II: THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN, ITS IMPLEMENTATION, AND THE MAINSTREAMING OF BIODIVERSITY

Q5: What are the biodiversity targets set by your country? Describe the measurable targets (for example, for 2020) that have been developed in line with the Aichi Biodiversity Targets of the Strategic Plan for Biodiversity 2011-2020. Please provide further updates on the targets if your country has submitted a report to the eleventh meeting of the Conference of the Parties.

A.5.TARGETS

This issue is currently under discussion in the revision study of NBSAP as per COP decision IX/8 and new targets are being established. However as for now, the revised NBSAP is an early draft.

The existing targets are given below.

Table 6. Goals and Objectives of NBSAP

GOALS	OBJECTIVES
1. To identify, protect and monitor biological diversity components which have importance for Turkey	**1.1.** In order to determine and monitor any changes in ecosystems, species and genetic diversity, to develop and implement biological diversity inventory and monitoring methods and programmes, by considering rapid assessment methods and biological diversity indicators, as well **1.2.** To include the less-represented ecosystems, species and genetic diversity centres into protected areas of both terrestrial and aquatic ecosystems, and to achieve an effective protected area management **1.3.** To prevent or minimize as far as possible any pressures on and threats to biological diversity
2. To use biological diversity components in a sustainable manner by applying the methods and at a level fi tting to their renewal capacity by taking the future	**2.1.** To establish harmony among legal, administrative and institutional regulations and applications having relevance to the conservation of biological diversity and

generations' needs into account	sustainable use of its components **2.2.** To develop and put into practice the ecosystem-based planning and management systems for the purposes of the biological diversity conservation and the sustainable use of biological resources **2.3.** To raise public awareness and sensitivity concerning the conservation and sustainable use of biological diversity
3. To identify, protect and benefit the components of genetic diversity, including the traditional knowledge, which have importance for Turkey	**3.1** To identify, record, protect and manage the components of genetic diversity which have importance in terms of biological diversity, agriculture, food and economic value **3.2** To control access to genetic resources and guarantee the sharing of the benefi ts arising out of the utilization of these resources with Turkey
4. To identify, protect and monitor the components of biological diversity which have importance for agricultural biological diversity; to protect genetic resources which have actual and potential values for food and agriculture, and to ensure the sustainable use of such resources; and to ensure the fair and equitable sharing of the benefits arising out of the utilization of genetic resources	**4.1** To identify, protect and monitor the biological diversity elements which have importance for agricultural biological diversity **4.2** To develop management applications and technologies as well as policies which support the positive impacts of agriculture on biological diversity, on one hand, and minimize its adverse impacts, on the other hand, and to increase yield from agricultural ecosystems and its capability to sustain as a source of livelihood **4.3.** To prevent or minimize as far as possible any pressures on and threats to agricultural biological diversity which come from the genetically modified organisms (GMO's) and the alien species **4.4.** To ensure conservation and sustainable use of genetic resources which have actual and potential values for food and agriculture; and to ensure the fair and equitable sharing of the benefits from the utilization of genetic resources
5. To protect steppe biological diversity, to ensure the sustainable use of its components, as well as to ensure the fair and equitable sharing of the benefits from the utilization of genetic resources; and to combat against the loss of steppe biological diversity and the socioeconomic results of that}	**5.2.** To identify ecological, physical and social processes such as grazing, drought, desertification, aridity, salinity, flood, fires, tourism, agricultural transformation or abandonment which have adverse impacts on the biological diversity of steppe ecosystems and mainly on the ecosystem structure and function, and to take measures regarding the above

	5.3. To establish mechanisms and frameworks in order to support the fair and equitable sharing of the benefi ts from the utilization of the genetic resources of steppe areas
6. To establish an effective monitoring, management and coordination system for the conservation of forest biological diversity and the sustainable use of its components	**6.1.** To develop and put into practice the monitoring programmes for better evaluation of the status and tendency of forest biological diversity **6.2.** To establish appropriate mechanisms for more effective conservation and sustainable use of forest biological diversity
7. To establish an effective monitoring, management and coordination system for the conservation and sustainable use of mountain biological diversity, together with its different ecosystems, pursuing a holistic approach	**7.1.** To effectively implement biological and ecological inventories, monitoring programmes and classification systems **7.2.** To establish appropriate mechanisms for the conservation and sustainable use of sensitive mountain ecosystems
8. To develop and implement effective methods for the conservation of inland waters biological diversity, the maintenance of ecological functions of inland waters ecosystems, and the sustainable use of these ecosystems	**8.1.** To strength technical and institutional capacity for the conservation and sustainable use of inland waters biological diversity **8.2.** To take actions for the conservation and sustainability of inland waters biological diversity and reduce threats to it
9. To develop and implement effective methods for the conservation of coastal and marine biological diversity, the maintenance of ecological functions provided by coastal and marine ecosystems, and the sustainable use of these ecosystems	**9.1.** To strengthen necessary administrative, legal, institutional and technical capacity for the identification, monitoring, conservation and sustainable use of coastal and marine biological diversity **9.2.** To fill the information gaps concerning coastal and marine biological diversity, to identify and put under conservation the areas and species which have importance for biological diversity and are under threat, and to develop and implement monitoring programmes **9.3.** To combat against the threats to coastal and marine biological diversity
10. To establish a mechanism for the implementation of the Biological Diversity Strategy and Action Plan and the follow-up of implementation and reporting	**10.1.** To establish coordination among the relevant institutions as regards the conservation and sustainable use of biological diversity **10.2.** To achieve the integrity and sustainability of financial structure for the identification, conservation and sustainable use of biological diversity

Q6: How has your national biodiversity strategy and action plan been updated to incorporate these targets and to serve as an effective instrument to mainstream biodiversity? Provide a brief description of your national biodiversity strategy and action plan. If the national biodiversity strategy and action plan has been updated, how does it differ from the previous national biodiversity strategy and action plan? Describe: (i) how the actions contained therein will achieve the targets outlined in the answer to question five; (ii) how it will contribute to the achievement of Strategic Plan for Biodiversity 2011-2020; (iii) how it will address the threats to biodiversity identified in the answer to question three; and (iv) how it addresses the guidance provided in decision IX/8. Describe in particular how the biodiversity strategy and action plan will achieve the integration of biodiversity considerations into broader national plans, programmes and policies, economic and social sectors and levels of government.

A.6. NBSAP UPDATE

The updating study of NBSAP is being continued by MFWA as per COP decision IX/8.

Q7: What actions has your country taken to implement the Convention since the fourth report and what have been the outcomes of these actions? Describe relevant legislation, policies, institutional and cooperative mechanisms, and funding. Where relevant, link these actions to outcomes in terms of the status and trends of biodiversity and implications for human well-being. Use case studies and, as appropriate, cross-reference to the answer to question two. Indicate how the actions relate to the various programmes of work and cross-cutting issues of the Convention (with details provided in appendix III), particularly those selected in the multi-year programme of work of the Conference of the Parties for in-depth review at the eleventh and twelfth meetings of the Conference of the Parties to the Convention. Highlight any obstacles to implementation (including lack of capacity, human and financial resources). Note that if your biodiversity strategy and action plan has been recently updated, most of the actions reported may relate to the previous version.

A.7.1. NEW LEGISLATIVE ACTIONS TAKEN FOR IMPLEMENTATION OF CBD

A new institutional structure under GDNCNP is established. The previous “Division of Biodiversity and Genetic Resources” is transformed into “Department of Biodiversity” with the following 5 divisions:

1. Division of Research

2. Division of Inventory

3. Division of Monitoring

4. Division of Biotechnology

5. Division of Information Systems

Furthermore, an online research application system and its relevant legislation are being developed for native and foreign biodiversity research applications.

A.7.2. NEW PROJECTS FOR IMPLEMENTATION OF CBD

Table 7 Recent Projects for Implementation of CBD

NAME OF THE PROJECT	ADDRESSED CBD ISSUE (Keywords)	CARRIED OUT BY
Training of Interest Groups and Guideline Preparation for Integration of Nature Conservation Into Economical System	Strategic Plan for Biodiversity 2011-2020 (Aichi Targets Goal A), 2015 Targets of Millennium Development Goals, Mainstreaming Biodiversity, Sustainable Use of Biodiversity, Incentive Measures	MFWA
The Combating Biopiracy Project (2013-2015)	Biotechnology, Combat to Biopiracy, Aichi Targets Goal C and Goal D	MFWA
National Biodiversity Inventory and Monitoring Project	Inventory, Monitoring, Clearing House Mechanism	MFWA
Project for Determination of Plant Species to be Submerged Under The Dam Reservoir	Conservation	MFWA
National Park, Wetland, Wildlife, Hunting Projects	Protected Areas, Sustainable Use of Biodiversity	MFWA
Many Water Projects	Ecosystem Approach, Basin Management, Biological Monitoring	MFWA
Many Basin and Landscape projects	Ecosystem Approach, Basin Management, Landscape Approach	MFWA, MFAL, MEU

Q8: How effectively has biodiversity been mainstreamed into relevant sectoral and cross-sectoral strategies, plans and programmes? Describe how biodiversity is reflected in poverty reduction strategies and other key cross-cutting policy instruments, and into the various economic sectors (which sectors (and ministries) integrate biodiversity well and which do not?). Describe also how biodiversity is integrated into planning mechanisms. Describe actions taken and outcomes achieved by each sector to implement biodiversity actions

included in their respective strategies, plans and programmes. Which tools are used (e.g., ecosystem approach, biodiversity-inclusive environmental impact assessment and strategic environmental assessment, spatial planning, etc.)? Describe also how synergies are achieved at the national level in the implementation of the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change (UNFCCC) the United Nations Convention to Combat Desertification (UNCCD) and other relevant conventions. Describe also how biodiversity is considered in international and/or transboundary cooperation, including South-South cooperation.

A.8. MAINSTREAMING BIODIVERSITY

Other than the previously reported studies on the mainstreaming of biodiversity into relevant sectoral and cross-sectoral strategies, plans and programmes in the classical sectors based on natural resources, a new project with the title “Ecological Economy Action Plan” is prepared and will be carried out between 2015 and 2017.

A new national synergy study is planned.

A project on “Climate Change and Biodiversity” is prepared; a possible GEF support is being waited before operationalisation.

Q9. How fully has your national biodiversity strategy and action plan been implemented? Analyse the extent to which the national biodiversity strategy and action plan has been implemented. For example, what proportion of the planned activities has been carried out and to what extent have the objectives been met. Identify the remaining challenges for implementation. (Note that if your national biodiversity strategy and action plan has been recently updated, this analysis will relate primarily to the previous version of the national biodiversity strategy and action plan).

A.9. NBSAP IMPLEMENTATION

This issue is being heavily reviewed in the aforementioned studies on NBSAP Revision.

PART III: PROGRESS TOWARDS THE 2020 AICHI BIODIVERSITY TARGETS AND CONTRIBUTIONS TO THE RELEVANT 2015 TARGETS OF THE MILLENNIUM DEVELOPMENT GOALS

Important note: The answers to Question 10 and 11 should be handled together.

Q10: What progress has been made by your country towards the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets? Drawing upon information in parts I and II, analyse the progress towards each of the 2020 targets of the

Strategic Plan for Biodiversity 2011-2020, as well as towards the overall mission of the Plan. Also indicate progress towards the national targets referred to in the answer to question five (i.e., national actions taken to achieve each target and outcomes achieved). Where possible, use quantitative indicators including the application, as appropriate, of global headline indicators contained in decision VIII/15, as well as additional indicators for measuring progress towards the Aichi Biodiversity Targets that may be adopted at the eleventh meeting of the Conference of the Parties. Technical details of the indicators may provided in an appendix. Also draw upon expert qualitative assessments. You may wish to use a simple "traffic-light" scheme or similar illustrative tool to give an overall assessment of progress.

A.10. PROGRESS FOR 2020 TARGETS OF THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020

1. NBSAP is being revised.

2. Projects are carried out (Table 7). Practically all new projects of MFWA are serving the Strategic Plan for Biodiversity 2011-2020 and 2015 Targets of Millennium Development Goals. However it is a fact that this is not based on a systematic approach built upon a national strategy, which is a case that is possible only after the revision of NBSAP is finished.

Furthermore, Turkey has a genuine approach to measurement of success of some parameters of the 2020 targets of the Strategic Plan for Biodiversity 2011-2020. Some graphic examples are given in the following section (Section A11).

Q11: What has been the contribution of actions to implement the Convention towards the achievement of the relevant 2015 targets of the Millennium Development Goals in your country? In order to highlight the importance of biodiversity for achieving broader national objectives, and drawing upon, as appropriate, information in parts I and II, analyse how the actions taken to implement the Convention, particularly the implementation of the 2015 milestones and Aichi Biodiversity Targets of the Strategic Plan for Biodiversity 2011-2020, have contributed or are contributing to the achievement of relevant 2015 targets of the Millennium Development Goals, as well as to the Millennium Development Goals overall.

A.11. PROGRESS FOR 2015 TARGETS OF MILLENNIUM DEVELOPMENT GOALS

As mentioned in the answer of the previous question, practically all new projects of MFWA are serving the Strategic Plan for Biodiversity 2011-2020 and 2015 Targets of Millennium Development Goals. However it is a fact that this is not based on a systematic approach built upon a national strategy, which is a case that is possible only after the revision of NBSAP is finished.

One of the direct intentions of the aforementioned project "Training of Interest Groups and Guideline Preparation for Integration of Nature Conservation Into Economical System" is to serve the Millennium Development Goals, however with a unique methodology. Some relevant graphic results are given below:

Q12: What lessons have been learned from the implementation of the Convention in your country? Provide an analysis of lessons learned from implementation, highlighting examples of successful and less successful actions taken, including remaining challenges. Also provide suggestions for actions that need to be taken at the national, regional and global levels to further enhance implementation of the Convention at the national level and, in particular, to achieve the strategic goals and targets of the Strategic Plan for Biodiversity 2011-2020.

A.12.1. LESSONS LEARNED

One of the most important outputs of World Sustainable Development Summits[2] is that there is a varying degree of the lack of organized and coordinated management in countries, which is an underlying cause of global failure in establishing sustainable development. And Turkey is not an exception. Turkey should definitely revise NBSAP as per COP decision IX/8 and identify clear responsibilities for each relevant institution and organization.

A.12.2.SUGGESTIONS FOR GLOBAL IMPLEMENTATION

Quantitative measurement and enhancement of economical feasibility and social feasibility of biodiversity conservation should be globally discussed.

There should be a more concrete link between IPBES and CBD.

Annexes and appendices

1. Use annexes and appendices to provide detailed or supporting information that is not necessary in the main report. Annexes and appendices may be bound separately to limit the size of the main report. Suggested appendices are listed here:

Appendix I - Information concerning the reporting Party and preparation of the fifth national report. Please provide information on the process used to prepare this report, including information on stakeholders involved and material used as a basis for the report.

Appendix II - Further sources of information. Parties should provide sources of information on national implementation, such as website addresses, publications, databases and national reports submitted to other related conventions, forums and organizations.

Appendix III - National implementation of the thematic programmes of work and plans under the Convention on Biological Diversity or decisions of the Conference of the Parties related to cross-cutting issues. **Parties could use a table or matrix[3] to highlight how national actions taken to implement the national biodiversity strategy and action plan, activities related to mainstreaming and the Aichi Biodiversity Targets have contributed or are**

[2] Notably Johannesburg 2002, Decision 12

[3] The table or matrix will be developed and provided to Parties in the reference manual for the fifth national report referred to in paragraph 6 above.

contributing to goals, targets and activities suggested in the thematic programmes of work and plans or decisions related to cross-cutting issues, particularly those selected in the post-2010 multi-year programme of work of the Convention for in-depth review at the eleventh and twelfth meetings of the Conference of the Parties. Parties could focus on those thematic areas and cross-cutting issues that are nationally-relevant and important.

ANNEX I: PROTECTED AREA STATISTICS

Ministry of Forestry and Water Affairs **Protected Areas**	**Number**	**Area (ha)**
National Parks	40	848.202,57
Nature Parks	192	90.218,30
Nature Conservation Areas	31	64.242,95
Nature Monuments	112	6.683,72
Wildlife Conservation Areas	80	1.191.340,22
Wetlands (Internationally Important)	135	3.215.500,10
Protection Forests	55	320.450,54
Honey Forests	200	24.861,11
City Forests	128	11.721,93
Gene Conservation Forests (in-situ)	257	47.977,77
Seed Stands (in-situ)	351	47.062,81
Seed Orchard (ex-situ)	179	1.413,75
TOTAL OVERLAPPING	**1760**	**5.373.162,20**
Ministry of Environment and Urbanization Protected Areas	**Number**	**Area (ha)**
Special Environmental Protection Areas	16	2.459.116,06
Natural Sites	1273	1.322.748,90
GENERAL TOTAL OVERLAPPING	**3049**	**7.883.551,072**

Reference:

Finike Submarine Mountains **(1.124.173 ha**) declared as Special Environmental Protection Area.

For 2013 while the total protected areas has been calculated as **9.651.540,73** ha, it has been calculated **7.883.551,072** ha in overlapping

areas by the Republic of Turkey The Ministry of Forestry and Water Affairs , Department of Information Technology

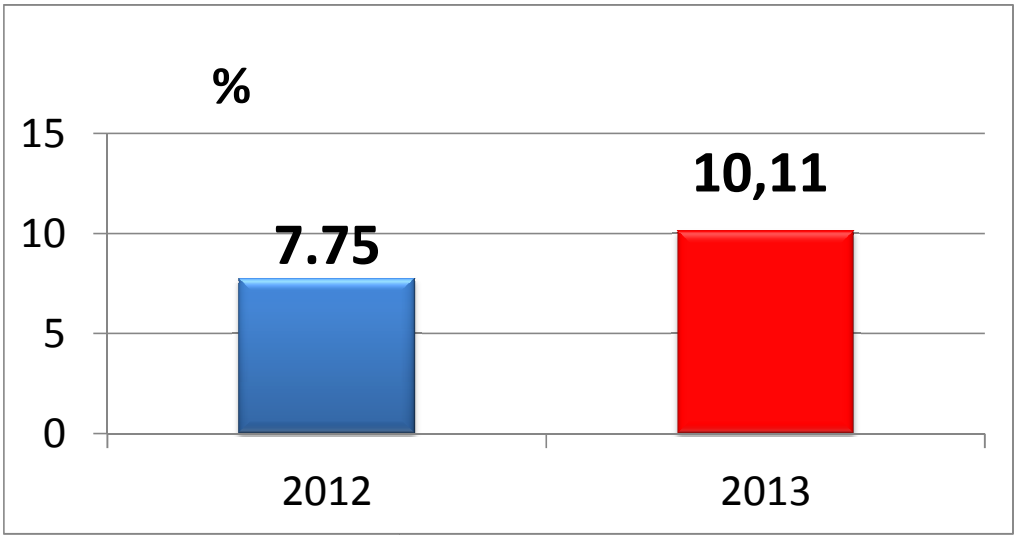
Size of protected areas are expressed for both land and marine.

Number and size of Protected Areas are given by Republic of Turkey The Ministry of Forestry and Water Affairs ,

Department of Information Technology

PERCENTAGE AND SIZE OF PROTECTED AREAS ON LAND AND MARINE

2012	2013
6.045.015,08 ha	**7.883.551,072** ha
%7,75	**%10,11**



Reference:
Republic of Turkey The Ministry of Forestry and Water Affairs , Department of Information Technology